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THE BRITISH JOURNAL OF PHOTOGRAPHY.

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THE REPRODUCTION OF NEGATIVES BY MEANS OF GELATINE PLATES.

With regard to the production of the duplicate negative, little remains to be said beyond what we have already stated a fortnight ago in connection with the intermediate positive—so far, at least, as the actual manipulations are concerned. If, as we recommend, a positive by superposition be first made, and the second negative is to be enlarged or reduced from the original, some optical means of effecting the purpose will, of course, be necessary; but with this part of the process we have nothing to do in this article. The operations of exposure and development will be the same as those detailed in the previous article, namely, full exposure with a rapid development suddenly checked at a certain point from intensification is proceeded with slowly.

In the matter of "dodging" or improving the original negative there are several ways of proceeding which, as they apply equally to the treatment of the positive and the reproduction, may be described here. Supposing that all has been done that is possible by judicious development, it may still happen that local treatment affords a means of further improving the gradations of either positive or negative. The general treatment during development answers perfectly with a negative that is merely too uniformly dense or the reverse; but in cases where there exists a want of contrast or an excess it will frequently happen that local treatment will be necessary in order to secure the best result, and this may be applied either to the transparency or the negative, or to both.

Take the instance of a negative in which the distance being well lighted is fully over-exposed, and, in consequence of forcing the less exposed foreground, has become too dense to print properly without masking the negative. Now, masking portions of a negative when printing upon albumenised paper is a comparatively easy operation, as the effect can be watched as the operation proceeds, and the means altered or modified from time to time to suit circumstances. But when it comes to the production of a picture by development (be it on carbon tissue or a gelatino-bromide plate) it is absolutely needful that the remedial means be perfect—a result that can only be obtained by pure accident or after repeated experimental trials. Hence the plan of masking becomes a somewhat troublesome, if not hazardous, one in connection with developed work.

But, without any masking, if it be found that the foreground of the transparency made from such a negative as that described above has become too heavy by the time the details in the distance have made their appearance, it is possible, by careful local application of a reducing solution to greatly modify the character of the image. While bearing this in mind, it should always be observed that the finer details—that is, the high lights in the transparency or the shadows in the duplicate negative—must always be looked to in preference to the other portions of the image; for the former cannot be *created* after development is completed, whereas the latter may be easily destroyed, reduced, or modified. For this reason a full exposure is always beneficial.

Of the numerous reducing solutions with which we are acquainted we give the decided preference to those which perform their work in one operation, and which, therefore, enable the effect to be watched as it proceeds. When two operations have to be gone through—one of which converts a portion of the image into chloride or iodide of silver to be subsequently dissolved by the application of a second solution—the final result cannot be accurately judged until after the performance of the second operation, when it will probably be found that the effect is not precisely that sought nor that which might be gained, and either that the image is spoilt or that it is requisite to repeat the double operation with the recurrence of a similar amount of uncertainty. If a slight error of this description occur in the treatment of the positive, it may, most probably, be remedied in the negative; but it is obviously preferable to secure the desired effect in each separate stage.

Of the single operation methods we know nothing better than a very dilute solution of Holmes's ozone bleach, or of *eau de javelle*, or Labarraque's solution. The more dilute the solution the better and safer will it be, though the process will be more prolonged. With a dilute solution the whole surface of the negative may be covered by immersion in a dish, and the plate then being taken in the hand the reducing agent is diligently applied to the portions which require it by means of a brush or tuft of cotton—an occasional departure from the strict boundary or a flooding of the whole surface tending to prevent any sudden line marking the area of treatment.

A mixture of cyanide of potassium and iodine, or even of hypo. and iodine if used very weak, also answers well; while of the double operation methods, chloride of iron or, better still, very dilute *aqua regia*, followed by re-immersion in the hypo., answers well. A convenient solution—which is practically, so far as its action is concerned, a mixture of nitric and hydrochloric acids—is made by dissolving common salt in nitric acid and diluting to the proper strength.

A variation of the double-method plan is to apply the hypo. or cyanide solution first, and, after slightly rinsing the surface to remove the surplus, to apply ferric chloride or oxalate or hydrochloric acid in very dilute solution. This plan is not, however, equal to the others, and is, moreover, especially when hypo. is employed, likely to leave a veil on the clear parts of the picture.

It is better to remove thoroughly all traces of hypo., first of all, by washing, and afterwards treating the film with extremely dilute *eau de javelle*. This latter is superior to alum, as it leaves no veil of sulphur, sulphide of silver, or alumina on the clear portions.

PHOTOMICROGRAPHY.

The image is received upon the focussing-screen, placed, and supported at any convenient distance in a suitable manner. The apparatus is supplied with a special chromatic polarising arrangement, that permits of the reproduction of objects, which, on account of their inactive colours, have not hitherto been permitted to enter into the domain of photography. With this special apparatus, the operator can bring the object to a monochrome scale, which can be infinitely varied by simply turning a button. "Negatives remarkable for their brightness and detail can be taken instantaneously upon wet collodion." Upon referring to the *Comptes Rendus de l'Academie* for 1857, page 213, we find in a brief note some remarks from M. Bertsch, which we suppose have particular reference to this instrument:—"Diatoms of guano were magnified 500 diameters; animalculæ to 500 and 800 diameters, and illuminated by oblique light, without diffraction, or interference lines; blood globules to 500 diameters, each taken in the fraction of a second. Crystals of salicine, as seen by parallel polarised light, were imaged—one by the ordinary, and the other by the extraordinary ray. In superposing these, and rotating them on their axes, until coincidence of the two rays, it will be remarked that the complementary tone of a photographic colour exercises no action upon the sensitive substance, and *vice versâ*. The experiment, which can be repeated under different methods, furnishes useful guidance in photography, and to opticians certain data upon the best achromatic medium in the construction of objectives applied to this art." The photomicrographs taken with this apparatus called forth the eulogium of the late Sir D. Brewster. The expense is no doubt largely due to the costliness of the prism, as well as to the great care in the general construction.

M. Bertsch, in his remarks later upon M. Jules Girard's communication to the Photographic Society of France, stated that for many years he had employed homogeneous illumination, by a small chromatic polarising apparatus, which permitted him to give the field a colour adapted to the object, so that each part would be reproduced in the tone that belonged to it, without the field being solarised; and by its means M. Neyt had produced beautiful photographs of vegetable tissues. [See this Journal, July 3, 1868.] Mr. Richards exhibited and described the camera to the Photographic Society of Great Britain in 1863. [See *Journal of the Photographic Society*, 1863, page 273.] Pictures could be made on Talbotype paper, one yard square, in four seconds.

This is the kind of instrument made by M. Hartnack and very successfully used by M. Neyt, from whose paper in the *Bulletin Belge de la Photographie*, and reprinted in this Journal, April, 1862, we extract some additional detail. The prism with its parallactic movements, though of considerably greater cost, was adopted in place of the usual mirror, as it is less influenced by the wind. The condensing lens is two and three-quarter inches in diameter. Three converging lenses, with a separate, or conjoined motion, are placed in its focus; also two diverging lenses, complementary to the focus of the condensing lens, to obtain parallel light when lenses of a large field are used. M. Neyt remarks that the lenses are achromatised for the yellow and violet rays. In ordinary apparatus, it is the yellow and red that are reunited, and in such a case there would be the chance of too much heat on the object, and a visual, instead of a chemical, focus. The instrument ordinarily transmits the rays horizontally. In reproducing *infusoria* this is inconvenient as regards the fluid being in a vertical plane, and the animalculæ constantly seeking the lower edge, and thus continually passing out of the field. To counteract this, so far as we can learn from the description, the plane of the stage is set horizontally, the objects illuminated by a prism of total reflection, and the image thrown horizontally by another prism—which may be of quartz, and as small as possible—set over the objective. This is similar to the plan already described. The loss of light from the two prisms, M. Neyt remarks, amounts to nothing. A series of diaphragms are adjusted immediately beneath the object. He adds to these a compensating prism, either at the point where the rays leave the instrument, if he use it horizontally, or in the dark chamber, if he use it bent. The focussing is made on a focussing-glass of an ordinary camera without a bottom, and then the intensity of the illumination is regulated. When the focus is exactly on the object, the image of the sun is seen at the same time on the ground glass. The focus is then thrown a little behind, until a blue point is obtained in the centre of the field, and the adjustment of the lenses is left at the point where this spreads itself over the entire image, it being the *maximum* amount of chemical illumination. The image is received on the sensitive surface in the usual way, but before it is exposed in the camera the light is intercepted by a yellow-coloured glass, and the room well shaded from light, the exposure being made by the sudden removal, and replacement of the yellow glass according to the time required. With the magnification of 1200 diameters seven or eight seconds sufficed; for 300 diameters the fraction of a second. The exposure was sometimes made by the use of a winged shutter. Preference was given to the wet collodion process. For the representation of *infusoria*, their movements being extremely rapid, this exposure was found to be too long to secure the vibratory action of their *ciliæ*. Poisoning them, distorted and convulsed their form; consequently, the electric spark or a galvanic current was employed. The two poles from a Daniel's battery, or small induction coil, were put in contact with the drop of water. The circuit was interrupted near its source; the movements of the animalculæ were followed through the yellow glass—the contact for the transmission of the current being effected at the desired moment; then the exposure made, whilst the objects remained transfixed in their different attitudes. With yellow- or brown-coloured objects, which do not admit the actinic rays, a small polarising apparatus was used to modify the general tint, and render it more photogenic. M. Neyt advocated the use of such images for the reproduction of copper plates, after the heliographic process of M. Chas. Nègre.

To lessen the risk of vibration in a somewhat similar apparatus, provided with a long mirror with parallactic movements made by M. Dubosq, of Paris, Dr. Maddox had the window closed by two shutters, each sliding in its own frame fixed at the side of the window. The lower one had a square aperture cut out at the right height near the centre, and on each side, an oblong one fitted with a sliding frame, provided with a pane of non-actinic glass and curtains. The square brass plate of the apparatus was fastened upon a stout frame with a foot that could be clamped, so as to keep the frame rigidly vertical, at the end of a long stout, blackened, baseboard, which was iron grooved at the sides, and supported upon four strong double triangle legs. At the opposite end of the board was an open frame, with two horizontal sliding bars, to hold the screen and plate; the frame being hinged to a wide foot made to slide in the side grooves. This frame had slight movements for adjusting the plane of the sensitised plate, if required, to the plane of the objects. In use, the lower window was thrown up, the shutter drawn down, the mirror passed out through the square aperture, and the square frame brought close to the shutter, *but not to touch it*, the foot being clamped in position, whilst light-tight flaps of cloth prevented all leakage of light into the dark room. The object on the stage was illuminated, either by direct sunlight from the mirror, or this by the light reflected from the mirror of a heliostat, placed in proper position outside on the window sill. Fine card, cemented to plate glass, formed the focussing-screen. Sometimes the stage, with its bar, pierced diaphragm, and objective carrier, was removed from the end of the small body tube, and a large microscope centered by guides was placed on the base-board in a horizontal position, the achromatic condenser being correctly set in the optical axis of the large condenser. A large ammonio-sulphate copper cell was hung to the shutter outside before the large lens, or a smaller cell, with a stronger solution, was fixed next to the achromatic condenser.

The facilities of this method, we note, are great, as after work, or in case of rain, or want of sunlight, the square frame with mirror could be unclamped, and drawn inside, the other part of the apparatus remaining *in situ*, the shutter thrown up, the heliostat removed, and the lower window closed. The sliding panes of red glass admitted of examining the sky, and judging of the continuance of sunshine, as well as of admitting ordinary light into the dark room, the whole plan being a luxurious mode of working. For judging of an enlargement, a card could be fastened against the closed door opposite the window. As a caution *do not* look through the empty tubes to judge of the centering when the full blaze of light is directed through them from the large condensing lens, as we know from this inadvertence Dr. Maddox was obliged to desist from all serious work with the microscope for a considerable period. Mr. Wenham worked with a smaller kind of solar microscope fixed to a shutter with a hole cut in it, provided with a sleeve for the facility of operating, non-actinic light being admitted by an aperture towards the top.

DISTORTION CAUSED BY THE SWING-BACK.

We have been asked if an accurate or absolutely non-distorted photograph can be obtained when employing a swing-back to the camera.

To reply to such a query we have to inquire what, in this sense, is meant by distortion? The displacement of the vertical lines in an architectural subject, so as to bring them into parallelism, which is the function of a swing-back as applied to architecture, evidently must not fall within this category, seeing that the swing-back is conducive to the avoidance of distortion. But in a landscape the matter is quite different.

It has been shown in a former article in this Journal that in landscape work the swing is indispensable in order to secure sharpness in the foreground; but by this employment of the swing-back the image is thrown upon an oblique plane, by which, while the definition is improved, an error in orthographic projection is undoubtedly introduced, inasmuch as by the requirements of conjugate foci no two parts of the picture in a vertical direction will be taken with a lens (practically) of the same focus. The foreground will be sensibly enlarged in comparison with the distance.

The nature and extent of this unrecognised class of distortion can be readily perceived by taking a view of any convenient scene with a lens having a stop so small as to define the distance equally well with the foreground when the ground glass is in a strictly vertical position. Next take another view without moving the camera or altering the lens, but employ a larger stop and swing the ground glass until sharpness of the objects in the immediate foreground is secured.

Upon comparing the two photographs thus taken it will be found, on measuring by means of a pair of compasses the distance between any well-marked object in the foreground and of another object in the distance, that these measurements are not alike in both; but that in the picture last taken, in which recourse was had to the functions of the swing-back, the distance between the two points indicated will be greater than that in the former.

LANTERN TRANSPARENCIES BY THE ALBUMEN PROCESS.

Resuming the subject of the production of lantern slides by the albumen method where we left off last week, we shall now proceed to the sensitising of the plates.

The formula for the bath stands thus:—

Nitrate of silver	2 ounces.
Distilled water	1 pint.
Iodide of potassium	5 grains.
Glacial acetic acid (52°)	2½ ounces.

The method of mixing is as follows:—First, the iodide is dissolved in the water, then the nitrate of silver is added, and the whole well stirred with a glass rod until the silver is dissolved. The solution is then filtered, and, finally, the acetic acid is added, when the bath is ready for use. The object of adding the iodide is to saturate the bath with iodide of silver in order to prevent any of that salt being dissolved out of the film after it is once formed, which otherwise might happen. Sufficient of the solution to cover the size of the plate to be sensitised is poured into an ordinary dipping bath. The plates are then immersed (with the precautions usual in the wet collodion process) for a period of half-a-minute to a minute only. In summer, when the solution is warm, thirty seconds will be ample, and in winter the longer time may be allowed; but it should never be exceeded, as the sensitising takes place very rapidly, and a longer time than is necessary is liable to affect the plate injuriously.

By continual use the bath will become discoloured, as does that employed for sensitising albumenised paper. It may, however, be decolorised by simply shaking it up with a little kaolin. If the bath be much used—or if it be allowed to stand in an open vessel when out of use—the addition of a small quantity of acetic acid from time to time will be necessary. Some operators prefer to employ a new solution for each batch of plates. In this case the plates are usually sensitised in a flat dish, when, of course, a much smaller quantity of solution will suffice. When the plates are taken from the bath they are placed in a dish of distilled water to remove the major portion of the free nitrate, after which they are thoroughly washed under the tap to eliminate the remainder. They are then reared up on a pad of blotting-paper to drain, and are afterwards dried.

The drying may be accomplished in any of the boxes used for gelatine plates, and, as the film is very thin, it does not retain much moisture; therefore the plates dry very much quicker than do gelatine. As many who do not possess properly-constructed drying boxes, or cupboards may like to try the albumen process, it may be mentioned that one, suitable for the purpose, may be extemporised by taking an ordinary box, or packing case, and placing it in front of the fire for an hour or so to thoroughly desiccate the wood. In this the plates are placed on some dry blotting-paper, and in a few hours the plates will be perfectly dry, the moisture from them having been absorbed by the desiccated wood. We have ere now used a common hat box when anything more suitable was not at hand. It may be as well to mention here, for the information of those who have never prepared albumen plates, that it must not be expected that the films will be dense and creamy like those of gelatine, or even of wet collodion, as they are always very thin and transparent.

Printing the transparencies may be effected either in the camera or by superposition, the latter being the method usually followed; but if the negatives be a different size to that of the required slide the camera must be used, and with it a lens capable of giving good definition with a large aperture. For compared with wet collodion the albumen process is slow, and in comparison with gelatine *very* slow indeed, although it is not so slow as the gelatine chloride process. With the camera the exposure will necessarily be somewhat long, and, as a rule, when prolonged exposures have to be given, the colour of the image is rarely very satisfactory.

In printing by superposition, either diffused daylight or artificial light—such as a gas flame or a paraffine lamp—may be employed. With regard to the time of exposure little can be said, as all will be dependent upon the source of light employed, the distance the plate is placed from it, as well as upon the density of the negative itself. Therefore, the experimentalist must determine this matter for himself. This he can easily do by exposing a plate or two under a negative of average intensity, giving different times for different portions of it, and then developing. One or two plates exposed in this way will enable a very correct judgment to be formed as to the exposure required in future for every class of negative. When once this is arrived at it remains constant, because, unlike the gelatine, each batch of albumen plates prepared may be relied upon as being of equal sensibility.

We now come to the development of the image. This at one period was treated, and preserved, as a great secret. The developing solution after all is very similar to that used in the wet-collodion process before the iron developer was introduced, except that it contains a little citric acid, and that *it is employed warm*. A good developer is as follows:—

Pyrogallic acid	25 grains.
Glacial acetic acid	½ ounce.
Citric acid	10 grains.
Water	10 ounces.

This solution had better be made and kept in a Florence flask, so that it can be heated and kept warm over a spirit lamp when required for use.

The exposed plate is first placed in a dish of distilled water, heated to about 150° F., until it has acquired that temperature. It is then removed, slightly drained, and flooded with the developing solution, which has previously been heated to about 130° or 140° F. Immediately before the solution is applied it must have about four drops, per ounce, of a five-grain solution of nitrate of silver added. If properly exposed the image will quickly appear, and by the way it comes out it may be judged if the exposure has been rightly timed or not, similarly as in the development of plates by any other process. As the films are so very thin and transparent the density of the image can easily be judged of by transmitted light. It is always best to err on the side of under- than over-density, because, in the latter case, the slides will always appear dense and heavy on the screen; whereas if they be slightly thin it may, to some extent, be remedied in the toning. As a guide in the development, it may be borne in mind that the more fully the plates are exposed and the more rapidly they are developed, as also the less silver employed in the developer, the warmer will be the colour of the image; while the slower the development, either from the solution being cold or the plate under-exposed, or if too much silver be used, the more the picture will approach an olive-brown tone.

As the development proceeds the plate must be carefully watched for stains or fog. If any appear the plate must at once be washed under the tap, and the surface rubbed with a pledget of cotton wool, which will remove them. The development can then be recommenced with a fresh batch of solution and silver, repeating the treatment with the cotton wool if found necessary. When the development is complete, the plate must be thoroughly washed under the tap to remove all traces of the pyrogallic acid, which, if allowed to remain, would tend to injure the toning bath.

The plate is now ready for fixing and toning. This is usually done in one bath, which is made as follows:—Half-a-pound of hyposulphite of soda is dissolved in half-a-pint of water; then three grains of chloride of gold, dissolved in two ounces of water, is added very gradually, and with vigorous stirring. After standing twelve hours and being filtered it is ready for use. It is then placed in a flat dish and the plate immersed. The iodide is quickly dissolved out, but the toning proceeds slowly—from a quarter- to half-an-hour or more being frequently required to obtain deep, rich tones. But much depends upon the colour and density of the image at starting. When the desired tone is obtained the plate is well washed under the tap and afterwards soaked in plenty of water, and again rinsed to ensure the entire removal of all traces of the hypo. Indeed, as much care should be bestowed on this part of the operation as in the case of gelatine negatives, in order to ensure permanency.

Alkaline gold toning (after fixing in plain hyposulphite and thoroughly washing) may be employed instead of the double fixing and toning bath; but the colour obtained in our hands and to our taste has not been so satisfactory as by the method just described. which is that used by MM. Ferrier and Soulier.

ATMOSPHERIC MOISTURE.

Considering the important part played in photography by the moisture-carrying power of the atmosphere, there is good cause for surprise at the paucity of exact observations in connection with it, and at the rarity of instances to be met with where scientific treatment is bestowed upon the measurement of the amount of water present in the air. Where, outside scientific works, for instance, are data readily available to show the amount of water a room of given size will carry? And at how many studios will an instrument be found for indicating the amount present—an hygrometer, in fact? Yet it cannot be denied that for drying dry plates, gelatine tissue, and, in a lesser degree, albumenised paper, such knowledge and such instrumental assistance is of high value. At the present season, however, the water vapour in the atmosphere often renders its presence manifest in another peculiarly unpleasant manner, and in a way that bodes no good to apparatus, negatives, or pictures. We refer not to fog, but rather to what might be not inaptly termed "dew."

In most parts of the country the day before Christmas Day just past presented in the highest possible degree those phenomena of universal humidity that can only be seen to perfection in these isles. The day was by no means cold; there was no fog, neither had rain fallen; yet the flags of the footpath were damp (almost wet), the walls covered with moisture, the trees dripping as though a smart shower had fallen, and everything out of doors was dank and miserable. Indoors the state of affairs was less marked, but sufficiently unpleasant. In apartments where no fire had lately given off its cheering rays something very like the outside conditions prevailed in miniature. Negatives lying about were to be seen covered with a thin film as though they had been breathed upon, and newly-mounted pictures looked limp though the paste had been allowed hours wherein to dry. Apparatus was equally damp, and the brasswork of lenses was likewise covered with the all-pervading moisture.

The explanation is easily given. The previous day had been decidedly cool, and on the day in question the wind had brought a warmer air containing as much moisture as it could possibly hold at the temperature. The consequence was that, wherever an object with not too porous or rough a surface and of lower temperature came into contact with the new air, as it might be termed, the temperature of the latter was lowered, and, in consequence, the water it contained as vapour became precipitated, naturally, upon the very object that caused that precipitation, the closely adjacent layers of air being the first to become cooled and give up moisture.

The danger of this precipitation of thin films of moisture upon negatives need not be dilated upon; and if by any chance negatives so affected are stored without removing the moisture, or if it be deposited upon them when they are kept in closed boxes that are only occasionally opened, the result will be the almost inevitable cockling up in ridges, or honeycombing, of the whole film so familiar to some photographers. Gelatine negatives not varnished will be in danger of causing the albumenised paper to adhere so firmly as to be irremovable without damage, or it may result in "setting off" of the silver from the paper, only to show its effects as a bad stain after the lapse of time.

A remedy—or, at least, a partial one—is not difficult to find. It simply consists in keeping the apartment warm where negatives or apparatus are stored, or, where that is difficult, to keep doors and windows well closed so as to keep out the moist air till the cold objects of the room may, perchance, become more assimilated in temperature to the outer air; for it will be understood that this precipitation only occurs when objects are brought into contact with a warmer atmosphere containing much moisture. It is no special property of "damp air" to give off its moisture in this fashion; it only does so to cooler objects. This fact carefully borne in mind may save much anxiety and trouble.

Apparatus of wood should always be put aside in the driest and warmest corner possible, if any store be set by it, as it is far easier to injure or put out of working order a camera or dark slide, &c., by damp, than it is to cure it by removing damp that has gained access to them.

Another very fertile cause of evil is the putting away of newly-mounted cards and cabinets without their thorough desiccation, as, when this does happen, it is almost sure to lead to fading prints. A picture freshly mounted upon its card will be drier after the lapse of an hour with an average state of the atmosphere than at the close of a whole day under such atmospheric conditions as those of which we speak. The great secret, therefore, for avoiding the evils that follow in the train of damp may be said to be the use of heat beforehand; and if principals would give attention to this point they would find it really economical, for not only would better work be done—better through the absence of moisture about printing-frames and pads and all printing-room *paraphernalia*—but the *employés* would work to better advantage, as well as with greater comfort, which is a point that was well put at a meeting of the Society of Photographic Operators in New York the other day.

In the drying of carbon tissue the hygrometric state of the air is a very important factor, for with a comparatively thick film of gelatine holding a large amount of water it cannot be expected that it will dry without special precautions being taken when the atmosphere is already loaded with moisture. The inconvenience of tissue dried too slowly is well known. In its way it is as troublesome as when over-quickly desiccated.

Similarly, with albumenised paper, artificial heat is practically a necessity if negatives are to be kept uninjured; for though a certain amount of moisture, as long since pointed out, is a necessity for the production of the best tones, the carrying to extremes the amount present will be equally productive of evil.

We cannot too strongly lay stress upon the need for decreasing the relative amount of water present in the atmosphere of a room by the simple expedient of raising its temperature in the department where mounting is carried on. If there be one condition of things more than another which can be shown to conduce to fading of prints it is the presence of moisture. Whenever the atmosphere is in such a state that it can carry little if any more moisture—and this may occur in other than the winter months—there is danger, unless artificial heat be applied, of mounted pictures being stacked away damp, and, as they are usually sent out in dozens or so, remaining in the receiver's hands for weeks or longer, it is next to impossible for the individual *cartes* or cabinets to become quite dry unless separately exposed. We are convinced that a very large number of instances of faded prints may be traced to their having been mounted upon a damp day when the whole of the moisture from the mountant has not been expelled, and the pictures have been sent away practically damp.

It will thus be seen that the presence of a moisture-laden atmosphere is productive of as much danger as inconvenience, and the best preventive against evil is a constant elevation of temperature of all apartments where photographic work is carried on or materials and negatives are stored.

THE frontispiece of a recent number of *The Illustrated London News* consists of an admirable engraving from a photograph by Mr. John Thomson, F.R.G.S., better known among his friends as "China Thomson."

SUCH was the rush of business at the Patent Office on the first day of the new year—on which day the new law relating to patents came into force—that no fewer than two hundred and sixty-six new applications for patents were received. On referring to our list of patents, given in another page, it will be seen that of these photography furnished a fair share.

WITH the close of the old year two new French photographic journals have made their appearance, namely, the *Bulletin Officiel de la Société des Employés en Photographie* and *Le Progrès Photographique*, both of which appear monthly. M. Leon Wulff, the editor of the latter-named journal, announces in his introductory preface in the first number that *Le Progrès Photographique* is but a continuation under another name of *La Revue Photographique*, which ceased to appear in 1865, and of which he was for about twelve years the editor. Subsequent to that date, however, another *Revue Photographique* was started as the official organ of the *Société Francaise des Archives. Photographiques, Historiques et Monumentales*, and which is now in its sixth year.

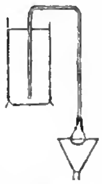
IN this country, too, a high-class scientific journal, under the title of *The Science Monthly*, has reached its third number during the present month. It is published by Mr. David Bogue, of St. Martin's-place, and its general get-up is of a character rarely met with in English journalism. In addition to original articles by eminent writers on different branches of general science, it contains a monthly review of progress and novelty classed under special departments, Photography, together with Experimental Physics, Electricity, and Chemistry, being treated under the head of *The Laboratory*. The columns headed respectively *The Library*, *Topics of the Time*, *Table Talk*, *Summary of News*, *The Observatory*, *The Museum*, *The Workshop*, &c., &c., sufficiently speak for themselves. A series of articles, entitled *Leaders of Science*, is admirably illustrated by phototypic engravings by Meisenbach's process. Those which have already appeared are portraits of Sir Geo. Biddle Airey (late Astronomer-Royal), Sir John Lubbock, and Sir William Thomson.

WE are pleased at receiving from an enthusiastic and clever American amateur, Mr. George H. Johnson, of Bridgeport, Conn., a genial letter with which he encloses several excellent examples of his photographic work. One of these is a characteristic full-length portrait of his friend and neighbour, the world-renowned P. T. Barnum, for whom he is about to photograph the nearly equally-renowned "Jumbo" in several attitudes. In the Barnum winter quarters in Bridgeport there are forty elephants. What a chance for Mr. Johnson! Excellent use is made by that gentleman, in his private business, of the capabilities of photo-mechanical printing.

ON the subject of transparencies Mr. Johnson says:—"I have been trying some of Mr. Wm. Brooks's collodion emulsion for this purpose but incline to give the preference to some made by a formula of Mr. H. J. Newton's. I devote quite a considerable portion of my spare evenings to transparencies, and have probably made more of them than any amateur in America." We are not unacquainted with Mr. Johnson's ability in this direction, having heard a mutual friend, who possesses examples of his work, speak of them in high terms.

A VERY ingenious and simple method of filtering large quantities of fluid, without the necessity for the constant attention involved in the repeated filling up of the funnel, has been devised by Mr. E. E. Robinson, who sends an account of it to our contemporary, the *Chemical News*. Appended is an illustration of his method described in his own words:—

"When large quantities of liquids, such as reagents, have to be filtered in the laboratory, it is often convenient to have some means by which the filter is kept filled. The usual 'bird-fountain' method which is applicable in some cases, has the disadvantage of requiring the inverting of large bottles or flasks filled with liquid, and besides this it does not maintain the liquid at a constant level in the filter. The following apparatus has been found more convenient.



To the longer limb of a syphon is attached a short piece of india-rubber tube projecting a little beyond the tube; the india-rubber is closed by the narrow conical stem of a small glass globe which floats on the surface of the liquid in the funnel. When the liquid rises to a certain height the float is lifted, and stops the flow of the liquid, the narrow stem on the float which passes some distance into the syphon acting as a guide. The apparatus keeps the liquid in the funnel at a constant level, and may be left without attention until the filtration is complete."

THE first meeting of the Photographic Club, in their comfortable new quarters at Anderton's Hotel, was attended by about thirty members and visitors.

WHAT is an "*optical* lens?" We inquire because we frequently see this phrase employed in the advertisement of an "optical lens" manufacturer in the great republic. Month after month this apparently tautological term stares us in the face when glancing over the advertising pages of a New York contemporary, and we find ourselves asking if there are any lenses which are not optical.

THE dangerous properties of celluloid are again troubling the non-technical world, if we may believe a paragraph which appeared in the *Globe* a few evenings since. The writer is evidently not aware of the name of the material of which he speaks so seriously, and certainly is not acquainted with its composition, or his remarks would have been more forcible. It appears that as a couple of persons were playing billiards in a *café* in the Boulevard Poissonnière, Paris, a rather sharp "cannon" caused the balls (which were of "sham ivory") to ignite, with, fortunately, no more dangerous results than to destroy themselves and set fire to the cloth of the table—to the amusement of the onlookers and the indignation of the proprietor. The latter talks of bringing an action against the individual who supplied the balls; meanwhile their fragments are to be analysed.

AN announcement of interest to photographers is made, namely, that the duration of sunshine recorded at Greenwich Observatory last week was—*nil*.

WE have worked celluloid in almost every conceivable way. We have scraped, filed, drilled, sawn, and hammered it. The photographic form known as "celloidin," which is simply solidified collodion, is, when perfectly dry, so hard that it requires a heavy hammer or a hatchet to break it. We have performed even this last operation without any sign of ignition or explosion. As a matter of fact, no form of celluloid or celloidin we have ever met with, though in comparatively small masses, will ignite readily, even in a gas flame, unless held there for some time, and when removed immediately "fizzles" out. We, therefore, take the billiard-ball story with the customary grain of salt.

The improved carrier for lantern slides which Mr. McKean brought under the notice of the Edinburgh Photographic Society at their last meeting is likely to prove very useful. It provides the means of effecting the changing of the slides in the lantern with a degree of rapidity so great that the eye can scarcely appreciate the act. We have had one of them made, but modified in such a manner as to allow the picture to slide horizontally, the propelling force being a spring instead of gravity. This answers in cases where, owing to the construction of the lantern, the vertical movement could not be adopted.

The whole theory of light—not to speak of heat and electricity—is built upon the existence of a hypothetical ether pervading all space, which must of necessity be possessed of properties of elasticity, &c., almost beyond belief when the properties of the most rarified of terrestrial substances are compared with it. "Rays" of light are transmitted by it in waves in a manner something like, yet different from, that in which sound waves pass through air, and although the properties of the ether are such as can only be studied by mathematicians of skill, it is, nevertheless, useful to form some mental conception of the mysterious entity so closely wrapped up with the operations of our art. With the view of aiding the forming of such a mental image, we borrow the following abstract from a collection of the works of Professor Stokes:—

"Suppose a small quantity of glue dissolved in a little water so as to form a stiff jelly. This jelly forms, in fact, an elastic solid; it may be constrained, and it will resist constraint and return to its original form when the constraining force is removed, by virtue of its elasticity; but if we constrain it too far it will break. Suppose, now, the quantity of water in which the glue is dissolved to be doubled, trebled, and so on, till at last we have a pint or a quart of glue water. The jelly will thus become thinner and thinner, and the amount of constraining force which it can bear without being dislocated will become less and less. At last it will become so far fluid as to mend itself again as soon as it is dislocated. Yet there seems hardly sufficient reason for supposing that, at a certain stage of the dilution, the tangential force whereby it resists constraint ceases all of a sudden. In order that the medium should not be dislocated, and therefore should have to be treated as an elastic solid, it is only necessary that the amount of constraint should be very small. The medium would, however, be what we should call a fluid, as regards the motion of solid bodies through it. The velocity of propagation of normal vibrations in our medium would be nearly the same as that of sound in water; the velocity of propagation of transversal vibrations, depending as it does on the tangential elasticity, would become very small. Conceive now a medium having similar properties, but incomparably rarer than air, and we have a medium such as we may conceive the ether to be, a fluid as regards the motion of the earth and planets through it, an elastic solid as regards the small vibrations which constitute light."

A writer in *La Nature* adds another to the list of experiences with toughened glass. He narrates that for two years past he had been in the habit of using a capsule made of this material for heating liquids, and even evaporating to dryness, and often he had tested it by throwing it from a height on to the floor. Some days since, after cleaning it, he left it upon his work-table and went out of the room, but had scarcely closed the door when he heard a loud noise. On quickly returning he found his evaporating dish no longer visible, except in the shape of a number of splinters scattered about in all directions. This is but another example of a fact well known as to toughened glass; it will stand hard knocks, but, at the same time, is liable any moment to fall to pieces without any concussion whatever.

In the *Electrotechnische Zeitschrift* a description is given of a battery which acts only in the light, and which, when a galvanometer is placed in circuit, appears to act upon it directly in accordance with the strength of the light; in fact, the intensity of the incident light is said to be capable of exact measurement by its aid. If the facts should prove to warrant the assertion (which we are much inclined to doubt) a most useful photographic instrument will have been devised, and some remarkable problems solved; in fact, photographic telegraphy would be in the near distance. The battery is made by placing a porous cell containing mercury in a glass jar holding a solution of common salt and sulphate of copper. In the saline solution an electrode of sulphide of silver is placed, and in the mercury one of platinum. When the battery is placed in the dark the galvanometer shows no indication of electric action whatever; but a ray of light falling on the silver plate at once causes the galvanometer to move. From these concise instructions it is within anyone's ability to construct the battery; and, if what we quote regarding its power should prove to be correct, it is impossible to foresee the ramifications to which the use of the instrument would extend.

At the Berlin Physical Society Professor Rowlands' gratings have formed an interesting topic. They had before them at a recent sitting a grating received from Professor Rowlands and a negative taken by him, as also a photograph of the normal spectrum. So searching was the definition of the negative that with the naked eye Dr. Kayser was able to count over seventy-five lines between the two H lines, and with a microscope it was expected that still more would be discernible, as they appeared to form groups.

We have often pointed out how the usual order of exchangeability of chlorine, bromine, and iodine is apt to be reversed by the conditions governing the mixture in which they are formed, and some interesting experiments, recently described by Paul Julius, will show in a remarkable manner how previous conceptions have at times to be modified. Passing a thoroughly-dried current of air into bromine contained in a small Hoffman flask, and so saturating it with bromine vapour, he conveyed it through a tube of very infusible glass, bent at its end into a right angle, the termination being contracted and dipping into a beaker of soda or potassa. When silver iodide was placed in the tube and strong heat applied, it was all converted into bromide. When chloride of silver, previously dried in the air bath at 120° C., was placed in the tube, the stream of dry bromine converted it also into bromide after the lapse of an hour or two. Further experiments showed that chlorine and bromine can be expelled from their silver compounds by the vapour of iodine, though in the case of the chloride from six to ten hours was required to entirely complete the substitution. The whole experiments, therefore, show that any halogen, if used in excess, is capable of expelling any other halogen from its combination with silver.

PREPARING GELATINE PLATES FOR HOT CLIMATES.

Intending to go to India as soon as the season is a little farther advanced, and being desirous of employing gelatine plates, I have for some time been rather anxious regarding the effect upon such plates of the warm water which alone is said to be met with there, especially during the more sultry weather.

Knowing that a greater degree of heat is usually encountered by photographers in the United States of America than those in England, I obtained from the former country a parcel of plates of a good average class, and proceeded to test them by warming my developing solution, fixing bath, and washing water to the temperature said to prevail in Calcutta during the sultry season. To make the trial as instructive as possible I invariably tried an English plate along with the other. The former stood the warm fluid applications quite well; the latter did not. I cannot say that I found any appreciable difference in their sensitiveness.

Finding that the English plate was unaffected by the warm water, I carried the experiment still further and poured over it water whose temperature was at almost boiling point, and still the film remained undisturbed. I had previously observed that the American plate was easy to fix in comparison with the home brand, and I reasoned that some such substance as chrome alum must have been added to the gelatine in the latter in order to harden it, or perhaps prevent frilling, the same substance also conferring upon it insolubility in hot water.

To ascertain if my hypothesis were correct I made ten ounces of emulsion with a gelatine that is rather noted for its softness and easy solubility. From this I separated three ounces, to which I added four drops of a solution of chrome alum, shaking well up. Having coated six plates with the alumed and six with the unaltered emulsion, I marked them, and tried the result. Greatly to my gratification I found that, while the quality of the negatives was excellent on the alumed plates, the film had become so thoroughly tanned as to be altogether unaffected by the warmed developer and washing water; while the negatives obtained on the plain emulsion, subsequently treated in a manner similar to the other throughout, dissolved entirely away.

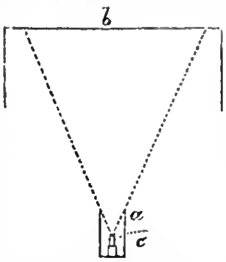
It seems, therefore, that while there are some commercial plates sold in the usual way which will fulfil all the requirements of a tropical climate, it will not be a difficult matter for photographers to prepare for themselves, or get their plate manufacturers to do so, plates which will remain quite unaffected while undergoing treatment with the heated water of equatorial regions.

HERBERT J. RIGBY.

DARK-ROOM LIGHT.—CARRIER FOR LANTERN SLIDES.

DARK-ROOM LIGHT.

DARK-ROOM lighting is an important subject. I shall describe my method of dark-room illumination now that the question of lighting by reflection from coloured surfaces has been brought to the front by Mr. Herbert S. Starnes. *a* is a circular lamp open at the top, and of such a height and diameter as only to allow of the ceiling, *b*, or a part thereof, being illuminated by light direct from the gas or candle, *c*. In my room a part only of the ceiling is so exposed, and that part is covered with a dark orange matt surface, which reflects a soft and pleasant light into every corner of my room. I can see every bottle, and very small articles are quite visible. Moreover, I find the light quite safe, although from habit I expose the plates as short a time as possible to its influence.



This arrangement involves exactly the same principles as that of Mr. Starnes' new lamp. I hope that Mr. Starnes will not think I write in order to take from the merits of his lamp or experiments, or to claim priority in the slightest degree, although I have been working with this arrangement since towards the end of last summer.

I did not think the matter was worth writing to the Journal about, as it is well known that a rapid and neat operator may develope a plate quite satisfactorily by reflected light from a naked peep of gas, shading his plate previous to and during the first stages of development. However, as the matter is to the front, I think it ought to be thoroughly "gone into" and scientifically examined. I must confess to having been a little staggered by some of the results of Mr. Starnes' experiments, but of that more anon.

I may be in error, but I imagine that ordinary light received on a coloured and *very extended* matt surface will give a more pleasant room than any other device. The use of the roof as a reflecting extended surface is a very simple expedient. I am careful to say that I hold this opinion as to extended surfaces lightly, because I have not experimented on the subject so deeply as I would have liked. I have a presentiment, however, that a room will never be properly illuminated from *small* reflecting surfaces without introducing a dangerous percentage of white light. If the light be cut down by double or triple reflection from matt surfaces, then a sufficient *quantity* is not obtained.

While on this question of reflection from matt surfaces, it is well to take cognisance of the fact that a very great deal depends on the nature of the surface employed. Two surfaces may be made with the same colouring material, and even the same proportion per given area, which will give very different results in the spectroscope and on gelatine plates. I explain on this basis to my own satisfaction the apparently anomalous results arrived at by Mr. Starnes.

In carrying out a series of experiments such as the readers of the Journal have been favoured with, very great care ought to be taken that the degree of roughness or pitting on the surface should be the same in all the surfaces experimented on, otherwise the results may be of inferior value. Most of us will remember the class-room experiment with metallic copper surfaces. By reflection or reflections from a comparatively smooth yet pitted surface of copper the colour may be made to vary from the light ordinary "copper" colour through all shades up to a colour not far removed from the colour of blood. Mr. Starnes' suggestion to use cloth material instead of paint shows that he is alive to the effect of difference of surface. May I ask if he has estimated the effect of differences in the various surfaces employed by him?

There is another point hinging on the foregoing, and one that in a colour investigation of this kind absolutely demands attention—that is, the real or absolute photometric value of the light reflected from the surfaces. Mr. Starnes says:—"On the threshold of my experiments in this [production of new reflecting lamp] direction I found how misleading the results of photographing the spectrum—or, rather, the density given on a sensitive film by the spectrum—is when applied to practical photography," &c.; and he proceeds to say that light from an orange surface gave nearly as dense a deposit on a gelatine plate as light from a blue one. As an outcome of his experiments he says "they tend to show that the action of light on a sensitive film is a heat force or, rather, an expansive force."

Now, unless Mr. Starnes has determined the photometric values of the reflected beams from those orange and blue surfaces he has happened to work with, and compared them with the photometric values of the nearest approaching orange and blue colours of the spectrum, I think he has been rather premature in coming to the conclusions he has set forth.

Will he pardon my apparent forwardness in saying a little as to the course he ought to pursue in this investigation? I trust he will, and put all down to the interest I take in the subject and to no lower motive. First, I would have him make two surfaces—one blue and the other orange—and let these surfaces be nearly alike as to roughness, porosity, &c. Next, let him determine their photometric values by the shadow or oiled-paper method, and expose a plate first to the light reflected from the one surface and then to the light from the other, taking care that his plate is at that point at which their values are *equal;* or, if he wish it, from that point at which their values are *equal to the photometric values of the respective colours of the natural spectrum.*

I shall be very much astonished if he arrive at the conclusions he has already announced. Should Mr. Starnes not have the time or not care about doing this and wish me to carry it out, I shall be very happy to do so. He has the apparatus ready, however, and will easily accomplish it in an hour or two at most.

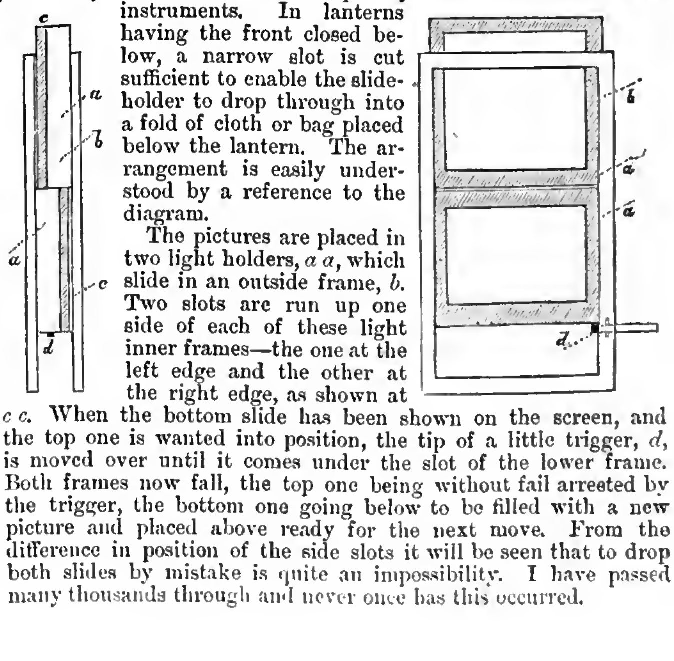
In this way only, or some other involving the same principles, will he be able to give a *practically*, not to speak of a *scientifically*, accurate estimate of the value of various reflecting surfaces for dark-room illumination.

CARRIER FOR LANTERN SLIDES.

I give below a diagram of a simple and exceedingly-efficient carrier for the instantaneous substitution of one slide for another in the optical lantern. I observe the subject has been before the Edinburgh Photographic Society, and a very ingenious device exhibited there by Mr. J. McKean. Perhaps the description of another device which I thought out some years ago may cause some of your readers who contemplate the purchase of a biunial to "tak' a thocht" and keep to a single, provided with a device similar to Mr. McKean's or that I am about to describe.

The carrier now in my possession was exhibited at a popular meeting of the Dundee and East of Scotland Photographic Association two years ago. I think it is simpler in construction than Mr. McKean's, but this is a matter of opinion. It is quite impossible to put anything coenected with it out of order, it having practically no machinery.

Mr. McKean's device requires a modification (although not a very serious one) of the front of the lantern. With this device no modification is required in lanterns where the front plate is supported by four studs, as is frequently the case in first-class instruments. In lanterns having the front closed below, a narrow slot is cut sufficient to enable the slide-holder to drop through into a fold of cloth or bag placed below the lantern. The arrangement is easily understood by a reference to the diagram.



The pictures are placed in two light holders, *a a*, which slide in an outside frame, *b*. Two slots are run up one side of each of these light inner frames—the one at the left edge and the other at the right edge, as shown at *c c*. When the bottom slide has been shown on the screen, and the top one is wanted into position, the tip of a little trigger, *d*, is moved over until it comes under the slot of the lower frame. Both frames now fall, the top one being without fail arrested by the trigger, the bottom one going below to be filled with a new picture and placed above ready for the next move. From the difference in position of the side slots it will be seen that to drop both slides by mistake is quite an impossibility. I have passed many thousands through and never once has this occurred.

As an improvement I intend to have the next one made with all the running parts covered with velvet or other soft material, in order to make all as silent in working as possible. I shall be very happy to forward my carrier to Mr. McKean for his inspection should he think fit. G. D. MACDOUGALD.

DEVELOPMENT AND DIRECT PRINTING OF GELATINO-CHLORIDE PLATES.

As the above kind of plates are likely to become more useful to the photographer for the class of work to which they are best adapted—such as transparencies for lantern slides, window decoration, and enlarged negatives—the question arises which of the two methods will meet the requirements of the photographer best, namely, to have plates that will print the image right out without resorting to development, or plates that with a slight exposure in the printing-frame are afterwards developed.

Having had some experience with both methods, I find the plates adapted for development will do the best service when a number of slides are wanted in the shortest space of time from one negative; beyond that I cannot say anything more by way of preference.

As a rule, photographers will find direct printing far more easy and certain—that is to say, printing out by exposure to light in the printing-frame—let alone the economy of that method, as the citro-iron developer, which is the best on account of the variable tones yielded, is as expensive as the general forms in use. I find, from recent experiments, that plates for direct printing can be made to yield tones almost as variable as those produced by development, by compounding the chloride emulsion with different salts. The samples sent are not toned, but by toning them they can be altered in colour. To place one of these plates in the printing-frame and examine its progress along with the roll of paper is but a brief trespass as regards time, and when printed is taken out, placed in the fixing-bath, and washed. The whole operation demands the least attention of any process extant for producing the same kind of photographs.

A word as to judging the depth to print. With glass you cannot pull it back from the negative and look upon its surface to examine the progress, unless great care be taken in registering its position by using a suitable printing-frame. This is, however, quite unnecessary in the present case, as by looking at the back of the plate on opening half of the printing-frame you will see the progress made easily, the plates are so transparent. When the high lights are well browned that is the stage to stop printing, provided the picture be for a lantern slide. When a gelatino-chloride plate is fixed and examined in the wet state it looks rather thin and weak, but when dry becomes much more vigorous.

For transparencies to be used for enlarging purposes a much finer film can be had on one of these chloride plates than on a bromide one, as the two enclosed examples will show. Both are from the same negative, but are made from chloride and bromide plates respectively, the negative being taken from a paper print. But there is as much difference between the two transparencies in fineness as there is between a negative from a copy and one taken from the original sitter. L. DIXON.

[As the specimens which accompanied this communication are not toned we can scarcely form an idea as to the possible variety obtainable. At present they are all very similar.—EDS.]

TRANSATLANTIC JOTTINGS.

WHICH of our readers will not sympathise with Mr. L. Coe, photographer? who, according to the New York *Times*—

"Is just at present anxious to know who is to pay him for his broken camera. On the 5th instant it occurred to certain policemen that the photograph of Mr. Thomas Davis—a man said to be a professional criminal—would be a desirable addition to the Rogues' Gallery. Thereupon they arrested Mr. Davis, escorted him to Mr. Coe's photographic studio, and directed the photographer to take the man's likeness. Mr. Davis, curiously enough, did not wish to have his photograph taken—fearing, perhaps, that the *Sun* would get hold of it and publish it as a portrait of Holman—so he seized his chair and, using it as a club, irretrievably smashed the camera. For this offence he was again arrested and committed to jail on a charge of disorderly conduct. Of course, he will not pay for the camera, and as the police officers did not smash it they will not pay for it; so that Mr. Coe is naturally in a discontented and gloomy frame of mind."

Our American cousins do not, as a rule, need to copy English mechanical "dodges," as there always seems to be out there a supply sufficient for all demands of ready-made ideas in that direction. According to the *Scientific American*, however, a patent has been granted for a revolving album, of exactly the same construction as the well-known pattern that created so much interest in this country on its introduction many years ago. Our readers have more than once seen the same thing at the exhibitions of the Photographic Society of Great Britain. It consists of a box suspended between two pillars and containing pictures temporarily held in wooden frames which, as the box revolves, slide over one another and continually expose fresh pictures each time the opposite face of the box is brought into view.

According to *Anthony's Bulletin*—the month's engraving for which journal is a portrait of Mr. W. Kurtz—"retouching the negative was one of his suggestions, and he was the first to practise it." There is surely some error here. Mr. Kurtz may have learnt the secret, when it was a secret, on the continent and largely practised by German artists, when English photographers, with one or two notable exceptions, were talking of the superiority of continental skies; but it was in use there long before Mr. Kurtz had a studio. Let that be as it may, the fact remains that Mr. Kurtz is one of the foremost men of the day in his own or any country, and his photographs possess rare excellence and beauty.

The American journals to hand contain accounts of two new developers, one of them being merely an old friend with a new face, and the other an undoubted novelty. No. 1 is Mr. Joshua Smith's "missing link" developer, described before the members of the Photographic Association of Chicago. The formula introduced after a few experiments is simply as follows:—

Lime water	6 ounces,
Bromide of ammonium	12 grains,
Pyro	A small mustard spoonful,

and, as our readers will perceive, the only new point in it is the obtaining of the ammonia from the bromide salt, the mixture producing ammonia and bromide of calcium. Possibly the latter salt may have a slight effect on the colour of the negative. No. 2 has real novelty about it. We make no criticism upon it in this place, but merely content ourselves with placing the formula in this column. We have often brought before our readers the well-known name of Mr. H. J. Newton, to whom the carbonate of soda method of developing is due, and this new process also is the result of his experiments. In brief: it may be said to consist of adding to the ordinary carbonate of soda developer a few drops of iodo-chloride of mercury. Mr. Newton claims for it that a picture may be taken by its aid in one-fifth of the time required by the ordinary developer. If he should be right he will have made the most important improvement in gelatino-bromide plates since Mr. Bennett's discoveries. The proportions are as follow:—

SOLUTION 1.

Bichloride of mercury	30 grains.
Water	4 ounces.

SOLUTION 2.

Iodide of potassium	90 grains.
Water	½ ounce.

Pour Solution 2 into Solution 1, and stir; the red precipitate first produced quickly dissolves. Mr. Newton's carbonate of soda developer is used, and when the image begins to appear a few drops of the above solution are added to it; and "it is surprising to see how this starts the picture," Mr. Newton says. With the full details we give there is no doubt many will experiment with this new developer.

Anthony's Bulletin extracts a considerable portion of our leading article on *The Various Styles and the Mode of Preserving Photographs*, which appeared in our pages of September 21st, and in which we indicated a great want at present existing for some simple, cheap, neat, and expeditious mode of securing photographs singly, so as to exhibit them to advantage and, at the same time, preserve them. With regard to our suggestion the *Bulletin* says:—

"There is no doubt that this want is a positive one, existing in this country as well as in Europe, and we desire to call the attention of persons who cater for the needs of photographers to the subject, and hope that ere long something may be provided as suggested."

According to the *Photographic Times*, Mr. Rockwood—who has been carrying on a series of delicate experiments in photographing the vibrations of a telephone plate—has been following the lead of our own recent experimentalists, and photographing the vocal chords of the human throat with results that were considered, on the whole, so far satisfactory that "further experiments will soon be tried with trained singers, arrangements having been made with Mesdames Patti, Nilsson, Gerster, Sembrich, and other stars of the vocal firma-ment, when Mr. Rockwood's already long list of publications will be enriched by the 'vocal chords' of the above celebrated artists."

A well-known dry-plate manufacturer, Mr. Beebe, paid English-made glass a high compliment at a meeting of the Chicago Amateur's Club, which throws a side-light upon the question of cost of plate-making. He said he would tell them a secret. He had some considerable amount of trouble with defective glass, and finally had settled down to use an English make entirely; for, although it was much dearer than any other kind, it was infinitely better. According to Mr. Beebe, plates really are dearer in proportion in America than in London; and, with the price of materials running up in this manner, no one can wonder that American plates, costing so much in the first instance, should be retailed at a higher price. The wonder would be if they were not still dearer.

SOME ATTEMPTS AT DETERMINING THE ACTINIC LIGHT IN THE STARS BY PHOTOGRAPHY.

When the great comet of the year 1882 was visible, Dr. Gill, Her Majesty's Astronomer at the Cape of Good Hope, attempted to photograph it by means of an ordinary camera attached to the equatorial. Copies of these photographs were in due course forwarded to England. The multitude of stars shown is very striking. The photograph appears mottled all over, and this mottling is due to the light from the fainter stars.

In the summer of the present year Professor Pickering, of Harvard, U.S., showed some negatives of stars taken in the same way, and made remarks upon them before the Royal Astronomical Society. One of these negatives I was allowed, by the kindness of Professor Pickering, to examine while he was in Liverpool, in September. The work that Professor Pickering has undertaken is (1) a photographic map of the whole heavens; (2) a determination of the colours of the stars.

Now, as the action upon the photographic plate increases with the distance from the red end of the spectrum, those stars whose colour inclines to red will come out comparatively faint on the photographs. Conversely, if there are any blue stars they will come out brighter than their eye magnitude. Now, if we take as our standard the magnitudes as apparent to the eye, we shall find all the stars photographed either equal to the eye magnitude or above or below it. Where the actinic light is in excess the stars will come out brighter; where it is the contrary the stars will come out less than the eye magnitude. At the centre of the plate the stars come out as dots; at the edges as ovals. But, as these ovals increase in proportion to their distance from the centre, there is no difficulty in applying a correction, and the stars can all be reduced and compared with their known magnitude.

Early in October, assisted by Mr. W. H. St. Q. Gage, F.R.A.S., and Mr. W. L. Stubbs, I made some experiments with a rough equatorial stand on which was mounted a camera with lens of 2½ inches aperture. Our instruments were so rough that we did not succeed very well. However, some stars were photographed in Andromeda. Later on in the month we succeeded in obtaining two plates—one of the Constellation of Cassiopeia, the other of a portion of Taurus, containing Saturn and the Pleiades. The exposures were long, being one hour and twenty minutes and one hour and thirty minutes. The plates used were the Withington dry plates.

The results of these plates were communicated to the Liverpool Astronomical Society, at their meeting on the 12th of November. On the Taurus plate there are one hundred and twenty stars. Of these the little Asterism of the Pleiades furnished forty-one. From the two plates sixty-eight stars were reduced and compared with the eye magnitudes as given in the catalogue of Heis' *Atlas Cœlestis*. Of these, twenty-two show differences which we believe to be real. Nine belong to class A (stars where the actinic light is apparently greater than the eye magnitude), and thirteen to class B (stars where the actinic light is apparently less than the eye magnitude); so that about one-third of the total number show divergence from the eye magnitude. As might be expected this produces a very considerable change in the aspect of the stars, and on the plate the constellation of Cassiopeiæ, which is well known from its curious W shape, becomes altered; for Alpha, which is the second star at the bottom of the W, is greatly reduced, while Kappa, the third of the top stars, is equally increased in magnitude. Two stars known as Upsilon One and Upsilon Two, which appear to the eye of the same brightness and of the same colour, come out on the plate—one very considerably less than the other. In both plates minor changes of the kind are very noticeable. On the Taurus plate two stars of equal magnitude and equal colour come out a magnitude and a-half different.

As regards the planets, Saturn was photographed in the Taurus plate. At present we can only go upon the evidence of this single plate; but, from a very careful comparison, there seems little doubt that Saturn's reflected actinic light is only equal to that of the star named Eta Tauri.

When we consider the important part chemical light plays in the vegetable world we shall see at once how extremely interesting the question of actinic star light becomes. If the actinic light in the sun was greater or less than it is, remarkable changes would be produced in the world around. When a plant grows in the dark, its leaves are colourless. A very simple instance of this occurs in our every-day life in reference to celery, which, if not banked up and protected from light, becomes bitter, while the colour is altered to red. On the other side, the experiments of Dr. Siemens in forcing plants under the electric light have shown what an effect the increase of actinic light has upon plant life. Indeed so strong was the action that it was found necessary to shield the plants by placing a globe of glass round the light, otherwise they were killed by its intensity. The question as to whether other worlds are inhabited like ours has ever been a favourite one; but now, by the application of photography, we may produce new evidence, if we can determine the actinic light in each of the stars. Thus a new field of research is opened out, and doubtless it will yield a rich harvest in due course of time.

T. E. Espin, B.A., F.R.A.S.,
Special Observer to the Liverpool Astronomical Society.

DEVELOPMENT BY NAKED LIGHTS.

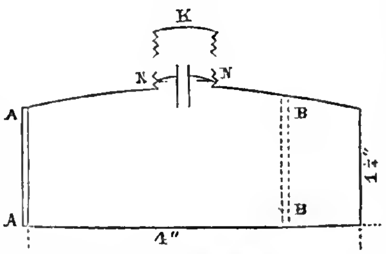
The necessity which exists for lightening the weight of passengers' luggage in travelling on the continent—also for lessening liability to damage by fracture—induced me, recently, to try what could be done in the way of abolishing photographic lanterns, and at the same time to conserve the power of working by a good light. In the copy of last week's Journal, to hand to-night, I see that for other reasons Mr. W. M. Ashman has been working in the same direction, and trying the influence of coloured flames.

Some ten years ago, at Kew Observatory, I saw the method in use, by Dr. Balfour Stewart, of developing photographic waxed papers by means of a Bunsen's flame primarily supplied with so much air as to destroy all the white light of the common gas used, and secondarily to then charge the flame with a soda salt, to give yellow luminosity. In travelling one cannot depend upon being able to invariably obtain gas, and, were it otherwise, the carrying of sufficient tubing, with mouthpieces of variable diameter, would prove a practical objection. Hence I fell back upon the plan mentioned by Mr. Ashman, of utilising the flame of a spirit lamp. Even for an ordinary photographic lantern, Mr. Donkin had to carry a metallic screw-topped lamp to Switzerland, and I surmised that by substituting alcohol for the oil, with or without the addition of soda, his lamp-glasses and frame ought to be unnecessary.

Dr. Balfour Stewart's plan was to suspend a bead of one of the melted salts of soda in the flame, on a loop of platinum wire, but the particular salt of soda he used I have forgotten; I remember, however, that the bead was when fused a liquid one, that it had then a tendency to drop off the wire, and required renewing with some frequency. My intention last week was to try the salts of soda all round, until in talking over the matter here with a chemist, Herr F. Brunck, of Züricher Strasse, Lucerne, he suggested the trial of biborate of soda, because that salt would form a bead on the loop considerably permanent either in the heat or in the cold, and yet would yield soda enough to "yellow" the flame, the quantity necessary for that purpose being but a trace.

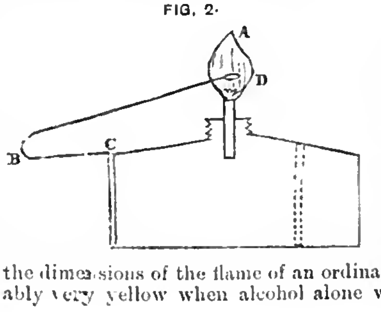
Accordingly a lamp was made for me in the town here, as follows:—

FIG. 1.



It was simply a lamp of brass, of the dimensions indicated in the cut, with the top K, to screw down tightly upon the neck N N, after which by the pressure of the top upon an india-rubber ring, the whole was made liquid-tight, so that the alcohol in it could be carried without spilling in baggage. Three fine tubes were soldered to my order outside this lamp; one of them is indicated by A A, another by B B, *fig.* 1, the third, of course, being the other side of the lamp. The small bore of these three tubes would permit the insertion of a somewhat fine wire—one thin enough to be bent into any desired curve by the fingers.

FIG. 2.



The wire, being bent into the form C B D, *fig.* 2, held in the loop D, the bead of biborate of soda in the spirit flame A. The shoulder B furnished a simple means of readily turning the bead D into or out of the flame A, for comparative experiments, as well as for regulating the elevation of the bead.

One evening I regulated the flame until it had about twice the dimensions of the flame of an ordinary candle. The light was palpably very yellow when alcohol alone was used, but on inserting the biborate bead, which was about as big as a cherry stone, it became yellower still. I then took a Fry's dry plate, and exposed different portions of it to the light, when free from biborate of soda, four different times, so that five sections of the plate had been acted upon respectively, for 3, 6, 9, 12, and 0 minutes. Next I inserted the biborate bead, thereby making the flame obviously yellower, and exposed the next plate from the same batch in the same way and for the same times. These exposures were all made at a measured distance of eighteen inches from the flame. Both plates were then developed at once in the same dish, with the same developer.

The result was unexpected. They both were much more acted upon than I anticipated from such a yellow flame, and no advantage had been gained by introducing the biborate of soda. That plate, indeed, was actually very slightly more intense than the other; but this may have been from a slight difference in the manufacture of the two plates, or from slight variations in the exposures governed by measuring them with the seconds' hand of a watch.

Spectroscopic examination of the two flames gave similar information to the photographic experiment. A very feeble blue and violet spectrum was to be seen with both flames, an intensely strong yellow one, and the light was fairly strong in the red. Yellow, we know, acts to some extent on bromide plates.

Although the light—in which I afterwards made no further use of the soda—thus fogged plates at eighteen inches distance, when exposed to it dry at right angles for a minimum of three minutes, the effect for this shorter exposure was but feeble; so that I saw at once that I could develope my plates by the light at double that distance with comparative safety.

The great point to remember in developing plates by bare lights is that the intensity of the light varies with the square of the distance. On this principle it was a common practice with me in the days of the old wet-plate process to print a transparency at from 6 to 15 inches from a candle, and to develope it at from 2 to 3 yards from the same candle; slips of cardboard at the edges prevented the wet surface of the hinder plate from touching the negative. I used to get sharp lantern pictures, with bare glass in the shadows, with impunity by this method.

All the negatives taken by me the last few days have in consequence been developed at more than a yard from a spirit lamp flame, taking care to let even that light fall on each plate as little as possible, and to let the sides of the dish generally keep the direct light off the film until the image was well out. The experience is satisfactory enough to probably prevent my having anything further to do with photographic lanterns when travelling. There is no more veil on the negatives than on the average of those I have seen developed by photographers in ordinary dark rooms appertaining to studios. The very feeble veil which exists would probably be removed by one of the usual clearing solutions. It is a great question how far the feeble veil in negatives is due to the light of the dark room; and, however dim this may be, those photographers who have not tested theirs by exposing a plate to its action for from three to fifteen minutes are not perfectly acquainted with the nature of their appliances in daily use. I was exceedingly surprised to discover in these experiments how much printing could be done on gelatine plates with a low and ghastly yellow light.

Still I am not satisfied, but wish to work with a bare and brilliant light; so I shall have to try the salts which give red and green flames to alcohol. Putting them in the alcohol itself is not an efficient plan; they (at least those generally known) are not volatile, they clog the wick, and, being much below the centre of combustion, have a minimum of influence on the flame. This is easily seen in the Christmas-party experiment of burning weak alcohol charged with salt. If the salt in the dish be below the level of the liquid, the effects are tame; but when lamps are put in, the upper portions of which are in the flame itself, the effects are exciting to unscientific observers. Of course there must be no other light in the room.

Probably Mr. Debenham's discovery will have little practical effect in preserving the good eyesight of photographers, the adverse influence being possibly due more to the low intensity than to the colour of the light. In the dark the pupils of the eyes dilate, and this is to be pre-eminently seen in the example of the eye of the cat, whereby pussy is able to see well in comparative darkness. Intermarriage between lady and gentlemen photographers would in a few generations probably produce a race able to see as well as cats in a feeble light; but this is not what is wanted, and it is not desirable to weaken the power of the eye in ordinary daylight. What is wanted is to first secure a light which does not act upon photographic plates, and then to use plenty of it.

Daylight will probably be found to be about the worst light to filter through screens to give this result; it contains such powerful chemical rays in the first instance. It will be best to make a start with a light emitting rays of low refrangibility, so as to have the minimum of high ones to abolish. A large Bunsen's-burner flame or a large spirit lamp flame, *plus* soda or strontium, with a thin screen of Mr. Debenham's cathedral yellow-green glass, would probably go far to solve the problem in permanent developing rooms, though for travelling I expect to use no more screens of any kind till one which does not break or tear is introduced. Why should not *ruby oil-silk* with Mr. Debenham's colours be made? The best developing light for bromide of silver I ever saw in a permanent studio was at the bromide paper-making works at Greenwich, and was founded on the principles herein laid down. The original light was that of a fish-tail gas burner turned up to full height, and placed in a kind of cupboard near the ceiling of the room. The door of the cupboard consisted of a very large area of thicknesses of orange paper. Large filtering surface, combined with considerable distance from the source of light, are elements of safety even with good luminosity. It was possible to work in any part of that room with comfort and without straining the eyes. A newspaper could be read with ease. Small lamps, as Mr. Donkin says, are bad in photography.

With brass lamps made as herein described there would be no great objection to add three steel knitting needles to the weight of the baggage, and the three needles inserted in the three tubes outside the lamp might serve to support the top of the camera stand, the centre of which would form an opening for the escape of the products of combustion. Then, if some enterprising man will but introduce a very flexible and transparent, non-actinic, untearable fabric, such as properly stained oil-silk, a conical cylinder of that substance, open at both ends, might be suspended over the skeleton framework just described. The objection to orange paper in travelling is that it is liable to tear and thereby give trouble at an inopportune moment; the objection to ruby glass is that it is always liable to breakage. W. H. HARRISON.

Hotel du Lac, Lucerne, Switzerland.

A WORD ABOUT STUDIO BUILDING.

FROM the advent of photography to the present time much has been spoken and written about this theme; nevertheless, I still cherish the hope that my small communication will not be found devoid of interest. Far be it from me to pronounce a decision regarding the different views of photographers as to the lighting power of flat and sloping roofs, over which there have been great disputes. On that question I offer no opinion, the real object of this communication being to treat of how a studio can be made to last for the longest possible time in good, substantial condition, and water-tight. The continual annoyances which are in store for the occupier of a badly-built glass house, and the inconveniences occasioned by repairs, are unfortunately only too well known, so that anyone may consider himself fortunate who is able by constantly-active attention to exercise his calling under a really water-tight glass roof.

It is well understood that two persons are required for every solid building—the technical man and the practical man. Who are or have these, almost without exception, hitherto been? For the first the builder or master-mason, and for the second the proprietor of the building, who is preferably the photographer himself. This would be all very well if these two gentlemen were always agreed and wished to understand each other, but that is hardly ever the case. In a word: the one could easily do what is required, but he does not, or, rather, will not take the trouble to understand what *is* required; while the other comprehends very well what is wanted, but cannot do it himself. His instructions and directions do not usually combine easily with the manner of execution customary in the building trade, and they are the rather allowed to fall to the ground, since an experienced builder must surely know best; and when he assures one that this or that drawback can be removed in some other way the photographer, who is no builder, is overruled, is fain to be persuaded that the builder's way is the right one, and the result is and remains the usual one—mistakes are made and are only observed when too late.

But there is a third person who might be taken into council but who is seldom consulted until it is too late, namely, the glazier. Unfortunately, he is nearly always left out of consideration, and is only called in when the building is nearly finished to complete, generally in great haste, the edifice. Any objections which he might make are now useless; for, even if he were acknowledged to be right, it is now too late to make any alteration, especially as a look at the sky is sufficient to convince him that haste must be made to get the roof on dry. Permit me, as a glazier of twenty years' standing, to relate my experience in this matter.

In the first place, it is especially necessary, in erecting the iron framework which is to support the glass, to insist (and this is still more imperatively necessary when the glass house is built out upon old roofs) upon the framework being independent of any neighbouring roof; that is to say, that even when the glass roof and the house roof are connected each part must have its separate supports. Above all, beams and rafters traversing both roofs are to be avoided; for, when persons walk about on the firm surface of the one, as often happens, that of the glass is shaken or bent, by which the outer skin of the putty is broken and water holes inevitably formed. The avoidance of these water holes is best attained by imparting to the putty a skin and maintaining it intact, which is best done by painting over the putty at least once a year with oil colour so as to prevent air and sun from acting upon it; for this water-tightness is, next to light, the chief requisite of a glass roof.

It is further advisable (though, unfortunately, this recommendation runs counter to the new plan of building) that the iron astragals should not be too massive, particularly in their breadth, as the greater the mass of putty which has to be spread upon it the more and the sooner will it dry up and shrink together, and consequently it will the sooner peel off from the glass. The dimension of astragal most suitable with a height of a centimetre and a-half is a width of three-quarters of a centimetre—that is, groove-width, but not much stronger. It is then also advisable that the width of pane selected should not much exceed twenty c.m., but rather that it should be somewhat less, otherwise the proportions will not be agreeable, the width being usually taken to be about two-thirds of the height of the pane. With a greater breadth this would not be practicable, as the individual panes would then offer too large a surface. The larger size would also render it more difficult to press the panes into the putty, whereby air-bubbles would be apt to remain in the latter, and these again are the direct causes of water holes.

I am speaking here of the common double glass; it is rather different when plate glass is used. There, there is no question of the surface, because the latter is perfectly even, and the glass presses firmly in by its own weight if the putty be merely prepared for it. It is of very special importance that the putty should be prepared with varnish and not with linseed oil, because the former dries slowly from without inwards, whereby an external skin is formed, which prevents any air from penetrating, and the putty always remains fatty. On the contrary, putty prepared with linseed oil puts on no skin, and is, therefore, very soon soaked off.

Then it is decidedly a great mistake when, as almost always happens, the expanse of glass is covered at the sides either with zinc or with roofing felt, &c. The real aim is quite missed if the intention be, by this means, to afford a protection against leakage. Under this covering surface dust and soot soon settle down firmly, and the rain-water trickles down and soaks in further and further, even beyond the end beams, and then the water-tightness suffers, and rot sets in, for it is never dry under the covered part.

Now, if the end beams be made relatively thicker and the covering material be laid in the groove before the glazing is commenced, so that the glass and putty are outermost, as at the middle part of the roof, this fault is not only cured but any repairs that may be required become very much more easily executed, while before they were almost impossible. Nearly every occupier of a glass-house will testify that the gables are the parts which suffer most from leakage, and that leak first of all. If the covering be of zinc, the precaution should be taken of going over it well several times with good oil paint before glazing, because zinc is known to be much less porous than iron. For the latter a single coat of paint is sufficient.

I have now to speak of an extremely-important point, with which many casualties are bound up, and which, unfortunately, no builder of glass houses seems to keep in mind, though it comes so near home to him. I mean an apparatus for securing the safety of all workmen who have to execute repairs, &c., upon such a roof; and yet it is a small thing to offer the person in question sufficient security, namely, if at intervals of two to three feet distance, upwards, a simple peg of iron be made to project for about a centimetre from each alternate astragal, so that the planks which the workman uses for walking upon might strike against them. When this is done it depends solely on the workman himself if anything happen to him, for the feeling of security lightens labour. Even the smallest movement of the plank on which one stands inspires fear and is sufficient to cause great injury and damage, as has repeatedly happened to myself. The thought that one is suspended at a height of five to six storeys appeals to one then in all its terrors.

I take this opportunity of inquiring why the police regulations only require these safety hooks or pegs upon slate roofs. Is it because it is more difficult to work upon a slate roof—which, as everyone knows, has always flat side-edges, and upon any and every part of which one can step or sit—than upon a glass roof, where there are only the slender iron astragals, which offer a most doubtful hold?

It is, nevertheless, a sad fact that this question has not been more minutely touched upon by the authorities, who have arranged so many protective measures for other purposes; and I believe there is no word of these small pieces of iron on the roof which are so small in size but have such important effects, though they prescribe such enormously-great solidity for the iron framework of the studio. As this precaution, therefore, seems to be still, as it was formerly, left to be voluntarily adopted, it would be well if all photographers or other traders who have occasion to build a new glass house would, as an act of self-help, insist upon the builder inserting these precautionary pegs, as it would then be easier for them to mount the roof either to clean the glass or the gutter.

Now, with regard to the great collections of dirt in the gutter: it is my opinion that a great deal of it is caused by the lowermost panes almost always projecting past the centre of the gutter, so that the rain water only washes one side of it, and that the outermost one; while on the other side it leaves untouched the dust, which easily accumulates under the projecting glass. Now, if the fall of the roof were so arranged that the lower edge of the lowermost panes should terminate just where the hollow of the gutter begins, then both sides of the latter would be equally washed, as the fall of the water would not be kept back, but rather would be led directly off the roof, thus the gutter would be less apt to become dirty or choked. If the iron pegs spoken of above as precautions for safety were there also, it would be but a trifling matter to give the gutter a frequent cleaning.

In conclusion: I beg all those interested in the erection of glass roofs to give the advice contained in the foregoing remarks a trial, both in their own interest and in that of the general public. There is no risk involved in the experiment, and I am firmly convinced that this method of construction would offer advantages exceeding all others, and would not be more costly. EMIL FUCHS.

—*Photographische Mittheilungen.*

RE-SITTINGS.

"STILL harping on my daughter!" It might appear quite superfluous to again revert to the subject on which I am treating, but for the fact that there is still a "thousand-and-one" varieties of opinion entertained on this same matter. Somebody says something to the effect that "Many minds make wisdom." Perhaps the source of my quotation is somewhat vaguely expressed, nevertheless it must suffice, as the excuse for my saying my little say.

Possibly no rule would exactly meet all classes of re-sittings; still, all things considered, I think it is usually best that a nominal fee—say just about sufficient to pay for materials—should be charged on each of these occasions, excepting where the manipulations or the photographers themselves are directly at fault. I mean, for instance, in the event of under- or over-exposures, imperfect lighting, blemishes, unsteadiness, and bad positives or expressions.

Of course, these defects are supposed to have no right to exist, and then free re-sittings should be courted, even for the photographer's own credit; but where the portrait is photographically satisfactory and the objection resolves itself into almost a question of taste, or even ordinary expression, then, certainly, I would conclude that a fee should be charged, alike in fairness to other customers and to secure the photographer from pecuniary loss through faults that are not his. Furthermore: it prevents those people who re-sit just through sheer wantonness from bothering photographers—people suffering from that melancholy complaint of having "nothing else to do;" and, however much may be said about some sitters being glad to get the operation over, yet I know from personal experience that there is still a fair percentage who eagerly seek this means of killing time so long as the entertainment is free of charge.

Let me state why I think it only just to all clients that re-sittings should be charged for all round. We may accept it as indisputable that a commercial photographer arranges his prices with a view to leaving himself at least a fair margin of profit. Then, if this profit be sufficient to include the expenses of a free re-sitting, certainly the majority of his sitters—those who are content in the first case—pay for what they do not get; or, even if the profits are such that re-sittings were to make the individual order a losing one, yet the surplus must come somehow, and the other clients are still, more indirectly, paying towards the extra work for that particular customer.

Another matter, on the ground of consistency, I venture to take exception to—the system so frequently adopted by photographers of destroying the first plates when re-sittings are given. It smacks of a greater feeling of independence than may be made a rule to indulge in in these latter days of photography. It seems to me very like seeking redress from the doubtfully-congenial task of punching one's own head! Satisfaction to the customer and gain to the photographer certainly go hand in hand, and all the profession will be able to call to mind many cases where the client, although desiring to be reasonable, has only become contented with the first proof by the time it had been compared with one from a second sitting—not, I may hasten to add, only due to the first picture being bad and the second one worse, but because they invariably find that the representation of their features is different to the hazy and too favourable impressions which it seems to be inherently natural that they form on the subject themselves; and this impression has to be gradually rectified by the combined influence of the "likeness growing on them" and the approving expressions of their friends.

In the event of this by no means uncommon revulsion of feeling I fail to see any advantage the photographer enjoys by the first negative being destroyed. Nor can I agree that the conditional offer to keep the negatives exactly meets the requirements of the case; for it is in every way probable that at that particular moment the client may really not care for the proofs, and be quite willing to have the plates destroyed if the photographer be so injudicious as to suggest it. It appears clear to me that the preserving of all negatives, coupled with a reasonable extra charge for such re-sittings as I have enumerated, is still the most rational means of fair compensation all round. There is no unjustness to one client through another having extra positions submitted, and the photographer increases his chances of receiving a good order proportionate to the extra possibilities of the individual sitter being satisfied.

While we endeavour to frame laws for our protection from imposing demands, still the sitter should always have "the benefit of the doubt;" and I cannot too forcibly remind all photographers, who respect themselves and their profession, of the every-day increasing necessity to avoid palming off indifferent work. The education of the general public to better photography is gradually but surely progressive; they will no longer continue to tolerate the "soot and whitewash process," nor any of the glaring defects that used to be either unseen or looked upon with a lenient eye as incidental to a new discovery. In these days of ultra-keen competition, if we do not harken to reasonably just complaints the rival establishment near by will do so, and farewell the patron.

I trust it is understood that I do not advocate fawning to clients; far from it. If their objection be decidedly unreasonable and the complaining person be obdurate on the matter of making further payment for extra sittings, then let him or her go. No photographer should entertain the idea of remedying an evil which possibly does not exist, and in genuine cases of this kind he will be most respected in the end, even by the grumbling customer who respects himself. But if there be really cause for exception to be taken to his work, and the photographer is confronted with it, then so much the better ultimately for both him and his profession. The same principle which governs necessity as the "mother of invention" forces the compulsory demand for better work to most naturally expand the elastic-like resources of our art-science; and it is this always increasing requirement more than all else besides that is gradually raising photograhy from out of the slough of mediocrity in which it has been so deeply embedded.

I "kinder calculate" that the Editors of the Journal will be comparing the length of my remarks and the limit of their space with not too-friendly-disposed feelings, so I shall show the better part of valour and retire. Let me conclude with the statement that one of the best means I know of to enlist the sympathies of the operator with the whims of his model is for the said operator to have an occasional negative taken of himself. He may *say* that the resulting portrait does him every justice, simply because he feels some amount of diffidence in giving vent to the same stale objections which he has "pooh-poohed" over and over again in the case of his clients. Nevertheless, in his heart of hearts, the possibilities are that he is wondering how the short-sightedness of his friends can make them admire such a caricature on the classic lineaments of his well-proportioned physiognomy. Nor is he apt to look upon those sitters who show occasional indications of unsteadiness during exposure as quite such unmitigated dunderheads after he has himself spoiled some two or three impressions in succession from the same cause; indeed, I am not prepared to state but he then begins to conclude that unsteadiness is due to some finer sensibility of nerves than those possessed by such common people as present an unflinching front to the camera.

LYDDELL SAWYER.

AMONG THE SOCIETIES.

In the course of a discussion on the employment of green glass in the operating-room, and which took place at the London and Provincial Photographic Association, Mr. A. Haddon asked a question as to how it was to be accounted for that leaves of trees make an impression in the camera if green light be so inactive in the developing-room. Upon Mr. Debenham replying that leaves of trees reflected a great deal of white light as well as green, Mr. Haddon wished to know why the leaves did not come out upon an iodide plate as on bromide if the white light acted. Mr. Debenham spoke of white *as well as* green light, and it is just because the iodide plate is impressed only by the former that the results as regards foliage were, as a rule, so inferior to those obtained with bromide.

An addition has been made to the practical applications of balloon photography, in the shape of the camera exhibited by M. Triboulet at the last meeting of the Photographic Society of France. When a panoramic or general view of a district is required for military or other purpose a captive balloon is employed to carry the photographic apparatus, the exposures being made by electricity. But instead of taking a series of successive pictures—which, in consequence of the motion of the balloon, renders necessary some special means of marking the position of the camera at each picture—six cameras are employed, and the exposures made simultaneously, thus securing at one *coup* a complete panorama. If a ground plan be required, an additional camera is worked from the bottom of the car.

At the semi-monthly meeting of the Photographic Society of Great Britain the chairman made a practical suggestion in connection with lantern slides, namely, that they should be printed upon quarter-plates instead of upon the usual $3\frac{1}{4} \times 3\frac{1}{4}$ size, in order to allow sufficient room for a description that will be legible in the darkened room. Mr. Sebastian Davis's experience during the series of lantern displays in connection with the Society's exhibition has, no doubt, led him to proffer this advice. It may be remarked that the Woodburytype slides of the Sciopticon Company are made this size.

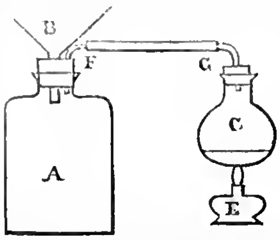
DR. STOLZE ON THE FIXING BATH FOR THE EMULSION PROCESS.

In the *Wochenblatt* Dr. Franz Stolze writes regarding the treatment of the fixing bath in the emulsion process:—The question of how emulsion plates should be fixed is coming more and more to the front. Though some maintain that the use of freshly-prepared hyposulphite is absolutely necessary, yet the results of theoretical and practical investigation seems to lead to the conclusion that while the fixing bath still contains enough of hyposulphite of soda to dissolve the haloid salts of silver quickly and energetically there is no danger in using it. That one must wash the plates thoroughly cannot be recognised as a sound objection, since that is also necessary when a fresh bath is used.

If there be, then, nothing respecting the permanency of the emulsion plates to be urged against the continuous use of the same fixing bath which is only occasionally strengthened, the question arises whether on other considerations it is advisable to do so. The benefit of using an old fixing bath is twofold:—First, there is its increasing strength, and then there is the possibility of recovering by suitable methods the great quantity of silver contained in it. He who knows what quantities of silver are gradually consumed in the emulsion process as bromide of silver—and that only a small part of that quantity is reduced in the developing bath, while the pridcipal reduction takes place in the fixing bath—will not lightly value the last circumstance. But when the same fixing bath is used continuously for a long time, and is only strengthened when it requires it, one wholly renounces the possibility of recovering the silver and rather carries the quickly-saturated solution on to the washing water, where it is lost. Now, if one wish to profit by both of the advantages indicated above, he must strike out a middle path which will lead easily and surely to the desired goal. If one only uses a fixing bath as long as it works easily and willingly, and replaces it by another as soon as it begins to work sluggishly, it will be easy to recover the silver from it. But then the newly-made-up bath, until it has been some time in use, exerts no strengthening, but rather a weakening, action. This drawback, however, can easily be removed if about a quarter by volume of the old bath be retained and added to three quarters of the new bath, just as many photographers do with the positive fixing bath. The bath then never behaves towards the half-tones like a perfectly new one, and yet one can recover the whole of the silver.

The next question that presents itself is—How can the silver be best recovered from the old bath? Perhaps the most generally-adopted of all known methods is precipitation with sulphide of potassium; and where it is a question of a quick and sudden separation this method has the advantage that the sulphide of silver falls in large flakes, and settles down very quickly. But for many studios this procedure possesses a great disadvantage, which not only renders it troublesome and inconvenient, but also dangerous to the other preparations; that is to say, where this operation cannot be carried out in the open air, but has to take place in closed apartments, the greatest precautions are required to protect silver baths, sensitive paper, emulsion plates, &c., from the action of the sulphuretted hydrogen gas given off. I would, therefore, call attention to another method by which the silver can be as completely—though more slowly—precipitated, and in the metallic state. Dr. Lagrange has already recommended ferrous oxalate developer for this purpose, and for this use it was recommended in the *Wochenblatt* that it might be made from cheap chemicals, even though not absolutely pure. In spite of that this method still seemed too expensive, until the idea occurred to me of using developer—either ferrous oxalate or pyrogallic—which had already served for developing plates. The former is at present *generally*, and the latter *always*, thrown out. Yet, since but a small part of their deoxidising power is exhausted, though they are no longer usable as developers, they were at hand to try whether they could not be serviceable for the present purpose. The experiments made succeeded beyond expectation. In every case, even when a great quantity of sodium sulphite was present, the developer acted excellently. The silver was completely precipitated in a few hours, and could then be separated by filtration from the mother-ley. I arrange matters as follows:—As soon as my fixing bath begins to work sluggishly, I pour three quarters of it into the stone jar in which it is to be precipitated, and every time I develope a plate I add the used developer also. It is not long until all the silver is thrown down. When any work to speak of is going on this will take place in a few days, a fact of which one can easily be convinced thus:—When you think that all the silver has been thrown down, take a little of the clear liquid from the upper part of the jar and put it in a test tube with some liver of sulphur; if there be no longer a precipitate, then all the silver has been thrown down and the liquid can be decanted off, leaving room for the next bath to be poured in to be precipitated when it is saturated.

Whenever there is enough precipitate collected at the bottom of the jar it has to be filtered and washed. To accelerate as much as possible this very wearisome work, I advise the employment of C. Beckett Lloyd's filter, which is excellent for this purpose. In order to be able to use it for large quantities I have given it the accompanying form. Into the neck of a capacious bottle A a funnel B is inserted, as air-tight as possible, by means of a gutta-percha stopper rubbed with vaseline. Through the same gutta-percha stopper a bent glass tube is passed, which is connected air-tightly with the wash bottle C, containing water, by means of a gutta-percha tube F G. The water in C is brought to the boil by the flame of E, and the steam finds its way into the bottle A. As soon as the latter is filled and the steam comes out of the funnel put a plug of clean cotton into the pipe of the funnel, and remove the flame from under C. Whenever the steam begins to condense, if the precipitate in the jar be poured into the funnel B, it will be rapidly freed from the mother-ley, which will be energetically sucked down into the bottle A; a water pressure of 10 atmospheres being brought to bear upon it, while 0·20 of one is the most that one would otherwise find available. This fifty times greater pressure furthers the work easily and rapidly. When the mother-ley has all been sucked out pour in water and dilute muriatic acid, and, especially as it is easy to fill A with steam from C repeatedly, it is easy to obtain an unusually pure silver powder in B.



Of course the same apparatus serves for the filtration of chloride of silver, should one not prefer to reduce it also with old developers and then to treat it along with the soda residues. Whether, or in how far, it is possible to work up the silver powder so obtained into nitrate of silver I cannot yet say, but shall set experiments on foot. But without that the whole procedure is very simple and particularly valuable, because by the way of freeing it from the ley which can be so rapidly done here, the silver powder is at any rate pure enough to let the photographer know pretty exactly how much his ingot ought to weigh when smelted. For practical purposes I would recommend that the steam kettle C should be made of tin, as it would then be more durable and reliable, especially if it were made to end in a metallic tube without the intervention of a cork. It is, of course, evident that not only the fixing bath of the negative but also of the positive process may be precipitated in the same way and in the same jar. The whole process has the advantage of being self-acting with the exception of the filtration. I may here mention yet another use for the soda bath, by which all methods of recovering silver residues are reduced to this one. If, for instance, one has some useless emulsion, he only needs to press it as nodules into the fixing bath or to pour it in fluid. The bromide dissolves in the soda and is likewise reduced to the metallic state. In this way the boiling with acid, which is so disagreeable to most photographers, is avoided. Now, with regard to the soda bath: when in use the method recommended in the repertorium may be employed of always having two fixing baths in use and employing them one after the other, always making the last one the first, and replacing it by a new second one whenever the old first works slowly and has to be put into the precipitating jar. But with careful working I do not consider this modification *necessary*, though it gives very reliable results.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 5,827.—"Production of Transfer Designs." G. E. Lardeur.—*Dated December* 21, 1883.

No. 5,896.—"Improvements in Apparatus for the Production of Photographic Negatives to be Used in Photolithography, Photozincography, Photo-engraving, Photo-etching, or Phototype Productions." A. Borland, —*Dated December* 28, 1883.

No. 5,947.—Preparation of Photographs and the Treatment of Drawings or Designs Printed upon Paper or other Suitable Material for the Purpose of Imitating Stained, Ground, Cut, or Embossed Glass, or to be Employed for other Useful or Ornamental Purposes." G. Rydill.—*Dated December* 31, 1883.

No. 8.—"Photographic Cameras, known as Portable, Folding, or Tourists' Cameras." F. W. Hart.—*Dated January* 1, 1884.

No. 114.—"Producing Vignetted Photographs." H. Vander Weyde.—*Dated January* 1, 1884.

No. 175.—"Production of Picture and other like Mounts." W. Morgan, —*Dated January* 1, 1884.

No. 229.—"Construction of Speculum." J. W. Ayres.—*Dated January* 1, 1884.

A METALLIC PLATE-BOX.

If there be one photographic appliance better known than another it is, we imagine, the grooved plate-box. In the early daguerreotyping days they were in a large measure formed of tin; zinc, too, was not unfrequently employed. Both of these are still occasionally pressed into the service of the plate-box manufacturer, although wood is almost universally preferred. Under what circumstances M. Antoine Lumière, of Lyons, sought to obtain a patent in this country, in 1883, for a grooved tin plate-box for holding photographic plates forms a problem we shall not attempt to solve. From the fact that the protection did not extend beyond the provisional stage we infer that he has thought better of his original intention. The lapsed specification is as follows:—

The invention consists of a metallic box, intended to contain previously-prepared dry plates for photographic purposes, and to preserve them from all exterior action of light, of humidity, or of any other agent which could injure them.

The plates are enclosed therein directly after their preparation, and can then be transported by sea and by land in all climates without having to fear any alteration.

The photographer can preserve them indefinitely in good condition. In travelling the boxes which have been emptied can serve for various manipulations, such as for washing the negatives and protection against dust.

The negatives which are not to be developed until later can be replaced therein, and carried home protected from light and from all other deteriorating influences. This box and its cover are constructed of tin plate or of other convenient sheet metal fulfilling the necessary conditions of solidity and inalterability.

The height of the box is a little less than that of the plates which it is to contain; these latter are held therein in parallel grooves formed of a corrugated sheet soldered to the lateral walls, which are thus strengthened. The four vertical faces are also strengthened by projecting ribs of various forms.

The cover is provided with a shoulder parallel to its edges, which limits its application to the box in such a manner as to cover without touching the upper edges of the plates which project above the box.

The plates are thus held perfectly without contact, and can be easily placed and withdrawn by their upper edge.

All sides composing the cover of the box are carefully soldered by the overlapping of one of them over each edge in such a manner as to render the whole perfectly tight.

The closing is effected by a sealing with cement, sealing wax, or any other material preventing the entry of light, covered, if required, with a band of cloth or paper.

MANUFACTURE OF COLOURED PHOTOGRAPHIC PICTURES.

Under the above designation Mr. Josiah Adams, Jun., of Liverpool, entered the specification of a patent which did not pass beyond the provisional stage. It is as follows:—

In colouring photographs on glass, unless the colour be in the glass itself, and the photograph on the face, it has hitherto been considered impossible to get a uniform tint to the background, as air gets between the white paper used as a backing and the glass, and causes deepened shades.

If a glue or other adhesive be used, the paper is darkened and a greenish hue ensues. Now, as photographs made on first-mentioned plan, commonly known as opal glass pictures or "opals," are very expensive, it has long been a great desideratum to obtain pictures in which the whiteness of the opal glass is combined with the cheapness of the transparent glass. In opal glass, too, the paint being between the eye and the photograph, the fine gradations of the photograph are obscured thereby, and it is very difficult to paint an accurate likeness without a sitter. In the transparent glass photographs the paint is behind the photograph, and is seen through it, so does not obscure the photograph, and need not be so accurate and artistically done.

My plan of operations is to place the photographic image on the back of the plate, then paint its outer surface either after varnishing or otherwise. When the paint is dry, coat the entire back with a mixture of oxide of zinc, gum, and balsam, or oxide of zinc and a drying oil. In place of oxide of zinc the sulphide of zinc may be used, if the colours used do not chemically decompose it, or other suitable chemically-neutral pigment could be used with either of these menstrua. While the gum—which can be gum copal, gum elemi, or other like transparent gum—is still wet, a sheet of pure white cellulose paper is laid on in such a manner as to avoid the enclosing of air-bubbles, and gently pressed against the photograph, so that the menstruum in which the oxide of zinc or other pigment is suspended shall penetrate the pores of the paper, and be thus by capillary attraction withdrawn from the surface of the photograph. The paper is allowed to dry on the plate, and as evaporation goes on on the outer surface of the paper, still more of the menstruum is withdrawn from the surface of the plate. The result is, when the whole has set, a clear, closely-adhering coat envelopes the surface of the plate, and an effect almost, if not quite, equal to opal glass is obtained. Instead of pure cellulose paper other bibulous material could be substituted; but it must be absorbent, not brittle, and absolutely neutral chemically. The bibulous matter in some instances can be done away with altogether. Thus, if a varnish menstruum be used it can be laid on thick, and, before setting, the outer surface repeatedly but gently washed with ether. The ether having a strong attraction for the menstruum rapidly draws it from the surface of the plate, leaving the pigment against the latter. The result, however, is not as good, as it is liable to scratch or rub off, and is but a poor and expensive substitute for the process already described.

PROVISIONAL PROTECTION GRANTED.

No. 5,681.—"Improvements in and Relating to Colour Printing, also Partly Applicable for Producing Coloured Photographs." A communication from Auguste Bisson, Heliographic Engraver, Paris. W. R. Lake.—*Dated December* 8, 1883.

No. 5,461.—"Preparing and Producing Coloured Photographs." A. Kepler, A. M. de Premion, A. Pigeau.—*Dated November* 20, 1883.

PATENT LAPSED.

No. 5,176.—"Turntable for Posing of Sitters or Models for Artists' and Photographers' Uses." J. P. Clarke.—*Dated December* 10, 1880.

FRENCH PATENTS GRANTED.

No. 154,970.—"Mounts for Photographic Albums." MOSER. Class 18.—*Dated April* 19, 1883.

No. 154,983.—"Packing and Preserving Sensibilized Glass Plates." LUMIÈRE. Class 17.—*Dated April* 19, 1883.

No. 155,005.—"Universal Screens of Photographic Lenses." RUDHART. Class 17.—*Dated April* 20, 1883.

No. 155,029.—"Improvements in and Relating to the Production of Printing Surfaces from Gelatine Reliefs." BROWN, BARNES, AND BELL. Class 17.—*Dated April* 21, 1883.

AMERICAN PATENTS.

No. 289,951.—"Photographic Developing Pan or Tray." W. IRVING ADAMS.—*Dated August* 8, 1883.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
January 7	West Riding of Yorkshire	Godwin-street, Bradford.
" 8	Great Britain	5A, Pall Mall East.
" 8	Bolton Club	Studio of the Club, Chancery-lane.
" 8	Newcastle-on-Tyne (Ann. Meet.)	College of Physical Science.
" 8	Glasgow Amateur	Institution Rooms, Buchanan-st.
" 9	Cheltenham Amateur	
" 9	Bury Photographic Club	Temperance Hall.
" 10	London and Provincial	Mason's Hall, Basinghall-street.
" 10	Manchester	Mechanics' Institution.
" 11	Ireland	Royal College of Science, Dublin.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AT the meeting of this Society, held on Thursday, the 27th ultimo, the chair was occupied by Mr. A. Cowan.

Mr. W. M. ASHMAN said that it had been stated that the addition of mercuric iodide to the pyro. and soda developing solution had the effect of shortening the necessary camera exposure in the proportion of five to one. He had, therefore, experimented in the direction indicated, and, having prepared the mercuric solution as directed, he had added three minims to the soda developer, composed of saturated solution of washing soda one ounce, bromide of potassium two grains, and pyrogallic acid two grains. He showed three plates, one of which had been exposed for five seconds and developed for three and a-half minutes with his stock developer, containing two grains each of pyro. and bromide and two minims of ammonia to the ounce. The second plate had been exposed for twenty-five seconds and developed for seven minutes with the soda developer without the addition of the mercury; and the third, which was exposed five seconds, had been developed, with the iodide of mercury added, for a period of seven minutes. The second plate appeared to have been properly exposed, whilst the first and third (especially the first) were decidedly under-exposed. He believed that the addition of mercury did exercise an accelerating action, but not to the extent claimed. He thought the gain in speed was less than double.

Mr. W. E. DEBENHAM remarked that, although the first plate (that which was developed with ammonia) appeared less exposed than the one which had had the same time in the camera and been developed with soda and iodide of mercury added, it was much clearer in the shadows, and he thought that an equal amount of detail might have been brought out if the development had been pushed to the same extent as with the soda plate. The ammoniacal developer which had been used contained less ammonia in proportion to the bromide and pyro. than was usual when it was desired to bring out the details of an under-exposed negative.

Mr. A. HADDON said that the soda developer gave a yellow colour to the negative. This might be temporarily removed by acid, but it returned when the acid was washed out of the gelatine.

The discussion then turned upon the use of a solution of mercury in iodide of potassium as an intensifier for negatives, and Mr. A. L. HENDERSON said that in the collodion times when a negative so intensified became yellow, it was blackened after thorough washing, by being flowed over in the light with a plain solution of pyrogallic acid.

Mr. HENDERSON then showed Mr. Starnes' lamp, which had been altered, in accordance with a suggestion made at the last meeting, by being painted chrome yellow on the reflecting surface, and fronted with green glass. In this state he had exposed a plate giving 24 on Warnerke's sensitometer quite close to the lamp for times varying from thirty seconds to two minutes. On the longer-exposed portions there were distinct indications of the action of the light. The light was very good for working by. At two yards from the lamp he could see well to coat plates.

Mr. H. S. STARNES said that on the previous evening a plate of Mr. Henderson's make, giving twenty-four on the sensitometer, had been exposed in portions for periods of from one to fifteen minutes, at a distance of two feet three inches, without giving any deposit on development.

Mr. W. COLES showed a much faded photograph which he had to copy, and inquired whether anything could be done towards restoring it.

Mr. HENDERSON suggested that it should first be copied in its present state, lest it should suffer in the attempt to restore it. He would after that try immersion in bichloride of mercury, followed by washing with lime wash. If ammonia were used it dissolved some of the silver. Some time since he had succeeded by converting the image into iodide, and then developing it with pyro. restrained by citric acid. Returning to the subject of dark-room lighting, he (Mr. Henderson) believed that the solution of the question would be found in the use of light of two colours, green and red, thrown upon one screen, which would serve as the source of illumination.

It was mentioned that on the 10th January Mr. Ashman would deliver his lecturette *On Printing*, and a resolution was passed that at all future meetings the chair should be taken punctually at eight o'clock.

PHOTOGRAPHIC SOCIETY OF BERLIN.

THIS Society met on the 6th November, when the chair was taken by the president, Dr. Hornig.

The CHAIRMAN intimated that he had received a communication from Professor Bruno Meyer, giving examples of the comparative worthlessness of the protection afforded to photographers by patents and copyright.

A short discussion followed, in which Dr. Eder and Baron Schwartz-Senborn took part.

Two sets of articles competing for Voigtländer prizes were received, namely, a set of carbon-printed lantern transparencies and a collection of enamelled photographs upon dials, &c.

The Chairman called attention to the objects exhibited.

Herr CH. SCOLIK remarked that he had been induced, by an advice by Mr. A. L. Henderson, in THE BRITISH JOURNAL OF PHOTOGRAPHY, on the preparation of gelatine emulsion with small quantities of bromide of silver, to make some experiments which led him to the conclusion that good results could only be obtained by observing the minimum of bromide of silver already indicated by Dr. Eder. He thought there was sometimes a tendency to use too small quantities of silver salts.

Lieutenant DAVID showed a wooden press (with a lever action) for gelatine emulsion, also a digesting apparatus.

A letter from Herr Eckert, of Prague, was read, in which he described a simple method of partially strengthening or reducing gelatine negatives.

A model of a dark slide in tin or sheet iron, recently patented by Herr Madar, was also shown. It combined lightness with greater stability than some of the cardboard slides that have recently been in use.

A collection of phototypes from the studio of Herr Studders, of Liepzig, and of autotypes from that of Herr Galiard, of Berlin, were handed round for examination, shortly after which the meeting was adjourned until the 11th December.

Correspondence.

BRISTOL INTERNATIONAL EXHIBITION.

To the EDITORS.

GENTLEMEN,—In your last number Mr. E. Dunmore makes some observations in connection with the late Pall Mall exhibition, attributing certain shortcomings to defective organisation, and instituting unfavourable comparisons with the Bristol Exhibition. I believe he stands as a successful exhibitor in connection with the latter, and when this is the case the defective organisation of exhibitions generally are seldom heard of, the success or otherwise of an exhibitor making all the difference. I will, therefore, with your permission, say a few words in connection with the Bristol Exhibition from an unsuccessful exhibitor's point of view, in the hope that, by drawing attention to certain sins of omission and commission, they may, as far as possible, be avoided in future exhibitions, both at Bristol and elsewhere.

First, then, the Bristol Exhibition, from its international character, now occupies the unrivalled position of the finest and, possibly, the most important in the world, the exhibits in the present instance amounting to the enormous number of *nine hundred*. From this it will be at once apparent how unreasonably small and inadequate to meet such circumstances the award of "thirty" medals presents itself, and the consequent injustice many exhibits must suffer in consequence; for it is certain there must be no mean proportion of equally meritorious productions with those selected for special distinction, but which, in the absence of a sufficiency of prizes, must of necessity go unrewarded. With so remote a chance before them of being placed among the favoured few it would not be surprising if the exhibits become less in the future; if economy has to be considered, then diplomas of honour would answer the same purpose as the more expensive medal.

Secondly. This exhibition, like most others, is held under the auspices of an "Amateur" Society. The ranks of this section of photographers are becoming so large and extended as to bid fair to outnumber their professional brethren, if, indeed, it be not already an accomplished fact; and yet it is only necessary to glance down the prize list to be struck with the fact that nearly the whole of the prizes have been awarded to professionals. I may be wrong, but I do not recognise a solitary half-dozen "amateur" names. Two of these specially-favoured ones are, I note, officers of society, but, I have no doubt, they have well earned their medals for all that. If it be a fact that the professional element is really so far in advance of the amateur as to thus beat it all round, and, in fact, shamefully out of time, then, in justice to amateurs, let all future organisers of exhibitions note the Bristol result, and provide an amateur section, letting each fight his own battle on equal terms. Then honour will be given to whom honour is due.

Thirdly. Again referring to the prize list: it will be seen that a large number of medals have been monopolised by pictures well known and already medalled or exhibited elsewhere. If judges are *not to know* who the author of an exhibit is until after the award, then the extreme folly of placing such among pictures that are really unknown, never having been hung on the walls of an exhibition before, is apparent. To prevent any element of distrust arising, and in justice to both judges and exhibitors, a special class, with its medal of honour, open only to medalled pictures, would not only meet the case, but would render the honour thus won of double value.

Lastly. Every jury, to command universal confidence, should be essentially representative in its constitution, comprising professional and amateur and artistic elements, neither predominating unduly. There is always a praiseworthy emulation for mastery between the professional and amateur, neither caring to be publicly beaten by the other. There are, consequently, certain opposing interests at stake, and the artist would supply the balance. Until this plan is adopted, amateurs will naturally feel aggrieved when professional judges award the premiums to professional exhibits, and especially so when the authors must, to a great extent, be known by their works.—I am, yours, &c., AMATEUR.

December 31, 1883.

To the EDITORS.

GENTLEMEN,—In your last issue Mr. E. Dunmore writes, complaining that of two pictures sent to the late exhibition in Pall Mall, by an exhibitor *whose name was unknown to the hangers* (the italics are his), one was rejected and the other, after the glass had been smashed, was "ignominiously floored," and assumes, because these pictures have just been awarded a medal at Bristol, that they ranked amongst the *best pictures* exhibited, whilst "average work" monopolised the "best positions," simply because the exhibitors were known and favoured, to the disadvantage of the clever unknown. What a very unfair assertion to make! Surely Mr. Dunmore knows that, with few exceptions, the pictures lately exhibited in Pall Mall were unnamed in front; and surely he must also be aware that many pictures hang in Bristol unnoticed by the judges which have received medals in Pall Mall! Where, then, is his argument?

Throughout his letter Mr. Dunmore *positively* asserts that the two illused (?) pictures were, without doubt, of the best shown in Pall Mall. Except for this I should have thought they were his own; but if they were he would not be so egotistical. No! they cannot be his. Whose were they, then? There's the rub! Some youthful and experienced brother, brimful of modesty or so doubtful of the qualities of his work that he feared a wigging for his intrepidity in daring to mix them up with that of others? It would, indeed, be interesting to know more of these strange intruders, and the subjects they depicted.—I am, yours, &c., BRISTOLITE.

December 31, 1883.

ALBUMEN IN GELATINE EMULSIONS.

To the EDITORS.

GENTLEMEN,—Can any of your readers inform me to what extent albumen or other colloids can be added to gelatine emulsion without impairing any of its good qualities? The cause of frilling and of the curling up of sensitive gelatine sheets, when not supported by glass, is the unpleasant property of gelatine of expanding and contracting immensely when absorbing different liquids. The want of good blacks and shadows with all the gelatino-bromide papers I have seen is also largely due to the thick and spongy nature of gelatine films, so that the picture is not all on the surface, but sunk to various depths in a spongy stratum.

In working for illustrated newspapers I cannot well wait several days, sometimes a week, for local photographers to copy my negatives on paper, and am unable to find anything pictorially satisfactory, not on glass, which can be printed by superposition by candlelight, and finished straight off with the same developing solutions used for my negatives, although those solutions will develope good lantern pictures free from stain.—I am, yours, &c., W. H. HARRISON.

Hotel du Lac, Lucerne, Switzerland, Dec. 31st, 1883.

EDINBURGH PHOTOGRAPHIC SOCIETY.

To the EDITORS.

GENTLEMEN,—With reference to a paragraph in last week's issue, regarding a paper read by me before the Edinburgh Photographic Society on December 5th last, I beg to state that all the photographic conveniences mentioned were my own inventions, with the exception of the bicycle saddle, for which I gave Mr. Marshall Wane (my employer) due credit at the time.—I am, yours, &c., WM. CROOKE.

21, *Salisbury-road, Edinburgh, December* 31*st*, 1883.

PHOTOGRAPHIC SOCIETY OF IRELAND.

To the EDITORS.

GENTLEMEN,—In the report of the Society's meeting, and of the paper read at that meeting, on the 14th December, 1883, by an error the name of Mr. J. McGhie was substituted for Mr. J. H. Halvey. Will you kindly, in justice to Mr. J. H. Halvey, make this correction?—I am, yours, &c.,

Dublin, January 1, 1884. CHARLES W. WATSON, *Assistant Hon. Secretary.*

BRISTOL INTERNATIONAL EXHIBITION.—AWARD IN CLASS IX.

To the EDITORS.

GENTLEMEN,—Permit me to send you the following resolution passed by the Council of the Association with regard to the above award. For the clearer information of those interested, I may say that the regulation for Class IX. reads thus:—"A silver medal for the best enlargement of any subject and by any process, *provided it be the work of the exhibitor.*"

Mr. W. F. Donkin inadvertently omitted to state that the enlargement exhibited by him was not his work when sending his exhibits, the result being that a difficulty now arises; and with much regret the Council feel that the least unsatisfactory course is the one they have adopted.—I am, yours, &c., H. A. HOOD DANIEL, *Hon. Secretary.*

Academy of Arts, Queen's-road, January 2, 1884.

Resolution.—"That in consequence of Mr. W. F. Donkin having disclaimed the medal awarded to him in Class IX., *the enlargement in question not being his own work, but that of the Autotype Company*, and the conditions of exhibition in this class thereby not having been complied with, the Council, with reluctance, feel compelled to withhold the medal."

Notes and Queries.

WILL any reader oblige me with a few hints as to the way by which the "ink photos." of Messrs. Sprague and Co. are produced? If I knew how the texture or grain was obtained, I think I could manage the purely lithographic portion quite easily.—A. P. F.

KINDLY answer, through your next issue, whether a name for a new style of picture can be registered—the name to become the property of the party registering. Also, if the name of a particular firm can be registered, and, if so, the probable cost in both cases.—T. A. H.

I HAVE an astronomical telescope with a five-inch object-glass. Prompted by what I have lately been reading I have been trying it on stellar photography; but the chemical focus is so very far away from that at which the clearest image is seen that I despair of success. I have been told there are some rules for effecting the requisite adjustment, and would feel greatly indebted to any one who will aid me with information.—(Rev.) GEORGE MORSE.

G. S. ROBERTSON.—A curious query respecting a point of law is stated by by our correspondent. We give it in his own language:—"I am very desirous of illustrating a forthcoming lecture by means of engravings which appear in a book recently published. But I am refused permission to photograph them for use as lantern transparencies. Now, if I purchase the book, have I not a legal right to tear out the engravings, paste them on glass, rub away most of the paper, and render what remains transparent with varnish, in this way obtaining my transparencies without any act of piracy on my part? And, further, by charging the engraving with iodine fumes, and imparting increased density to the lines by a process known to myself, doing this previous to the pasting on to the glass, do I commit an illegal act?——We refer this knotty point to any of our readers conversant with this phase of copyright law.

Exchange Column.

No charge is made for inserting these announcements; but in no case do we insert any article merely OFFERED FOR SALE, *that being done at a small cost in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a* NOM DE PLUME *be thought desirable), otherwise the notice will not appear.*

We will exchange two large gas meters for a double-action harp or good piano.—Address, G. B. BRADSHAW AND CO., 37, Oxford-road, Altrincham.

Wanted, Lancaster's *Le Méritoire* apparatus in exchange for two double dry plate slides, $7\frac{1}{4} \times 4\frac{1}{2}$, and focussing-screen. — Address, JAMES THOMSON, Tynet Mills, Fochabers.

I will exchange a lithographic press, by Straker, takes a stone 20×15, or large collotype plate, for a large portrait lens or an equatorial stand.—Address, W., 46, Haverstock-hill, N.W.

I will exchange a splendid walnut double stereoscope, containing forty stereo. views, for a 10×8 landscape camera, symmetrical lens, or offers. —Address, H. C., 16, Berkeley-square, London, W.

Wanted to exchange a complete artificial light apparatus to take portraits by night, for rectilinear or portrait lens or enlarging lanterns, or offers.—Address, W. GREEN, 23, Plevna-street, Hunslet, Leeds.

Wanted a 10×8 portrait lens and Kinnear camera for same in exchange for studio furniture, background, $\frac{1}{4}$-plate camera and portrait lens, burnisher, &c.—Address, ALEX. F. CLARK, 18, Glamis-road, Forfar.

I will exchange a pair of Newton's dissolving lanterns (mahogany cased), camera fronts, $3\frac{1}{2}$-inch double condensers, argand oil lamps and blow-through jets, all fitting lock-up case, for Ross' or Dallmeyer's lenses.—Address, F. J. SMITH, Clydesdale, Stoke-road, Gosport.

Wanted, 15×12 and 8×5 travelling cameras, in exchange for a 5×4 travelling camera, by Rouch, with four double and one single slides; a lady's silver watch, by Bennett, Cheapside, and other useful articles, or difference adjusted in cash.—Address, C. W. G. USHERWOOD, 5, Priory-terrace, Tonbridge.

PHOTOGRAPHIC CLUB—At the forthcoming meeting of this Club, on Wednesday next, the 9th instant, the subject for discussion will be on *Reducing Over-Dense Negatives.*

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

Photographs Registered—

Alexander Macdonald, Douglas Hotel, Brodick, Arran.—*Three Photographs of Ailsa Craig.*

Alexander Rae, Jun., Banff.—*Photograph of H.R.H. The Prince of Wales at Duff House.*

Thomas Newton Armstrong, Garrick-gardens, Glasgow.—*Photograph of Steamship "Meg Merrilies."*

Paul Stabler, 62, 63, and 64, John-street, Sunderland.—*Two Group Photographs of the Prince and Princess of Wales and Shooting Party at Wynyard Park.*

Notice.—*Each Correspondent is required to enclose his name and address, although not necessarily for publication. Communications may, when thought desirable, appear under a* nom de plume *as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.*

M. P.—See inquiry under head of *Notes and Queries.*

F. W. Vollmar.—Much may be said in favour of both lenses. We make use of that most recently introduced.

Phil.—The collodion is too old. The pyroxyline has evidently become decomposed. Procure a fresh sample and make another essay.

B. P. Lascelles.—Husnik's work on the subject is the best you can possess. It is published in Vienna, and may be procured through any foreign bookseller.

S. Wyatt.—If the facts be as you state there can be no doubt whatever, even under the present law, that the copyright in the pictures is valid, and that it is your property.

R. B. Yeldon.—Try fusible metal. That may be procured so as to liquify at a temperature below that of boiling water. Any philosophical instrument maker will supply you with a small quantity with which to experiment.

Bevel Edge.—The only apparatus necessary is a mount cutting-knife, a straight-edge, a pair of compasses, and a blacklead pencil. Provide yourself with these and commence experimenting. The matter is simple enough, and requires but little practice.

Londoner.—Point out more definitely in what your difficulties in the collodion transfer process consist, and we will do our best to assist you. All we can gather from your communication is that, as you say, you are "in a mess." This is too vague a term for us to advise upon.

F. J. Cox.—We should advise you to purchase the canvas, ready prepared, from an artists' colourman rather than attempt to prepare it for yourself. It is a troublesome operation, and requires some technical knowledge. Are you aware that it is an article of commerce in rolls of several yards in length and of various widths?

A. Y. Z.—The markings are due to the cracking of the varnish. The only preventive we can suggest is to preserve the negatives in a dry place. If you sprinkle the negatives over with a little black pigment in fine powder—lampblack, for instance—and gently rub it over the film with the finger, the cracks will be filled up, and scarcely show at all in the prints.

Ajax.—There is no work published on the process, nor is one necessary. Woodbury lantern slides are made in precisely the same manner as ordinary Woodbury prints, except that glass is used instead of paper. If you are *au fait* with the production of prints on paper you will have no difficulty in making them on glass. No press, however, is necessary in the printing; all that is necessary is to press the glass on to the mould with the hand.

G. F. H. inquires:—"What form of development and intensification would you recommend for producing the most brilliant *wet*-plate negatives from engravings? I have some I wish to copy for enlargements, but have not had much experience in this class of work."——In reply: employ a rather old collodion, and a developer coloured from the presence of a persalt of iron. This condition is induced by dissolving the protosulphate of iron in hot water and allowing the solution to stand for a few days before using it. Tone with a weak solution of chloride of platinum.

Demarr.—1. You should have no difficulty in making the paper negative register. You must bear in mind that paper always expands more in one direction than it does in the other.—2. Surely you are in error when you say that "the area of the picture is enlarged when the stop is drawn out." If you examine it more closely you will find that it is the reverse of this.—3. Transparencies by the gelatino-chloride process are better than those by the gelatino-bromide process, for several reasons. The lights are purer, the shadows more transparent, and a much greater variety of tones can be obtained. Your previous letter did not reach us. We have reason to believe that several communications have miscarried during the past week or two.

Relief Experimentalist.—If your Woodbury films have taken over a week to dry there is little wonder that you failed to wash away those parts which had not been acted upon by the light. The reason is simple: the films, by being kept moist so long, had become spontaneously insoluble. They must be dried in a much shorter time than yours have occupied, otherwise they will be worthless. You will, at this season of the year, have to take advantage of the property which chloride of calcium possesses—namely, that of absorbing moisture—and place your films in a box at the bottom of which is a tray containing the salt. If the films do not contain too much glycerine, they should be perfectly dry in from twenty-four to thirty-six hours.

Hugh.—At the time specified we received the photograph now referred to, but have no recollection of any letter accompanying it. The strong contrasts between the lights and shadows are probably owing rather to the light than the quality of the plate. We judge that the picture was taken in strong sunlight with a clear blue sky. If this were so it would account for the want of definition in the shadows. We strongly advise the employment of a much larger stop in the lens. The maker of the plate upon which the negative was taken does not claim for his productions the highest degree of sensitiveness. The picture, notwithstanding the want of detail in the shadows, is quite interesting. With regard to ascertaining the strength of liquor ammonia: the specific gravity test, while one of the simplest, is also capable of giving results sufficiently accurate for practical photographic purposes. At page 254 of our Almanac for this year a table giving the strength of ammonia will be found.

A Hint on Developing Dry Plates.—We extract from our Almanac Mr. William England's excellent suggestions to amateur photographers:—These few remarks are more addressed to amateurs than professional operators, although the latter are sometimes rather careless in developing, with the result that they get stained and spotty negatives. A very important matter is to keep the dish perfectly clean. I prefer a glass one, although ebonite has an advantage in travelling. Marbling stains on the negative are caused by a scum forming on the side of the dish by repeated use, and on the developer being applied this comes off on the plate. I witnessed that in several studios lately, and on my telling the operator to thoroughly wash the dish with diluted nitric acid the plates afterwards developed perfectly clean. A brush called a 'painter's tool,' of a medium size, will be found very convenient for this purpose. Spots on the plates may arise from several causes, but the principal ones are dust in the dark slide. A clean camel's-hair brush passed lightly over the plate before placing it in the slide, and well dusting the latter, will cure this evil. Another cause of spots is air-bubbles formed on the plates during developing, which prevent the solution coming in contact with the film, and which thus causes transparent spots on the plate being fixed in the hypo. To obviate this, pass gently a clean camel's-hair brush over the plate during the development, if it be necessary. The above remarks seem so commonplace that I should have hesitated to make them, but several correspondents lately have called my attention to these matters.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician, *For two Weeks ending December 26, 1883, and January 2, 1884.*

These Observations are Taken at 8.30 a.m.

Dec.	Barometer.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max. Shade Temp.	Min. Tem.	Remarks.
20	30·07	NW	42	44	—	49	37	Overcast.
21	29·92	W	47	45	—	51	40	Overcast.
22	29·96	W	45	40	—	51	43	Cloudy.
24	30·52	SW	46	45	—	50	37	Overcast.
25	30·57	W	44	43	—	46	43	Foggy.
26	30·62	SW	40	39	—	43	39	Foggy.
27	30·42	SW	37	36	—	43	35	Foggy.
28	30·32	SE	43	41	—	45	35	Overcast.
29	30·29	S	40	40	—	42	39	Overcast.
31	30·50	E	37	35	—	41	35	Overcast.
Jan. 1884. 1	30·35	E	36	34	—	40	32	Overcast.
2	30·16	E	39	39	—	—	34	Overcast.

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1236. Vol. XXXI.—JANUARY 11, 1884.

NATURAL CLOUDS IN REPRODUCED NEGATIVES.

In two previous articles we have shown that it is possible to produce duplicate negatives which shall be quite equal to the original, and in many instances even better, and have given the details of the various operations necessary to secure this end. We shall now point out another direction in which a very decided gain is made in the operation of reproduction, and with the expenditure of a very small amount of trouble. We refer to the introduction of natural clouds or new skies into the duplicate negative.

It very frequently happens that a negative, though otherwise satisfactory, possesses a defective sky. This, possibly, prints too dark, giving a heavy effect to the picture, or it is marred by scratches, spots, stains, or other blemishes. It is possible to mask the sky and so make it print less heavily, and it is also comparatively easy to remedy the several other defects by suitable treatment of the negative; but this treatment and all this care has to be devoted to each separate print, whereas by the method we have to propose the trouble is got over once and for all by making a reproduced negative.

We need not dwell further on the advantages derivable from the adoption of this plan, nor stay to point out other possible applications of the same principle, but will proceed at once to the details. Presuming we have a negative of which the sky is in some manner defective—it matters not how—the first step is to produce a transparency, for which purpose the gelatino-bromide process must be employed. The directions given in our previous article will apply perfectly here, the object being to produce the best possible positive from the negative in question, ignoring entirely the sky portion. No attempt need be made to mask the sky nor to stop out any defects; for the sky, as it exists in the original, is simply obliterated —done away with—in the following operation.

The transparency, having been developed and fixed, is washed very carefully, and allowed to dry. It is not absolutely necessary that it should be dried at this stage, but we prefer that course for reasons that will be explained. Now prepare two solutions as follows:—First, dissolve separately, each in five ounces of hot water, one ounce of sulphate of copper and two ounces of common salt; when dissolved mix the two solutions, and, if necessary, filter. A second and weaker solution is made by diluting one part of this with five or six parts of water.

The transparency is now laid upon a retouching desk (or if such a convenience be not at hand it may be held against a window), observing that the sky portion must be downwards. This avoids any chance of the solutions running down over the landscape portion of the negative during the next operations. Now, with a fine camel's-hair pencil and the stronger of the solutions given above, follow the outline of the sky-line very carefully, leaving a margin of (say) one-sixteenth of an inch. Here is the advantage of the dry film: the solution spreads less, and it is easy to work almost into the intricate outlines of foliage with a little care; whereas on the wet film the copper solution spreads rapidly.

By the time this has been done the solution will have produced a white line wherever it has touched. Taking this as a guide, and with a larger brush, or a tuft of cotton wool, wash over the whole of the sky with the same solution until, when examined from the back of the glass, it presents an even white or greyish-white tint. Now wash for a minute or two under the tap, and re-immerse for a short time—a few seconds will generally suffice—in the fixing bath. Upon removal from the latter the sky will be represented by perfectly clear glass—presuming that the film has been properly washed between the different operations—except for the narrow margin left round the terrestrial portion.

This is now "tackled," and it is here that the only call is made upon the skill of the operator, though even at this stage but an ordinary degree of care is necessitated. Taking the small brush and the weaker solution, it is better to work slowly along the sky-line, gradually softening the remaining portion of the old sky if it should give a very pronounced tint; but this is rarely the case. Occasionally during the operation the larger brush, filled with the weaker solution, is passed with an undulatory motion along the whole sky-line, and in a few seconds the plate is plunged into water or held under the tap. This helps to prevent any formation of a too sharp line; but with ordinary care, and by proceeding in the same manner as in softening a wash of water-colour, the desired result is gained without any risk.

Should, by accident, the margin be overstepped, and the copper solution allowed to encroach upon the landscape part of the negative, wash the film and immerse the plate in a dish of developing solution—preferably ferrous oxalate—which will undo the injury. After again washing, the process may be resumed at the point where it was interrupted. Not the slightest deterioration occurs in this application of the developing solution to remedy a slip or an accident; hence no hesitation should be felt in at once putting the remedy into practice when the slightest cause arises.

If the various operations have been carefully performed the result will now be a transparency with a perfectly clear sky, into which clouds of any desired character may be introduced. These may be rubbed in with plumbago, or other artificial means may be adopted upon the transparency itself; but we decidedly recommend as preferable the use of natural clouds. These may be applied in the following manner, presuming, of course, that a stock of cloud negatives is at hand.

Clean a plate of glass in the ordinary way, finishing it off by polishing with powdered talc or wax solution; coat with collodion and produce a transparency of the desired clouds of the proper depth to suit the landscape transparency. When finished flow over the film a forty- or fifty-grain solution of gelatine, to which a little glycerine has been added to destroy its brittleness, and when this is dry strip the compound film from the glass. Place this in contact with the landscape transparency, and go carefully over the sky-line with a lead pencil, and afterwards with scissors or a sharp penknife divide the cloud positive at this line. Affix the proper portion to the sky of the transparency and proceed to make a compound negative in the same manner as has been previously described.

Another, though not so good, a plan is to make a positive silver print of the clouds, and having marked thereon with pencil the sky-line, to obliterate the clouds on that portion of the print which covers the landscape by means of the copper solution, followed by hypo. After washing, drying, and waxing, the paper cloud positive is attached to the transparency and printed on to a sensitive plate, as previously described.

In this manner cloud and other effects may be produced with an ease and certainty which are surprising, and the resulting compound negative obviates all the trouble and care which otherwise would have to be expended on each individual print.

PHOTOMICROGRAPHY.

In the plan adopted by Drs. Woodward and Curtis at the Army Medical Museum, Washington, a Silbermann's heliostat is arranged on a shelf outside, part of the window is closed by an immovable shutter, in which is a square hole to receive a movable shutter with an aperture of the same diameter as the short body of the microscope, which is connected to it by a sliding, light-tight tube. Another, worked from the inside, is made to close the aperture, outside of which is fixed the ammonio-sulphate copper cell. Below this is fastened a brass tube projecting outwards about thirteen inches, and carries at its end the microscope mirror, which can be adjusted from within the room by steel rods attached to it by ball-and-socket joints, and passed through the shutter. The microscope is placed on a shelf on the inner window sill. The camera and table, or base-board, at first used are dispensed with. The plate-holder is supported vertically upon a car that runs upon a tramway, laid correctly upon the floor for the distance of ten feet, and can be arranged at any distance upon it, a scale being laid off near to one of the rails. The image is first examined upon a white card, and the corrections of the objective made; then the card is replaced by a piece of plate-glass, the operator being seated behind it, and the final focussing made by means of a rod, and two bevel wheels, through one of which passes the long focussing-rod, connected with the fine adjustment of the microscope, by a silk band from a wheel, upon the edge of the shelf to which the rod is attached. A movable, yellow pane of glass allows of examining the sky, and the room is otherwise lighted by non-actinic light. Later the ground glass, used to prevent diffraction and interference lines when photoghraphing histological objects, was dispensed with, and a two-inch achromatic combination of about ten inches focus was used to condense the light from the mirror, the rays being allowed to diverge, as in the late Rev. J. B. Reade's plan, just before reaching the largest lens of the achromatic condenser. Sometimes the heliostat was dispensed with, and a large right-angle prism employed in the position of total reflection. This allowed of shorter exposures, and furnished equally good negatives, though with the trouble of constantly adjusting the illumination. The one-eighth objective was usually selected for anatomical preparations at from 200 to 500 diameters, but the preference was given to immersion lenses. For oblique light, in photographing delicate test objects, the light was directed from the mirror, so as to fall about three inches to one side of the centre of the stage, and reflected by a prism, set beneath the stage, at the angle needed to furnish the necessary obliquity, as thrown upon the object by an intervening objective. Dr. Woodward strongly advocates the use of specially-corrected object glasses, and states that, though the chromatic aberrations are neutralised by the blue cell, the spherical aberrations are not disposed of; and advises in the construction of such objectives that they should be tested by sunlight and the blue cell. Dr. Carl Seilers states there is no necessity for specially-corrected objectives when using monochromatic light. Professor Rutherfurd, of America, was the first, we believe, to suggest the construction of these objectives, and Mr. W. Wales made an one-tenth for him upon this form, the posterior combination being removable, and another back combination made to take its place for ordinary work. We have lately had an opportunity of testing an one-twelfth objective by Leitz, price five guineas, and can speak highly of its photographic qualities; but it required the most careful adjustment of the sub-stage condenser. We believe Dr. Woodward's plan is the most certain and correct. For further details see the *Catalogue of the Microscopical Section of the U.S. Army Medical Museum,* Part II., pp. 31-34, with three figures; also Dr. Woodward's article in the *American Journal of Science and Art*, and this Journal, October 12, 1866, pp. 480, and December 21, p. 607, 1866; also *Silliman's* and this Journal, October, 1871, *Monthly Miscroscopical Journal*, October, 1871, for his Report to the Surgeon-General, U.S.A.; and *Quarterly Journal of the Royal Microscopical Society*, January, 1872.

Dr. Sternberg—whose book, *Photomicrographs and How to Make Them*, was lately reviewed in this Journal, September 14th—when alluding to the operating-room, recommends the upper and lower sashes of a window facing south to be removed, and their places supplied by a frame, the right side permitting access to the heliostat arranged on a shelf outside, and the microscope to be placed, not in the centre, but as much as possible to the left-hand side. The heliostat governor (Woodward's, a tube with a ten-inch focus achromatic lens at the outer end, and at the inner one a space for the blue cell), is fixed to the frame, the axis corresponding to that of the microscope supported on a shelf, so "that the eye of the operator is on a level with the eyepiece of the microscope when he stands erect," which is the position preferred. The fine focussing is done by means of pulleys and cords worked at any distance from the instrument, a waxed linen thread being passed round a groove in the milled head, one end weighted by a small bag of shot, and the other end directed by pulleys to a framework *above the microscope*, and then to the spool, or key, which is fixed to the wooden frame of the movable screen. In this way the floor is clear, as a smooth piece of 2×4 scantling of a proper length to reach from the shelf to the opposite wall supports the screen. Dr. Sternberg suggests that beginners should work without a heliostat, and if the operating room be not sufficiently elevated to look out horizontally upon a clear blue sky, to incline the instrument 8° or 10° like a telescope; and that the microscope be placed on a shelf higher than when used in the horizontal position, to be reached by standing on a little platform, whilst the frame is suspended by a similar scantling placed with the same inclination as that of the microscope, its lower end being supported against the opposite wall. He strongly recommends this plan, even when not devoted to photographic use. A tube, an inch and a-half in diameter, slides in the shutter, and makes a light-tight connection with the sub-stage tube. The space between the microscope tube and the screen may be enclosed by a conical expanding bellows camera, if the exposure be long. He suggests two swing shutters to the camera—one of ground glass and the other of plate glass—so that they can be substituted the one for the other; or the former may be in a frame smaller than the latter and kept in place by a button, and removed when not needed. If the microscope face the sun, to prevent direct sunlight entering a sunshade tube, dull blackened on the inside, should project outside. A method is given for measuring. For obtaining fine black lines in the positive, silk or horsehair threads are stretched in front of the sensitised plate. By the use of a square diaphragm, one half of the plate can be covered whilst the other half is exposed; then this is to be covered by the diaphragm during the exposure of the other half, so that two pictures may be obtained for comparison on the same plate, and in juxtaposition, as blood discs of man and dog, &c.

In a paper by Mr. G. M. Giles (*Monthly Microscopical Journal*, January, 1876) is described a method to be used without a heliostat. He employs a large mirror four and a-half inches square, hung like a swing glass and adapted to the end of the base-board, so as to be capable of rotation in any direction by the use of cords, grooved wheel, and pulleys worked from the camera end. A large, three and a-half inches diameter and long-focus (ten inches) achromatic lens is employed as a condenser, for the purpose of procuring a large disc of light in sunlight illumination, and an alum cell, for stopping the heat rays. The holes in the diaphragm wheel, except one, are stopped with non-actinic paper. The wheel rotates loosely, and is used for making the exposure. The eyepiece is allowed to remain, "though seldom at the full ten inches." With artificial, paraffine, or magnesium light, the large condenser is dispensed with, and the ordinary achromatic condenser and mirror used.

In Mr. Walmsley's arrangement (for figures and description of which see *Journal of the Royal Microscopical Society*, page 557, 1883), with an ordinary expanding camera, there is a contrivance for focussing, which is stated to be of considerable delicacy, in use with the fine adjustment. The milled head of this screw has a groove cut in it, "around which a small cord is passed and carried through a succession of screw eyes on either side of the base-board to the rear, where a couple of small leaden weights are attached to its ends, thus keeping the cord taut. A slight pull on either side, whilst the eye is fixed upon the image on the screen of plate glass, suffices to adjust the focus with the utmost exactness."

Other methods of arranging the usual ordinary apparatus for photomicrography might be cited, but sufficient have been named to offer a fair selection of the most useful plans.

COMBINATION PRINTING.

In former times one of the principal qualifications of a photographic printer was his ability to produce from a negative with a defective background a print with one not only free from defects but also artistically graduated as regards light and shade. At the period to which we refer it may be mentioned few portraits larger than the old half-plate size were issued without a false background being introduced, and the print—which was usually on plain or what was called "salted paper"—being worked up to some extent in monochrome. As time wore on greater perfection in the manipulations enabled negatives to be produced in which the backgrounds were sufficiently perfect to be printed with the figure. Hence there was no longer a necessity for double printing, while, arising from the more extended experience of operators, finishing in monochrome was no longer required; therefore, salted paper and masked backgrounds practically became a thing of the past.

At the present time, if a masked-out background be required, it is generally that one figure only out of a group is desired as a separate portrait. Or it may be that when the original photograph was taken the portrait was only a secondary consideration to the other portions of the picture, but, owing to the changes wrought by time, it has become, at least to some, the most important, and they are therefore desirous to possess it in an isolated form. In cases such as this many modern printers are at a loss how to proceed when a salted paper print, with a masked background, or one printed from a second negative, is required. The result is a feeble print, on the back of a piece of albumenised paper, with a flat, even tint all over (as a background is produced) too often with a white line surrounding one part of the figure and a dark one the other. Such defects as these, entail upon the artist who has to finish the picture the greatest possible trouble to obliterate them. The print, also, is on the wrong side of the paper, which is very undesirable, as that always shows the web mark.

Now, the printing-in of a plain background is really a very simple affair after all, and this is the method usually adopted, or, we might say, used to be adopted. First, a print is made from the negative sufficiently strong to show the outline of the figure distinctly, then the figure is carefully cut out with a sharp penknife, keeping carefully to the outline. The two masks thus obtained are then exposed to light until they are thoroughly blackened. The background mask is now carefully adjusted on to the negative and secured in position with a few touches of gum, and the negative is ready for printing from. When printed, we have, of course, the figure merely with a white background only.

What is required now is to protect the figure from light while the background is being printed to the requisite depth. The plan generally followed in doing this is to remove the print from the frame and lay it on a board covered with black velvet, then to adjust the figure mask upon the printed figure, keeping it in position, when once adjusted, with a piece of plate glass. It is then exposed to light. Here some little judgment is necessary in shading, so as to produce artistic graduations, instead of the uniform flat tint one so often sees in what are termed "printed-in" backgrounds. The printing-in of a plain background is simple enough, and it only requires a little practice and ordinary care to accomplish it satisfactorily. However, the inexperienced often meet with a difficulty, namely, that they are unable to obtain an impression which does not show a palpable juncture, although the masks were, apparently, accurately adjusted alike on the negative and the printed figure. Frequently this arises from the opening in the background mask not being of the same size as that of the figure, although both were cut from the same print. This is owing to the expansion of the paper from moisture, which is often noticeable by the mask on the negative that was perfectly flat when first adjusted becoming cockled. It is manifest that if one mask be kept in the damp and the other in the dry, one will expand while the other will contract, consequently they will no longer fit each other or be in perfect register; hence, at least, one source of trouble.

At two of the recent meetings of the Photographic Club *Masking and Double Printing*, generally, formed an interesting and instructive topic of discussion, and at one of them Mr. Jabez Hughes described a plan adopted by the late Mr. Alfred Hughes for printing in false backgrounds, which obviated the difficulty arising from the expansion and contraction of the paper. It was this:—Instead of employing a paper mask, as just described, the background in the negative was carefully painted out for a quarter of an inch or so all round the outline of the figure; the remainder of it was then covered with a roughly-cut paper mask, or it might, if more convenient, be painted over with black varnish. After the figure had been printed to the requisite depth the print was removed from the frame, and its outline (on the print) was carefully painted, to the depth of about a quarter of an inch, with opaque body colour—lampblack being used. The remainder was then covered with a roughly-made paper mask. The print was now exposed to the light to print-in the background—being shaded and graduated as judgment and taste should dictate. In washing the silver out of the paper, prior to toning, the lampblack was removed, leaving the print none the worse for the treatment it had undergone. By this simple method accuracy of registration was ensured. Instead of printing-in a plain background one from a second negative is frequently required, and here greater judgment is necessary.

Many of our older readers will remember the charming little *carte* portraits, with landscape backgrounds, which were produced by Mr. Edge many years ago. These portraits were taken in the studio, and the landscape, from nature, was printed-in from a second negative. At one of the meetings referred to Mr. E. Dunmore explained the method by which this was accomplished, and which was as follows:—The portrait, a full length, was taken in the studio. The background, instead of being flatted in the usual way, was painted with ordinary glossy paint, and was shaded from a somewhat light to a moderately-dark tint, so that, when the negative was printed from, a portrait with a graduated plain background was the result. Different methods of masking the figure while the background was being printed were described, but this is the one finally adopted by Mr. Edge. After the figure had been printed, with the graduated background the impression was removed from the frame, and the figure painted over with gamboge sufficiently thick to protect it from the further action of light whilst the background was printing. The print was then placed on the landscape negative in another frame and printed to the requisite depth. The prints were now toned and fixed in the ordinary manner. In washing out the silver the gamboge was dissolved off, leaving the print intact, the same as in Mr. Hughes's method. One thing was specially alluded to and requires mention here, namely, that the landscape negative must be very thin and feeble indeed—such an one as it would be impossible to obtain a good impression from in the ordinary way, because if it were at all strong or vigorous it would, in this instance, be impossible to obtain artistic results, such as Mr. Edge's undoubtedly were.

This simple plan of combination printing might profitably be utilised now-a-days by portrait photographers for the production of (say) panel portraits in the studio, with backgrounds of interesting local scenery.

The term "combination printing" is a comprehensive one, inasmuch as it embraces not only the production of impressions, both in silver and carbon, from more than one negative, but also of transparencies, and the making of combination negatives containing portions of several others, all of which came under consideration during the discussion. We shall resume the subject next week.

CHLORINE, BROMINE, AND IODINE.

The experiments on the mutual reactions of the halogen elements by Paul Julius, described by us last week, deserve more than a passing notice, bearing, as they do, upon an important point in the chemistry of photography; and it will be interesting to remind our readers of some of the ordinary reactions of these three principal members of the group, bringing together some long-accepted modes of separating them and other interesting methods recently suggested.

The older chemical authorities used to give so-called "tables of affinities," in which various substances were classed in the order of the affinity they were supposed to possess for the body placed at the head of the table. Thus, for *metals*, the tables ran—O., F., Cl., Br., I, &c.; but modern chemistry has conclusively shown that such orders merely represent functions of a particular case, and that they are very liable even to be reversed under altered conditions. It is true that chlorine gas may, and usually does, drive out bromine, and that the latter again may displace iodine from combination; but it is also true, as shown in a most conclusive manner by Herr Julius, that the exact reverse of these reactions can be brought about when also the elements are employed in the gaseous form, and, indeed, that any halogen, if applied in excess, is capable of expelling any other halogen from its combination with silver.

To detect any one of these elements in solution the precipitation by silver gives results so characteristic that mistakes cannot readily be made; but when all three or the last two are found together the difficulty is very much increased. A well-known authority says—"There is no known method of effecting a separation of these elements" (bromine and iodine). This being the case, it is evident that the examination of a dry-plate film, for instance, or a sample of collodion, to ascertain its exact composition, may, perhaps, be considered a matter for the skilled chemist only; but to find out whether any or which of these elements be present in a sample under examination is not beyond the power of anyone possessed of an ordinary acquaintance with chemicals.

The substance is usually better examined in solution, and, when in the form of insoluble silver salts, can easily be made soluble by digesting with dilute sulphuric acid and a few fragments of zinc, the silver precipitating and leaving the zinc salts in solution. The iodide can be thrown down as subiodide of copper when all those salts are present; in presence of bromide, protochloride of palladium throws down iodide only, or, when chloride accompanies it, nitrate of protoxide of palladium. Bromine in presence of the other two is readily formed as follows:—Mix the fluid with a few drops of dilute sulphuric acid, then some starch paste, and afterwards with a little fuming nitric acid. The well-known iodine blue with starch is produced and must be destroyed by the gradual addition of chlorine water. When it has disappeared more chlorine water is to be added, the effect being to set free the bromine, which can be taken up by chloroform by shaking a little of it in the test-tube with the liquid. The chloroform will then show the characteristic colour. Chlorides are best detected by precipitating the salts with silver, and, after washing, treating with dilute ammonia, which, as our readers know, readily dissolves the chloride and also dissolves bromide, but only a trace of iodide. The filtrate has to be dried and fused with carbonate of soda, the result extracted with water and neutralised with sulphuric acid evaporated again, the residue fused with bichromate of potassium, and a little concentrated sulphuric acid added. A deep brownish-red gas (chloro-chromic acid) is evolved.

The above is an epitome of some of the readiest of the usual methods for testing for these compounds, and we now give, in as short a space as possible, two methods—lately-published modes—recommended as simple means of effecting the same end, one also estimating the relative amount present. The first we give is the subject of a communication to the *Chemical News*, under a well-known and respected name—Mr. F. Maxwell Lyte. It is founded on a familiar method of estimating the amount of these three halogens present in a mixture based on the property shown by Field to be possessed by one halogen silver salt, of being changed by treatment with a solution of an alkaline salt of another halogen. Thus, chloride of silver is completely changed by digestion with a solution of bromide of potassium, and bromide and chloride by iodide of potassium, a mutual exchange taking place. These reactions are a conspicuous example of the reversal of the "table of affinities." Mr. Maxwell Lyte writes:—

"The haloids having been precipitated together with silver, the precipitate is to be collected, dried, and weighed. It is now dissolved in about thirty or forty times its weight of water by the addition of the least possible quantity of cyanide of potassium. A quantity of pure bromide of potassium is now added, which need not be above the weight of the precipitate. The cyanide is now decomposed by the addition of an excess of dilute sulphuric acid. The precipitate in which any silver chloride has become, by this means, converted into silver bromide is now collected in a filter, dried, and weighed. It is once more dissolved in the least possible quantity of cyanide of potassium in the same quantity of water, and to this is now added one and a-quarter time the original weight of the precipitate of potassium iodide. The cyanide is now again decomposed by dilute sulphuric acid, and the precipitate once more collected in a filter, dried, and weighed. In the last precipitate all the silver is converted into iodide, excepting such as was iodide already. In the second all became bromide excepting such as was bromide or iodide already. From the weights thus obtained from the first, second, and third weighings the chlorine, bromine, and iodine can easily be calculated."

The other method we would call attention to is by Mr. Francis Jones, and is also found in the same journal. He states that, having compared the results obtained by his students when using this and other methods, they are far more successful with the new method:—

"Place a *small* quantity of the mixture to be tested in a good-sized test tube, and add a few pieces of manganese dioxide; then a little water. Add now *one* drop only of dilute sulphuric acid (one part acid to ten of water). A brown tinge indicates the presence of iodine. Boil the mixture and confirm the presence of iodine by the violet vapours in the upper part of the tube. Continue the boiling until these vapours cease to appear; then add another drop of sulphuric acid, and boil again until they cease. If necessary, repeat this addition of acid and boiling until violet vapours have entirely ceased. Now add about two cubic centimetres of the dilute acid, and boil again. Brown vapours indicate bromine. Continue the boiling until the vapours no longer smell of bromine; then add one cubic centimetre of dilute acid, and boil again. When the vapours no longer smell of bromine allow the residue to cool *completely;* add an equal bulk of *strong* sulphuric acid, and warm. A green gas bleaching a piece of moist red blotting-paper at the mouth of the tube indicates chlorine. Occasionally some bromine comes off in the addition of the strong acid; but, if so, it is soon got rid of, and is succeeded by the chlorine, which is chiefly evolved in warming the mixture. As, moreover, moist red blotting-paper is far more quickly acted on by chlorine than by bromine, there can be no difficulty in distinguishing between the two elements."

Two very useful methods of analysis—the latter within the power of any operator of average expertness to carry out—are here indicated, and we think they will be found as useful in practice as in theory. They show the futility of trusting to tabulated degrees of chemical affinity.

The Late Mr. J. H. Dallmeyer.—It is with sincere regret we have to announce the demise of one whose name has been long identified with the manufacture of optical instruments—photographic lenses, microscropes, &c. He was on a voyage to New Zealand for the benefit of his health, and died when within view of that coast. In our next issue we shall give a memoir of Mr. Dallmeyer. Meanwhile we may state that the business will be continued by Mr. Thos. R. Dallmeyer, son of the deceased gentleman.

We mentioned last week that the *Illustrated London News* had recently given a frontispiece engraved from a photograph. Now it is the *Graphic* which has adopted a similar course. The frontispiece of the volume for 1883, which was issued with the last number, entitled *Feeding the Pigeons, St. Mark's, Venice,* is from an instantaneous photograph by Mr. J. J. Acworth, who has recently contributed a series of articles to this Journal.

While on the subject of photography in its connection with our illustrated papers we may revert to a remark we made some little time ago, to the effect that photography might soon hope to find new applications in that direction. We were not at that time aware how soon, and to what an extent, photography would be so utilised; but, at the present time, at least two of our leading illustrated papers are using photography in the production of their illustrations. The *Pictorial World* has recently given a number of pictures which but for the scarcely noticeable words "ink-photo," in one corner we should have taken to be ordinary lithographs of the best class. They are, however, produced by Messrs. Sprague and Co's. photo-lithographic process, several examples of which have appeared in our own pages. Messrs. Sprague and Co. have also supplied type printing blocks to the *Illustrated London News* and for some time have regularly illustrated the *Architect.*

THE subject of Mr. H. J. Newton's mercuric developer, described in the *Photographic Times* of November, was brought before the last technical meeting of the Photographic Society of Great Britain. In the last issue of our New York contemporary Mr. Newton, afraid lest a blunder should arise in consequence of what he calls any foolish version of it being given, has carefully reproduced his directions, which we summarise thus:—Thirty grains of bichloride of mercury having been dissolved in four ounces of water, and ninety grains of iodide of potassium having been also dissolved in one ounce of water, the latter is then poured into the former. This mercuric solution is used in connection with a developer, on the precise composition of which Mr. Newton lays great stress—

Carbonate of soda (washing soda)	25 grains.
Sulphite of soda	4 ,,
Pyrogallic acid	2 ,,
Water	1 ounce.

The instructions for developing a very briefly-exposed plate is to bring out as much as possible with the developer for four or five minutes, and then add three drops of the mercuric iodide solution for every ounce of developer. This brings out details which could not otherwise appear. During the dull weather now prevailing it will be desirable that Mr. Newton's formula receive a fair trial.

BORACIC acid—which, as our readers are aware, has been recommended for use in several photographic processes—is a most troublesome material to pulverise. A method stated to be the best yet discovered is to grind it up in a Wedgwood mortar, keeping it moistened with ether all the time. This may possibly answer; but it must be a very unpleasant, not to say costly, method.

THE recent lantern exhibition of the South London Photographic Society was an undoubted success. The lanterns were manipulated by Mr. William Brooks as though he had been "to the manner born;" while the free and easy, jaunty, never-in-the-least-put-about style of Mr. F. Bridge, the Secretary, by whom the various pictures were explained, kept the large audience in excellent humour. The dissolving of one picture into another, the uniform steadiness of the light, the brightness of the eighteen-feet disc, and sharpness of the enlarged images were such as to reflect the highest credit upon all concerned. The large hall was crowded to excess, and the pictures exhibited numbered between two and three hundred.

OUR readers will remember the ingenious conception of a well-known *savant* to show the comparative slowness with which the sensation of touch is conveyed. He said if it were possible for a child on the earth to put out his hand and touch the sun he would have grown old and grey before he became aware of the sensation. M. Paul Bert has recently presented a note to the *Académie des Sciences*, Paris, in which are described further experiments by M. Block to determine the rapidity of visual and other perceptions. Vision is the most rapid; hearing occupied $\frac{1}{75}$ of a second longer; while the sensation of touch required $\frac{1}{24}$ of a second longer for transmission than a visual perception.

ANYTHING more forcible than these facts to prove the superiority of photographic over personal observation of astronomical phenomena cannot be imagined. These ratios are, no doubt, averages, and every observer will have his own rate of perception, though, quite possibly, the relative speed of perception will not vary in individuals. In taking transit observations, for example, with one man to count seconds aloud, another with his eye at the telescope, and a third to note down the actual observer's calls, we see how the real moment of contact or what not—being governed by the perceptions of those persons before the time is written down—may possibly be subject to perceptible discrepancies in the hands of different observers. Indeed, in most observatories, the "personal equation," as it is termed—that is, the rate of perception, and its audible expression, of each assistant—is always ascertained, and the records he makes reduced in accordance with it. In photographic observation, however, with a chronometric arrangement, so contrived that the plate records its own time, no error can thus occur.

A SUGGESTION is made in the *Photographic Times*, namely, that the Stock Dealers' Association of America pass a resolution calling upon dry-plate manufacturers to test the sensitiveness of their plates, and mark upon the outside of each packet both the number of the emulsion and its sensitiveness, this latter point being determined by a recognised sensitometer, such as Warnerke's. The label on the emulsion would, therefore, be marked in somewhat the following way:—

Emulsion, No. 1103. *Warnerke*, 22.

To understand the above thoroughly it is necessary we should say that the Stock Dealers' Association appear to command the situation in America.

WE should like to hear the opinions of some who hold that vitrified enamels are subject, in some instances at least, to fading. Although it is not easy to discover in what way they fade, provided perfect vitrification of the enamel surface has occurred, yet, from opinions we have heard expressed, it is probable that fading of some sort has really in some instances taken place. Seeing that burnt-in enamels are looked upon as the highest representatives of photographic permanence, it would be well to have the matter set at rest.

M. HENRI BECQUEREL continues his investigations upon the infra-red portion of the spectrum, and records some most interesting results. We need not explain that this part of the spectrum is entirely invisible to the naked eye; by means of the methods he adopts, M. Becquerel shows that there exists in this invisible region bright line spectra—also, of course, invisible—just as are seen in the visible spectrum the radiations from hot vapours. For example: incandescent sodium vapour shows two well-marked lines (wave-lengths 819 and 1098) corresponding to two bright lines hitherto unknown.

THE method adopted by M. Becquerel is as interesting as it is novel. Hitherto there have been three modes of investigating the part of the solar spectrum under consideration—the first involving the use of a thermopile and a rock-salt prism; the second, Captain Abney's photographic method; the third, Professor Langley's method, with his bolometer and a diffraction grating. This new mode, however, differs from any, and is based upon the discovery that the rays of the ultra-red spectrum have the effect of extinguishing the glow of a phosphorescent body previously exposed to the opposite—the ultra-violet—end of the spectrum. By this means water, for example, gives three well-marked absorption bands with wave lengths 930, 1,080, and 1,230 respectively. Some idea of the degree to which the spectrum is extended beyond the limits once assigned to it may be formed when we learn that this phosphorescent process enables a region from wave length 760 to 1,300 to be examined—that is, an extent greater than the whole of the visible and ultra-violet rays combined.

IT is a very good thing to have a knowledge of the mode of preparation of the various chemicals of the dark room, and any periodical that assists in bringing such knowledge before its readers is doing useful work. We were amused, however, to read, as we lately did in a monthly trade journal, that hydrobromic acid is recommended to be made as follows—"100 grammes potass. bromid. are mixed with 280 grammes of phosphoric acid of a specific gravity of 1304. This mixture is put into a half-litre glass flask. A molten potash metaphosphate forms, and chlorine is given off. Pure hydrobromic acid fumes at last pass over, which should be received in distilled water." While wondering where the chlorine came from we could not help also wondering what possible end is subserved by such paragraphs.

M. G. LEMOINE has contributed to the *Académie des Sciences* of Paris a note on the employment of ferric oxalate (or, rather, of a mixture of ferric chloride and oxalic acid) for the purpose of light-measuring. We shall probably, at an early date, give an extended account of M. Lemoine's results.

In the course of conversation, a few days ago, on the subject of coating plates by mechanical means, we were reminded of a rough appliance for this purpose which we constructed experimentally some three years or more ago, and which, if elaborated, would probably prove useful in the hands, at any rate, of amateurs and small producers of plates. It is based upon the same principle as the well-known stylographic pen, and consists of a wedge or other shaped vessel of the same length as the plate to be coated, having a slit or opening along the whole length of its lower side. This slit is closed by means of a strip or wedge of glass or other material dropping by its own weight into the opening, in the same manner as the needle in the "Mackinnon" form of stylographic pen. If the trough or vessel be filled with emulsion this movable slip or stopper prevents its egress until the slip is pressed in contact with a glass plate, when it is raised and permits the emulsion to escape. By slowly passing the arrangement over the surface of a plate it is obvious that a coating of emulsion may be applied varying in thickness with the rapidity of the motion.

UNSUSPECTED CAUSES OF STAINING IN GELATINE PLATES.

In the days of wet-plate photography with collodion films we seldom or ever heard of any staining of the film after varnishing, but with gelatine films it is not uncommon; indeed, as a rule, I think the complaint is more or less general. There is one cause of staining or spotting of negatives, but I cannot call it an "unsuspected" cause. Many photographers—amateurs especially—like to try a print from their negatives before varnishing, so that if they are not just right as regards density, they can be altered before varnishing. This is all very well, so far as it goes; but, if silver paper be applied to the negative before varnishing, sooner or later spots will show themselves.

If I require to see a print from a negative before varnishing, I always like to make sure that no evil result will accrue from it; so, to guard against the spots through this cause, which are so well known, after taking the print I give the film a slight wash of a weak cyanide solution. This will remove any particles of free nitrate of silver that may have attached themselves to the film from the paper. The best way I find to apply this, so as not to injure the negative, is to first soak the negative well in water—say for about a quarter of an hour—and then apply the cyanide solution with a flat camel's-hair brush about half-an-inch in width.

I find cyanide need not be more than about three grains to the ounce of water, but not more than five grains at the outside. Fully charge the brush with the solution, and pass it over the film lightly, re-charging it occasionally. Care must be taken that the cyanide is applied to the whole of the film. About one minute will be found quite sufficient, as it is only required to act on the surface of the film and not in it. After the negative has been thus treated and well washed, I have never found any staining from the cause named.

An unsuspected cause of staining is when a negative has been known to have been well washed and varnished and then placed aside for a few weeks, and not been printed from, on looking at it to find it all spots and stains. My attention was called to this kind of staining some six months since. As it seemed to me very peculiar I examined the plate well, and at last I suspected the varnish. I remembered that I had a sample of a similar varnish at home, which I had had by me for years, and was of a very sticky nature. I well washed a useless negative thoroughly, varnished it, and laid it aside on a shelf. After a time the spots and stains began to make their appearance in a similar manner to that in the one before mentioned. The cause with me was not far to seek; the varnish was at fault undoubtedly. The varnish was very strong in smell, containing gum benzoin and Venice turpentine. Now my experience with the latter article is that it darkens all silver compounds with which it comes in contact, and is very unsuitable in a photographic varnish. I see by a very old book on photography in my possession that such a varnish is mentioned.

For nearly twenty years I have always made my own varnish, and have never had any trouble with it. At one time I used to employ several of the gum resins; I now only use the best shellac dissolved in alcohol. I find it exceedingly hard, and it does not stick in the hottest sun. To temper it a little I add a small quantity of castor oil, which I find answers all purposes.

Why varnish-makers use such a combination of gums I cannot imagine. My idea of the gums for varnish-making is that the less odour a gum possesses in its solid dry state the more durable will be the varnish; for I consider that a gum which throws off any smell is throwing off solid particles, and a varnish made from such a gum causes it to crack. The lacs, I find, are almost entirely without odour. Sandarac smells stronger, and gum benzoin stronger still, and that is why I reject these gums and give preference to the lacs. There are several varnishes in the market that I should be very sorry to use on a negative of any value.

Another cause of staining I attribute to intensification with iron, and that is why I use pyrogallic acid in place of sulphate of iron. I saw some negatives the other day that were intensified with iron which had become stained more or less, while others that were done at the same time with pyro. had not stained.

All the gelatine plates I use I make myself, and I never employ more gelatine than I am obliged to do, as I consider the less gelatine used the more easy is the washing. I do not employ more than about half the quantity that is generally prescribed.

There is also another cause to which I think sufficient attention is not paid, and that is in the fixing. A great many, as soon as the unaltered bromide and iodide have apparently disappeared from the film, take the plate at once out of the hypo. and wash it. I have found, from experience, that the plates should be left five or ten minutes at least after the film appears clear; for, if it have a thick end to it, it takes some considerable time to free it from the bromide and iodide. If these have not been entirely removed and silver intensification be employed afterwards, a dark yellow stain will appear which nothing can remove. I have seen this on several occasions. By some it is said to be a hypo. stain. If silver intensification has not been employed, and the negative has *not* been properly fixed, discolouration is sure to occur sooner or later, no matter how much the plate has been washed; and, therefore, I think too much attention cannot be given to fixing or clearing a negative, which is very often slurred over. WM. BROOKS.

GELATINO-CHLORIDE FOR TRANSPARENCIES.

I HAVE long sought for a method of producing transparencies by contact from certain negatives, and I desired to find a method by which I could produce transparencies at once suitable for household decoration and for the reproduction of negatives in case any accident should happen to my originals. In the current ALMANAC I briefly stated the importance of such a step being taken in the case of perfect negatives for insurance against total loss by accident, and in the case of negatives requiring intensification or reduction to prevent loss through the mistakes so frequently made in these operations. That my remark in the ALMANAC is worthy of notice I am persuaded to believe from the facts that the Editors of this Journal have chosen my words as the text for a valuable and carefully-written article, and that disasters to valuable negatives are frequently occurring and always possible. A broken negative has, before now, in very deft hands, been patched up so as to give passable prints—at least so I read; but if a negative be smashed to "smithereens," as I have seen them, no mortal can replace, even if he can collect, the fragments.

And who can be certain of succeeding in the intensification of a gelatine negative? I, for one, confess my dislike, and even dread, of the operation, which, in my hands, has always been precarious—often disastrous—though I have given great care and study to the subject, and tried every published process that had a germ of rationality in it. The same remarks may apply—perhaps in a slightly modified degree—to reduction. Negatives over-dense can be reduced with tolerable certainty; but not seldom the reduction is overdone, or the gelatine incurably damaged, by the reducing agent. If a valuable negative can be rapidly, easily, and certainly reproduced as soon as dry, I submit that a great advantage has been gained. If, however, we produce not only a duplicate, but a superior negative, and if, further, our intermediate positive is a thing of unusual beauty, a valuable decoration, and a profitable commercial commodity, then I maintain that not only is our slight trouble amply repaid, but our ability of executing orders which might otherwise be lost is ensured.

Now I know that most professional photographers will agree with me, so far, as to the desirability of making contact positives of their negatives; but they will demur to the trouble, the expense, the time, and the extra accomodation required for carrying out what I urge. Well, I admit at once that more room will be necessary for the storage of negatives and positives, because in this, as in other matters, I like to look at all sides of the question. But how about my friend of the Exhibition who had a large and, to him, extremely valuable negative broken after the production of seventeen prints, the subject being a public ceremony which could not be re-enacted for his benefit, and the negative of which was a brilliant success that might have made his name renowned and left his pocket bursting? I guess he would not grudge the space required for a good positive on gelatino-chloride. And consider, also, that any valuable negative is liable at any time to be broken—all the more so because valuable. Everyone knows that when a large number of prints is wanted of a certain negative such negative is reproduced over and over again, thus saving time and avoiding superfluous wear and tear of the original negative. With gelatino-chloride plates, as I propose to recommend them, the time, trouble, and expense are as nothing compared with the advantages gained.

I have already said that the positives produced by contact printing with either portrait or landscape negatives are themselves things of beauty and eminently marketable commodities. No silver print can at all compare with either a transparent positive or a good positive on opal, whether the opal be matt or smooth. To-day I have produced in a couple of hours, and with one dose of developer four ounces in quantity, eight positives—six on opal and two on glass; and, though the batch of plates was new, I have not lost one operation. I was endeavouring also to produce a variety of tone, and in this I have succeeded, no two positives being alike in colour, yet all pleasing enough.

All my previous experience did not amount to eighteen trials, and of these trials were two batches of emulsion made by myself and differently treated, while the other experiments were made with plates prepared by the versatile and ingenious Mr. A. Cowan. Any person in possession of his senses would prefer these experimental positives of mine to my silver prints from the same negatives; indeed, I showed an opal to a person whom one of the negatives represents, and it was with difficulty I could resist the "annexation" of my opal property. Had it not been that I happen to hold the "suzerainty" of the person in question, my Transvaal — I mean my opal — would assuredly have been forfeited.

The positives on glass, too—backed with opal or ground glass or matt varnish, then the edges bound or the plate framed—make lovely objects to hang at a window or exhibit in a slanting frame on a table. If photographers would have the windows of their reception-rooms hung with such goods they would interest their clients and secure most profitable orders; for these positives have an *appearance* of great value and would command a high price, though the cost of production is but trifling. The ease with which these opals, especially, can be worked upon and beautified is a matter of great importance, whether the positive is to be sold or a new negative to be produced from it.

But I am writing so strongly it would almost appear that I have a commercial interest in some plates or some process. This, however, is not the case; all my interest is comprised in a thorough love for our art, in a firm conviction that we have in store a greater and nobler future than anyone yet imagines, and in a warm desire to point out to photographers what is really for their benefit, artistically and pecuniarily.

I have no doubt that almost any sort of emulsion in good order will serve to produce good or passable positives; but with emulsions anything like what we call "rapid" the difficulties are greatly enhanced. Given a slow emulsion, the trouble decreases very greatly; an artificial light may be used, and either pyro. or iron development will answer the desired purpose, so far as required for the reproduction of negatives. In this way I have successfully used various sorts of dry collodion and albumen plates, also Swan's slow gelatine plates; and I found some of Mr. Kennett's original gelatine plates, with excess of silver, I suppose, give capital results.

And here I must state what I consider the *desiderata* for positives to be used for reproduction of negatives, and for final prints of themselves. In some points the desired qualities tally with each other; in others, by slight modification, they can be made practically to agree. In both cases we must have fair density and clear shadows. The high lights must be clear glass, but there must be good gradation from this to the dark shadows, which for their part must be "firm," but not opaque. A positive without any half-tone, or a sudden jump from clear glass to dense darkness, is a "waster." I found that with (say) a bromo-iodide gelatine plate, when I got a good, brilliant positive for reproducing it, it was rather too dense to make a first-rate decorative article; nor, as a rule, was the colour suitable for a picture by itself. It was only occasionally, and always with much trouble, that I could tone a gelatine plate with bromide in it to a good colour, and even collodion positives were not to be depended on in this matter.

But at last I have found an emulsion of gelatine and silver chloride which, while possessing agreeable colour, is also eminently suited for the reproduction of negatives; and a positive on gelatino-chloride emulsion can be first used to reproduce the original negative and then used as a decoration. Or it can be put aside, or even sold as a work of art, and yet serve as a matrix for the reproduction of negatives at any time when the artist may get hold of it, as in the case of the original negative getting broken. I say I have found such a process; but I do not mean to infer that I discovered or invented it myself. I got my ideas from the writings of Mr. Cowan, who gave his process to the public with most commendable liberality. In the exposure and development of these plates, almost any variation of colour may be produced; and, further, if the finished transparency be not of the desired colour, it can with perfect ease be changed, if not to any colour, at least to several most pleasing tints.

On getting a copy of Mr. Cowan's original formula and directions for making gelatino-chloride emulsion, I, as usual with new processes, proceeded to make a batch of emulsion for myself. I do not know whether it is worth while to fill these columns with what can be found elsewhere; but, in a very few words, I shall describe my operations. I took 320 grains of gelatine (Nelson No. 1 and Heinrich equal parts), soaked in six ounces of water for an hour, added 146 grains of ammonium chloride, raised to about 110° Fahr. I also took 320 grains of silver and two ounces of water at about 110°, dissolved and added slowly, with brisk agitation, to the chloride gelatine; then I raised the emulsion to 125°, and turning off my gas left the whole affair covered with flannel for ten minutes, after which I poured out the emulsion to set.

This was on October 28th. On November 2nd, on my return from a short absence, I washed, filtered, and coated plates with the emulsion. When dry they gave positives by contact as good as I could wish, but the emulsion was too slow for copying in the camera. Then I took part of the emulsion which had not been washed, and boiled it for fifteen minutes; afterwards washed it, filtered it, and coated some quarter-plates with it, and tried to copy negatives in the camera for lantern slides. I found this a failure, as fog was present in sufficient force to spoil a lantern transparency, if not any positive. I tried various developers—ferrous oxalate, ferrous citrate, &c.—but none of them would work for my purpose.

I may as well say at once that I do not recommend these chloro-gelatine plates for camera work. If the emulsion be not boiled it is too slow; if it be boiled there is always the fear of fog, to which, in my opinion, a boiled chloride emulsion is at all times liable. To make certain I repeated the experiment twice, boiling the emulsion five and ten minutes respectively, and the result was the same—fog; not violent, but enough to impair a lantern slide. I am told that a gentleman has used the unboiled emulsion plates for slides, exposing only five minutes in the camera; but I am not told what lens or what stop he used, nor do I know if his slides are anything like sharp in focus.

After I had prepared my emulsion as above, I noticed that Mr. Cowan's plates were to be had from the maker. As I have resolved not in future to prepare emulsion except for special purposes, or for the sake of experiment or keeping my hand in, I at once requested Mr. Cowan to send me a batch of plates—a few to be boiled emulsion. I see no reason why I should not say that I was charmed with these plates from the very first. As prepared by Mr. Cowan himself the plates were excellent. I wish all processes came up as thoroughly to what is claimed for them as this one does. I am told that the preparation of these plates has passed into the hands of Messrs. Marion and Co., and I have no reason to doubt that the plates will continue to bear the good character I have to give them. Tones ranging from cold, slatey grey to bright scarlet or carmine can be produced almost at will, and the exposure is of so elastic a nature that one can hardly go far wrong in the matter. Upon the duration of exposure, or upon the consequent modification of development, depends chiefly the tone of the finished transparency.

My practice is to expose the plate in contact with my negative—unvarnished for choice, but quite dry—to the worst daylight I can find for from one to six minutes, according to my negative and the tone I want. The redder the tone required the longer the exposure. That is the first grand principle. Mr. Cowan gave me quite a long list of alkaline substances with which I might develope—each of them in a certain proportion, and each counteracted by a proportionate amount of citric acid; and here comes in the second grand principle:—The greater the excess of acid in the developer the warmer the tone.

I tried three of Mr. Cowan's developers (those given in his printed instructions), and I found the last—that with the largest excess of acid, coupled with the longest exposure and restrained by a dose of common salt—to be the best. My plates requiring about four ounces of developer, I use the following:—

Citric acid	540 grains.
Carbonate of ammonia (fresh)	180 „
Water	3 ounces.

I heat the acid and water, and add the ammonia; this makes a "fizz," but does no serious damage to anyone. Into these four ounces I put from ten to thirty drops of a ten-per-cent. solution of pure sodium chloride, which, as I said, acts as a restrainer. To this add iron protosulphate 140 grains, water one ounce, and, if required, sulphuric acid one drop.

Development generally takes some minutes to begin; but when it does start you must "stand by to belay," as once on the move it works pretty rapidly. To tell the truth, my first plates took so long to start development that I put them into the sink and gave a much longer exposure to another plate. Meantime my rejected plate had started to develope, and I only noticed it by accident in the sink. Third grand principle—more salt, slower development.

Sometimes the image comes at first a grand carmine colour, and as development proceeds loses that tone. In such a case more exposure and shorter development is required. Fix in hypo.; no alum or acid required. If anyone attending to the printed instructions alone can make anything but fine positives from decent negatives, all I say is I don't "twig" how he does it. The fixed and well-washed positive can be toned with perfect ease, if the colour do not satisfy, to several beautiful tones with gold, or borax, or platinum. Gold works well, as I can testify. If transparencies of this kind are made on opal the development must not be carried too far. If the opal be matt, the surface is about as perfect for retouching with pencil or brush as anything I ever saw. Portraits and landscapes are also valuable when printed in this style, and, as I maintain, look better on glass than in any other shape I know.

To produce a duplicate negative from such a positive, nothing is required but to repeat the operation. This time, however, I use a slow bromo-iodide plate, printing by artificial light through ground glass or opal, and develope with pyro. But another chloride plate may be used without doubt. People are always raving about clear glass shadows in a negative; well, I don't like *any* clear glass in negatives, unless my shadow is in nature not only black, but *dead* black.

I omitted to say before that the developer I have given works quite well for six or eight plates, but does not keep for many hours. The two solutions composing it, however, will probably keep separately for a long time. ANDREW PRINGLE.

POLYCHROMATIC NEGATIVES AND DEVELOPING-ROOM ILLUMINATION.

MR. DEBENHAM's announcement that ruby light is not the best for the development of gelatino-bromide plates raises the desire of those in foreign lands to examine the matter; but no verbal or written description can exactly describe the particular shades of colour he used, nor if I had a specimen of the glass here would it be of use, because I have resolved to discard glass-faced lamps when travelling. Such lamps are heavy if of serviceable size, and glass breaks. Naked yellow lights worked at from a safe distance, or pasteboard candle-screens with paper windows are preferable. The objection to the latter is that paper tears, and that no enterprising manufacturer has yet introduced coloured oil silk into photography, for that would be a great boon.*

However, I hit upon the following simple plan of producing Mr. Debenham's results, and anyone far from London can do the same without previously knowing the exact colours used by him.

I took a plate of bare glass, quarter-plate size, and bought at a shop nine sheets of tissue paper, of various red, yellow, and green colours. I fastened two slips of each of them on the glass—one set of nine slips longitudinally and the other set of nine transversely. The majority of the nine colours were green and yellow, the absorption of actinic rays by the red being so well known already. A broad margin was left at the edges, because the strips were there fixed to the glass by gum. The gum spread a little while wet, under the necessary pressure of the fixing, but, because of the margin, it could not spread to where the strips crossed each other, and so interfere with the results, paper rendered more transparent by gum not being in general use for photographic lanterns.

Thus, by nine slips crossing the other nine slips at nine different places, I had no fewer than eighty-one squares of two thicknesses of coloured paper on but a single quarter-plate, so it was unlikely that some of these would not give results of interest. No doubt many will repeat this experiment, it gives such a large choice of coloured screens from which to select; but I recommend them to take a half-plate, with at least twenty colours in each direction, as when making a polychromatic negative it is as well that it should have a large range of colours, since that will require but a few minutes' extra work to prepare, and the negative when made will be permanently useful. The ends of the strips I turned round about one-sixth of an inch on the other side of the glass, and gummed them down there also, that they might hold on well.

I then exposed the polychromatic negative over one sensitive gelatino-bromide plate for seven minutes to the light of a common composite candle, and another similar plate to the same light for twelve minutes; the measured distance from the flame in each case was twelve inches. Both plates were developed at once in the same dish with the sulphite of soda pyrogallic developer, and both were fixed at one time in the same bath of hyposulphite of soda. The result was the discovery that many of the squares of superimposed papers had stopped the action of light well, and on searching among the coloured squares which had behaved well for one, which also gave plenty of luminosity to the eye, I judged the best to have been formed by one of the light yellows with one of the light greens—the result thus agreeing with those of Mr. Debenham, although some other tints answered nearly as well.

Knowing the eye to be useless as a judge of the pure elements of colour, I had a suspicion that the greyish-green light passing through the paper might, nevertheless, contain much of our old friend the photographically-useful ruby luminosity in disguise, and proving by its presence that the fairly-well-established first principles of science were really not upset by the apparent results of one experiment. Accordingly, I brought the spectroscope to bear upon the light of a candle passed through the two papers, when I discovered that, practically speaking, the transmitted light was a mixture of ruby and green, with a small preponderance of the latter, and that the blues, violets, and yellows were cut off, with the exception of a barely-perceptible trace of yellow. The red and orange papers, of which but one each had been used, answered well photographically and badly visually, as we all know; and the fact was apparent that the superposition of one of these colours upon itself gave little additional chemical protection, whilst vastly-diminishing the luminosity to vision by increasing the opacity of the screen. The little advantage gained chemically was probably due to the second sheet of orange paper cutting off rays which the grain and imperfections in the first sheet had allowed to pass; for tissue or any other ordinary paper is an unscientific and improper material to use in photographic lanterns, and its defects are made up by extra strain upon the eyesight of the operator. At those intermediate places where only a single sheet of coloured paper screened the sensitive plate the grain of the paper printed itself upon the film, showing the coarse nature of paper when used as a filter for light.

Mr. Debenham's experiments does not prove that his light was more non-actinic than ruby, although the latter allowed a print to be taken through it quicker than through the former. In the one case he had a screen of two colours, the one cutting off actinic rays to which the other was transparent, whereas he gave ruby light but the benefit of two screens of one colour, so that the chemical rays passed by the one would for the most part necessarily pass through the other also. Had he used two kinds of red, or ruby glass superimposed on orange, it is probable that the actinic rays would be more powerfully cut off than by his greyish-green, although the latter is more valuable for ordinary practical purposes. There is thus no evidence that his experiment necessitates a reconsideration of what at present is accepted as the first principles of spectroscopy as applied to photography.

In order to discover whether with light of a different space-penetrating power the same results would be obtained with the polychromatic negative, and another two colours prove superior with another source of light, I took the coloured negative today to Mr. K. Ulmi, a Lucerne photographer. He developes by means of a paraffine flame shining through ruby glass, and one of his plates, made at Twann, was exposed for eight minutes under the coloured negative at a measured distance of thirty centimètres from a bright paraffine flame about the size of a common candle, and with a tin reflector behind it. His was a rapid plate, made for portraiture. The results were the same as with my, perhaps, slower plates. His plates were developed with ferrous oxalate.

These tests were very severe as to the safety of the light, for nobody in ordinary operating holds his dry, undeveloped plates at right angles to a candle or paraffine flame for eight or twelve minutes. Their position is usually horizontal in relation to light, which diminishes the power of the latter immensely, and in less than a minute development has begun. Then, again, he does not necessarily work at but twelve inches from the light; at a distance of twenty-four inches its chemical power is diminished fourfold. The law that the intensity of light diminishes inversely with the square of the distance is a most valuable practical guide when developing by means of coloured lanterns. It is well, and quite as easy, not to let the plate be too close to the lantern in taking it from the slide and placing it in the dish; but, when once the developer is over it, it may be brought close to a fairly good lantern with impunity. A good plan is not to bring it very close to the lamp till the image just begins to appear.

* Our correspondent is misinformed on this point, as coloured oil silk for dark-room purposes—both orange and ruby—has been in the market for many years, and is quoted in at least one advertisement in our ALMANAC.

A chief reason why light will not act perceptibly on the film, even while the pyrogallic acid is colourless and when the lantern is faulty in the power of cutting off actinic rays, is that all polished transparent surfaces have a "limiting angle," at which angle all light falling on the surface is totally reflected, and none of it can pass through the transparent medium. Clear water or any similar medium thus rejects altogether a portion of the light falling upon it, and much of the remainder is reflected upwards when it falls upon the plate at the various angles of its emission from a developing lantern. Glass has its fixed limiting angle, water another, and probably saline solutions a different angle still. Here, away from books of reference, I cannot state the angles, but hope Mr. Debenham or someone else will look them up and publish them; for it is evident that the centre of the lantern glass should be at such an elevation above the centre of the developing dish that the line of light between the two shall fall upon the liquid at its limiting angle. Instead of the lantern glass being placed with its greatest length perpendicular to the plane of the horizon, its direction should be horizontal, that more of the light may fall on the developing dish near the limiting angle. It is also a mistake to make the other three sides of a square lantern of metal; they should all be of non-actinic glass. The light from the other three sides does not fall direct upon the developing dish, but has to reach the sides of the room, in which any feeble actinic rays are more especially absorbed by the surface of the walls, and the operator may as well have the advantage of all this well-filtered light in his room. An operating-room in which daylight is filtered through coloured glass is more unscientific than one in which light from a screened flame is used; in the former case the conditions are constantly varying, and more dangerous to good results.

There are conditions under which ground glass will illuminate a room more than plain glass; and one is where the window is so near to the large blank wall of a neighbouring house that most of the light from the sky falls on the glass at the limiting angle, as it is thus thrown off outside the room. If the exterior surface of the glass so placed be ground, much of this light is caught at other angles by the infinite multitude of little hills and valleys and is deflected into the apartment.

The colour of the ferrous-oxalate developer is a great protection to a sensitive plate beneath it from the action of light. Pyrogallic acid has not this advantage in the first stage of the development. Some harmless and cheap vegetable ruby colouring matter added to it might be an improvement.

The days of miserable working in gloomily-dark rooms with gelatine plates are nearly over, thanks to the initiatory step taken by Mr. Debenham. In the early days of gelatine emulsion the plates were not so good as now, and the operators fogged them more by over-development, over-exposure, and too much ammonia. The blame must often have been laid on the unfortunate light, and the photographer afterwards punished himself by working more and more in the darkness of Eblis. In some cases no doubt the light was to blame from want of care in testing the transparent screen by trying to what extent it could be printed through, and because of using two thicknesses of the same glass, instead of varying the colour in the second sheet, that the latter might cut off the rays to which the first one was permeable. This error is common now, and rendered Mr. Debenham's comparative experiment an unfair and inconclusive one. Very likely the best red colour obtainable will still be the best for abnormally-sensitive plates.

The yellower or redder and the more steady the primary source of light in the developing-room the better. If a gas flame be used an argand burner should be chosen, because when the central air-hole of the burner is plugged at the bottom the flame is made longer and yellower. In the future more than ever should the Irish-like expression, "the light of the dark room," be abolished.

Since the previous portion of this article was written, I have read the account of the experiments of Mr. Herbert S. Starnes, which is another step in the improvement of operating-room illumination. It was probably an error to employ any white paint in his lamp as a substratum. What was wanted was that the blue rays should be absorbed by the wood and paint of the walls of the box, and none reflected. An orange or green, rough, unpolished surface might have been more to the purpose. His plan does not amount to much more than the method of developing by the light of an ordinary candle, with an opaque screen between the candle flame and the plate, with the latter at a safe distance. But it is a little superior in that more of the blue rays are absorbed by the walls of the box than by the majority of the colours used on the walls of rooms.

Mr. Debenham will be pleased to hear that his method is already adopted in Lucerne by Mr. Ulmi, who is greatly pleased with it. The one sheet of thin tissue paper is of a canary-yellow colour, and the green is a very bright pea green, inclining to yellow. Some of the darker greens I tried answered no better, but quite as well chemically though inferior visually. On examining the accepted papers separately through the spectroscope by daylight I found they each transmitted a little blue, but when superimposed cut it off, I suppose because imperfections caused by the coarse grain of the one paper were largely neutralised by the other, and because red and green rays have more power of penetration through coarse media than blue rays. This is why street gas-lights at a distance look redder and yellower in a London fog.

Those who wish to try the new light without the trouble of experimenting, will probably be quite safe if they buy the most brilliant green tissue-paper and the most brilliant canary-yellow tissue-paper they can find in a shop—not the feeblest or the darkest of the colours, but the brightest. The feeblest let more actinic rays through; the darkest shut out light by opacity, which light is wanted for the benefit of the eyesight. I wish to withdraw the statement in my last article to the effect that the new light was probably change of colour without change of intensity. There is a great increase of intensity, and Mr. Debenham has conferred a great boon upon the whole photographic world.

W. H. Harrison.

Lucerne, Switzerland, December 28, 1883.

"POLICE PRISONERS' PHOTOGRAPHS."

A glance at a collection of criminals' photographs, so largely used by the detective police, does not increase one's admiration for mankind. Most of the portraits seen in their albums have certainly been taken under the most dismal circumstances. The felon brought to bay is not seen in his happiest mood, and it is beyond ordinary human nature to look one's best with the almost dead certainty of a period of prison discipline in the immediate future.

Scanning the prints it is the simplest thing in the world to pass over an apparently harmless, uncharacteristic face, and hazard a wonder at its being in such bad company. The chances are that the original was one of the vilest of the lot, for there are those who can "smile and smile and be a villain," and it goes hard with the innocent prisoner's photograph; no matter what expression is portrayed, the surroundings condemn him and brand him as a "bad 'un."

Those fairly nurtured in crime and abandoned to the lowest strata have a physiognomy which needs no Lavater to distinguish. "Assume a virtue if you have it not," says Shakespere; but it will not do much good here, for in the unemotionable photograph the brute character shows clear. The beetle-browed ruffians are, if possible, rendered more than naturally hideous. Being mostly taken under a top light, with no attempt at modulating its direct vigour, the shadows are wofully abrupt. The lines and furrows of dissipation, scars, and broken noses are made even more disfiguring, and, further, the consciousness of being trapped and compelled to submit does not tend to mend matters; thus we have the criminal bully perhaps at his worst.

I have before me two prints showing the baffled rage of two low-browed scoundrels while four constables are energetically holding them down. In the one a great bar of wood is forced under the chin; it takes two men to manage it. This effects two objects—raising the head and nearly throttling the "subject." The hair of the head is firmly grasped by another, no doubt to keep him steady; a punch in the stomach by the fourth completes the picture. He has been posed with a vengeance! "He won't object the next time," said the burliest constable, as he wiped the perspiration from his face. In the other picture a bunch of keys jagged into the throat is substituted for the bar of wood, and seems as effectual.

These portraits were taken by the old wet process, when rapid exposure was not the rule. Matters are somewhat improved now, for in a few cases they are taken unawares. The album contains some striking evidence of this—one, for instance, with an officer's hand on the prisoner's shoulder in the act of giving friendly advice. This is, undoubtedly, the pleasantest way, but is not always practicable. Generally speaking, the taking of a prisoner's portrait is very commonplace. He is brought out of his cell, placed on a chair which has been previously focussed, sits down looking a little bewildered, a rapid exposure is made, and the untried unfortunate is hurried off little the wiser. But, be on your guard, constables and photographer! In an instant the demon of destructiveness rouses the sitter, and in a moment the apparatus is smashed with a display of astonishing energy and vindictiveness, recalling to mind the nigger in the "Octoroon" who tomahawked the camera with bloodthirsty revenge.

In the album is the portrait of a "card-sharper," who smilingly sat down, apparently delighted with getting his portrait taken; but just at the critical moment he jumped up and gave a vicious kick at the camera, making a wreck in no time. If ever a man got punished I can in confidence say he did, for the burly constables were at him with gusto, and by the time another camera and lens were procured he was a sadder *and* a wiser man. The best policy is here, as elsewhere, to submit to the inevitable. The police department, I may mention, made good the photographer's outfit.

The women criminals are the worst to manage when once they make up their minds to be troublesome, and I believe they are not much meddled with if they show many qualms. A good lady on one occasion bounced up from the posing chair with great vigour, and with a preliminary spit on the hands, looking all over like fighting trim, she said, "I was just going to smooth my hair," when she was roughly collared by the constable and thrown down again.

One lesson to be learned is to use, for preference, a long focussed lens, and then the photographer is not too near his sitter. Perhaps in some cases a brick wall between the parties is preferable. A very good plan practised at one station is in having two raised platforms—one for the camera and the other for the model; and, with a wide, empty space between, a sudden kick is here just wasted energy.

As there is no law to compel untried prisoners to sit for their portraits, it is scarcely to be expected that operations will always proceed in quietness. It is different in the gaol in which the convicted prisoners are placed. There everything is done by regulation. Those who have to be photographed go through the routine as a matter of course. There are, comparatively, very few untried prisoners who come under the camera's eye, and these few are special cases where copies are wanted in a hurry. In some instances as large a quantity of prints as can be done in time for the night's post or other mode of distribution is required. In pressing cases the detectives accept, in their urgency, rough, untoned silver prints. If the likeness be traceable it answers their purpose. I have no doubt that the gelatino-bromide paper will, if it is not already the case, be largely employed for this purpose. Its extreme sensitiveness (an exposure of one second or so to gas or other light) enables scores to be printed in an astonishingly-short time. A large batch can be developed at once, and finished and despatched to particular stations for information. For this, what are called "route forms" are used. The portrait is pasted on a printed sheet, and a written description annexed of name and *aliases*, place of abode, age, height, marks, occupation, charge, &c., and in some forms even their religion have to be filled in. These forms are forwarded from one centre to another, and carefully examined and noted. If recognised, particulars are communicated. In some energetic offices these "route" photographs are all re-copied and added to the album, there to be studied and referred to at any moment.

A great number of portraits, too, is in circulation of suspects not captured. From whence the detectives obtain these photographs is not easily explained; but the fact remains that the counterfeit resemblance of the forger, the embezzler, or other person "wanted" is in the hands of the police, and copies made.

Local photographers are often applied to for a *carte* of an unfortunate customer, and it is questionable whether they should give it or not. That they do often stretch a point and favour the detective there is no doubt; but, on the face of it, it seems a great breach of faith on the part of the photographer against his customer. Certainly, in a law-abiding, commercial nation it is every honest tradesman's interest to strengthen the hands of justice, and aid in the detection of crime; but in the case of the photographer he may be the cause of an irremediable injury. To have one's *carte* hawked about by a detective is to a sensitive man a punishment in itself, and with the doubt of guilt or innocence hanging over him is unfair to himself and degrading to his friends. It is no part of the photographic profession to place their private customers' negatives at the service of the police without the permission of the sitter. I should say, even where the case is as clear as noonday, the photographer has no business to betray his client.

The following is a case in point:—The assistant in a photographic studio, whose duty was to copy the "route" portraits for the police, happened to recognise in one of them the face of a regular customer. He compared the photograph, and there was not the slightest doubt. The person was "wanted" by the police for absconding with silver plate, &c., from his late employer. The address of the man—he was valet to a gentleman in the neighbourhood—was known to the photographer; yet he did not feel it incumbent on him to divulge the matter. The man might be a thief, or he might not. The photographer had found him honest in his business relations with him, and he gave him the benefit of the doubt.

Thomas Maitland Laws.

DIFFERENT DEVELOPERS.—EXPERIMENTS WITH A POTASH DEVELOPER.

The question as to what developer one should work with is still undecided. While in England (the fatherland of the emulsion process) alkaline development is used by an overwhelming majority, in France and, lately also, in Germany the ferrous oxalate developer is coming to the front. The circumstance that in England tourist photography plays a much greater part than on the continent may greatly contribute to this result. At anyrate, it cannot be denied that the question as to which developer is best suited for use on a journey is of great importance when one has to make a choice of a method of development. One must insist upon the same process being used always in the studio that is used outside it, and one can only learn to master his process thoroughly when he can employ it independently of time and place. From this point of view the following experiments were made:—

The ferrous oxalate developer offers the great advantage of being easy and convenient to handle, and furnishes plates which, when looked through, have quite the character of wet ones. It is, therefore, unusually well suited for use in the studio, especially since the price of potassic oxalate has become so low. Yet weighty considerations are opposed to its employment upon journeys or in warm climates. It is necessary to prepare saturated solutions of salts which do not dissolve very rapidly. These solutions must, especially where no distilled water is to be obtained to add to them, be filtered even when the chemicals are pure and fresh—a particularly wearisome business in the case of potassic oxalate—as rinsing water rich in calcium may not be used, while, of course, such a water is quite unfit for adding to the developer itself. The quantity of chemicals that have to be taken with one on the journey and the extent of the stock solutions are very considerable; and, finally, if the temperature be high and the plates are not prepared with very hard gelatine, the film dissolves in the baths. However great, therefore, the advantages of the ferrous oxalate developer are, such strong objections to its use occur in many cases that it cannot be regarded as a normal developer which may always be used.

The pyrogallic acid developer with ammonia takes up to a certain extent an opposite position. It is more difficult to manipulate than the ferrous oxalate developer, and plates developed with it have not when looked through the character of wet plates, if sulphite of sodium (which is such an advantageous addition) be not added.

Further: there is the still greater drawback that both the stock ammonia and the normal solution of the same as employed are continually changing, by long use, their specific gravity, and therewith their efficacy, and also that the strong fumes of ammonia evolved by the developer may become very annoying in the confined tent; but to these defects some unusual advantages are opposed. With sodium sulphite the developer furnishes plates which are in nothing behind those developed with ferrous oxalate, and which have thoroughly the character of wet plates; indeed, the alkaline developer allows, without any trouble, of modifications which can only be made upon the ferrous oxalate developer with difficulty and with the expenditure of time.

The chemicals required for the preparation of a normal solution occupy comparatively little room, are easily carried about, dissolve quickly, and, if salicylic acid be used with the pyrogallol, require no distilled water; but any water fit for drinking may be used for working with it as well as for rinsing the plates. Lastly: the film is so well tanned by the alkaline developer that the plates can be developed at a much higher temperature both of air and water (the latter may be used at 28° to 30°) than is even to be thought of with the ferrous oxalate developer.

Now, to summarise the judgment on the two methods: one sees at once that the alkaline developer may claim the advantage of more universal usefulness, while the ferrous oxalate developer renders the most excellent service when one has always to work in the same studio. Where, therefore — even when views are taken outside and upon journeys—the plates are always taken to a fixed dark room in which distilled or rain water is at one's disposal, and the temperature never exceeds a certain maximum, the ferrous oxalate developer is in its right place. But there are limitations here. In warm climates it is often difficult to keep the dark room and the solutions cool enough, and the alkaline developer at once steps forward and deserves the preference then as well as from every photographer who must occasionally work in improvised laboratories during journeys. Besides, when sodium sulphite is added to it, it is only inferior to ferrous oxalate in one respect, namely, the instability of the ammoniacal solutions, which continuously lose strength in consequence of evaporation. If this drawback could be remedied the alkaline developer would by its universality supplant the ferrous oxalate developer more and more in course of time.

An effort in this direction is made by the soda developer (which is now gaining so much ground in America), in which the very unstable ammonia is replaced by carbonate of soda, the solution of which remains of the same strength for an unlimited time. This developer also deserves full consideration, since it works without restraining bromide, and imparts to its negatives the character of wet plates without sodium sulphate. One objection only can be raised against it, and it merely has to be taken into consideration when travelling. At a mean temperature of 15° C. carbonate of soda dissolves very slowly in water, and sixteen parts of it require one hundred parts of water. One is, therefore, not in a position to prepare a sufficiently-concentrated solution and must use great quantities of it. Thus: Mr. H. J. Newton uses fully 50 c. c. of a soda solution of about ten per cent. to every 100 c. c. of developer. In the studio this is no very great objection, as great volumes of soda solution can be kept in stock; but, when travelling, that is very burdensome, and to make the solution at the time of using it is generally forbidden by the waste of time it would cause—just like the ferrous oxalate developer. The soda developer, therefore, offers the objection to the traveller of requiring a great deal of room; on the other hand, it offers all the other advantages of the ammoniacal developer, with perfect stability of the solutions in addition.

Under these circumstances it seemed to me advisable to make some systematic researches in order to discover whether some other alkalies which are more soluble in water might not replace the soda advantageously. The most prominent of these is carbonate of potassium, which dissolves about six times as easily in water as that of soda. But the favourable comparison is not exhausted by that; for, while carbonate of soda contains 62·8 per cent. water, pure carbonate of potassium is anhydrous, and acts about three times as powerfully, while, if the saturated solutions be compared, one will find that that of the carbonate of potassium has at least fifteen times the effect of soda, and therefore that, if the potassium salt should otherwise prove suitable for the developer, the bulk of the stock solution one would have to carry about would be reduced to a fifteenth. Another advantage would be united to that. In using ammonia one can vary the quantity of alkali at pleasure; with soda that is hardly possible, as by adding more soda solution the developer would be so much diluted that it would require more pyrogallol. With the solution of carbonate of soda, however, one can work just as with ammonia, though the quantity must be somewhat greater. For instance: if one wished to take the quantity that would correspond to the above-mentioned—fifty c.c. of soda solution, for a normal developer, to every 100 c.c. of water—about three c.c. of the potassic solution would be required—a quantity which could, of course, be increased at pleasure.

For my purpose, in addition to carbonate of potassium, only caustic potash and caustic soda could be considered as being soluble enough in water and of undoubtedly powerful action. In order, therefore, to obtain a complete series for comparison I prepared the following solutions:—

I. Water 100 parts, potassic oxalate 33 parts.
II. Water 100 parts, ferrous sulphate 33 parts, citric acid 0·75 part.
III. Water 100 parts, bromide of potassium 10 parts.
IV. Water 100 parts, alcohol 10 parts, salicylic acid 1 part, pyrogallol 10 parts.
V. Solution of sodium sulphite (1:4) 230 parts, ammonia (0·925) 120 parts, bromide of potassium 40 parts.
VI. Water 100 parts, caustic potash 6 parts.
VII. Water 100 parts, caustic soda 6 parts.
VIII. Water 100 parts, carbonate of potash (purified potash) 90 parts.
IX. Water 100 parts, sodium sulphite 25 parts.
X. Water 200 parts, sodium hyposulphite 1 part.

Emulsion plates of equal size were exposed at a distance of one meter to the light of the burning of 1 c.m. of magnesium ribbon, under a graded photometer 13 c.m. long and 21 c.m. wide, specially constructed for this experiment of fine tissue paper. The photometer was arranged so that each of the twenty-five steps which formed the scale was 21 c.m. in length, and about 0·52 of a centimetre in width. These plates were afterwards cut into narrow strips perpendicularly to the degrees of the photometer, and each strip was then separately developed in 100 c.c. of developer. The average time of development was three minutes; only in the case of the potash developer, to which bromide was added, it was four minutes, and in one instance it was twelve minutes, in order to test the action of prolonged development.

The result given by the above table is that, while caustic potash and caustic soda seem quite unsuitable, the potash developer, as I propose to call it, stood the test quite exceptionally, and, especially when sodium sulphite was added to it and imparted a blue tint to the plates, it quite equalled the ferrous oxalate. But this result would be still more significant if a second series of experiments made by me be taken into consideration. I had a series of plates, prepared according to Mr. Henderson's method, which gave very good negatives with ferrous oxalate, but with ammoniacal pyrogallol showed the most pronounced green fog. These plates behaved faultlessly when developed with potash, and showed only a scarcely-perceptible fog, which remained unincreased even by prolonged development when sodium sulphite was added. In this respect also the potash developer shares the good qualities of the ferrous-oxalate developer—is quite equal to it in every respect, and surpasses it in convenience for use when travelling. It is very remarkable that an increased addition of potash does not produce flat pictures, as one would have expected, but exceptionally powerful negatives clear in the shadows. In the case of under-exposure one must beware of adding *more* potash. The right thing to do is exactly the opposite; while with over-exposure increasing the potash with, in case of need, the addition of bromide of potassium (which should not in general require to be used) produces excellent results. Now the formula which I consider the best is—

I.

Water	100 parts.
Alcohol	10 ,,
Salicylic acid	1 part.
Pyrogallol	10 parts.

II.

Solution 1:4 of sodium sulphite	100 parts.
Potash solution (9:10)	100 ,,

To every 100 c.c. of developer take 2 c.c. of I. and from 1 to 32 c.c. of II., according to the degree of softness or of brilliancy one wishes to obtain. By suitably graduating the developer one can doubtless develope every negative so that it shall not need any intensification. The proportion which, in respect to power, most nearly corresponds to the ferrous oxalate developer is 4 c.c. of potash solution to 100 c.c. of developer.

Finally: a word upon the question of cost. The soda developer is certainly cheaper, since one kilogramme (about 2 lbs.) of soda only costs 25 Pf. (say 2½d.), and one kilogramme of purified potash 1·40 Mk. (say 1s. 4d.); yet the proportion is not really so unfavourable after all, since the potash is three times as effective as the soda. One should, however, not be tempted on the plea of a false economy to use the unpurified potash, which costs only ·70 Mk., or the still cheaper raw product, because the salts of chlorine they contain would essentially retard the development. Also the potash developer is cheap enough, and, in consideration of its great advantages, can confidently step into the chemical-chest with every other one.

Franz Stolze, Ph.D.
—*Wochenblatt.*

		No.	Solutions. I. c.c.	II. c.c.	II. Drops	IV. c.c.	V. c.c.	VI. c.c.	VII. c.c.	VIII. c.c.	IX. c.c.	X. Drops	Developing Time in Minutes.	Photometer Number which appeared.	Remarks
	Ferrous oxalate developers	1	75	25	...	...	...	...	...	...	...	...	3	10	Powerful, slight fog.
		2	75	25	3	...	...	...	...	...	...	...	3	10	Powerful, no fog.
		3	75	25	3	...	...	...	...	...	...	20	3	10/13	Powerful from 10 onward, and numbers to 13 reversed.
Alkaline Developers.	Ammonia.	4	...	...	...	2	2	...	...	...	...	...	3	11	Powerful, clear.
		5	...	...	...	2	4	...	...	...	...	...	3	11	Powerful, fog.
	Caustic potash.	6	...	...	...	2	...	4	...	...	...	...	3	10	Very flat, strong fog.
		7	...	...	...	2	...	8	...	...	...	...	3	10	Medium, strong fog.
		8	...	...	20	2	...	8	...	...	...	...	3	10	Medium, slight fog.
		9	...	...	40	2	...	8	...	...	...	...	3	10	Medium, very slight fog.
	Caustic soda.	10	...	...	40	2	...	...	4	...	...	...	3	10	Very flat, clear.
		11	...	...	40	2	...	...	8	...	...	...	3	10	Flat, strong fog.
	Potash.	12	...	...	...	2	...	...	...	4	...	...	3	12	Powerful, slight fog, yellowish.
		13	...	...	...	2	...	...	...	8	...	...	3	12	Powerful, very slight fog, bluish.
		14	...	...	...	2	...	...	...	16	...	...	3	12	Powerful, clear, bluish.
		15	...	...	...	2	...	...	..	2	...	...	3	11	Powerful, slight fog, yellowish.
		16	...	...	...	2	...	...	...	2	1	...	3	11	Powerful, clear, blue.
		17	...	...	...	2	...	...	...	3	...	...	3	12	Powerful, slight fog, bluish.
		18	...	...	...	2	...	...	...	3	1	...	3	12	Powerful, clear, blue.
		19	...	...	...	2	...	...	...	3	3	...	3	12	Powerful, clear, very blue.
		20	...	...	1	2	...	...	...	3	3	...	4	12	Powerful, clear, bluish.
		21	...	...	1	2	...	...	...	4	4	...	4	12	Powerful, clear, bluish.
		22	...	...	1	2	...	...	...	3	3	...	4	10	Medium, clear, bluish (steeped first three minutes in potash alone).
		23	...	...	...	2	...	...	...	1	1	...	3	11	Powerful, clear, bluish.
		24	...	...	...	2	...	...	...	0·5	0·5	...	3	10	Medium, clear, blue.
		25	...	...	5	2	...	...	...	0·5	0·5	...	12	10	Powerful, slight fog, bluish.

SHEFFIELD PHOTOGRAPHIC SOCIETY'S EXHIBITION.

The Annual Exhibition of the Sheffield Photographic Society was opened in the Cutlers' Hall, on Monday last, Jan. 7th, by the Mayor, Mr. Alderman Brittain, who was accompanied by the Town Clerk and several gentlemen connected with the Society. The present collection offers a great contrast to the first attempt made by the Society, two or three years ago, in the same building, when, as we recollect, the rooms had a rather bare appearance, the exhibits being confined almost entirely to members. Now, however, there are upwards of four hundred pictures hung, including many works by our leading artists, both amateur and professional.

The MAYOR, in declaring the exhibition open, delivered an address in which he spoke of the advantages derivable from photography In the course of his remarks he said that he looked upon the art as one inducement to go into the country. By its aid the beauties of nature were reproduced, and, although it was not an absolute necessity that the photographer should be a true artist, yet he should have the feelings of an artist, to select such beautiful views for his work as were exhibited in that hall. The beauty of the picture was not entirely in the composition of it, and many men might note with pleasure a beautiful landscape without knowing much of the principles of art. The means of producing beautiful pictures were within the reach of every Sheffield man. There was no manufacturing town in the world more magnificently situated than Sheffield. He had had the privilege of travelling very much during a part of his life, and had visited some of the most beautifully-situated cities in Europe, most of those which had a reputation for pretty surroundings, and he must honestly confess there was no town in Europe he had had the privilege of visiting where the scenery was more beautiful, or even so beautiful, as that around Sheffield. Moreover, they were only within a comparatively short distance of the delightful Derbyshire dales. Their pencils and brushes might not be able to produce works such as those of B. W. Leader, Boughton, Vicat Cole, or other great landscape painters; but there was pleasure in producing, by the sun's aid, such beautiful pictures as were to be seen on those walls. There was a further advantage in photography—the reproduction of works and everything that was beautiful; likenesses, some of them of those they loved, and those whom in life they recollected. There were so many beautiful objects that he need not particularise; but he would say that anything that took them into the country out of the smoke of the town—be it photography, or any branch of natural history, zoology, ornithology, or botany—should have the support of every Sheffielder, for these studies were not only a means of great enjoyment but of prolonging life. Concluding, he declared the Exhibition open, and wished it and the Society every success.

Among the more noteworthy works exhibited are several of the well-known studies of Mr. H. P. Robinson, including his *Merry Tale* and others from the last two exhibitions in Pall Mall.

Mr. W. McLiesh, of Darlington, also sends his famous *Misty Morning on the Wear* and *Nature's Mirror*, with other examples of his work.

Messrs. Valentine and Sons (of Dundee), Messrs. Adams and Scanlan (of Southampton), Mr. W. England, the Autotype Company, Mr. T. B. Blow, the Rev. H. J. Palmer, Messrs. West and Sons, and Mr. M. Auty (of Tynemouth), are amongst the exhibitors from a distance, while Sheffield and its neighbourhood are well represented.

Dr. T. H. Morton, the late President of the Society, exhibits a number of Indian and other views, as well as photomicrographs. Mr. W. B. Hatfield, the Treasurer, contributes several frames of excellent landscape work, and also several "composition" studies; and Mr. J. Taylor, the Secretary, also exhibits some good landscape work, so that the Society, as represented by its officials, may be considered to have done its duty. Mr. W. Dakin, ex-Secretary, is also represented; and Messrs. W. Davis (of Ripley), Seaman (of Chesterfield), G. V. Yates, W. Turner, T. S. Yeomans, E. Maleham, T. S. Hicks, S. Foxon, and other local names are found in the catalogue.

The show of apparatus and appliances is not large, being confined to exhibits by the well-known firms of Marion and Co,, J. F. Shew and Co., H. Moorse, Lancaster and Son, and Hunter and Sands. Mr. J. Taylor, Secretary, exhibits cameras; Messrs. Cubley and Preston, graphoscopes, &c.; Mr. J. Dyson, an optical lantern; and Messrs. Hibbert Bros. examples of crystoleum painting and materials—these last-named being all local exhibitors.

The Exhibition will remain open until the end of the present week, the evenings being enlivened by lantern and musical entertainments.

RECENT PATENTS.

PATENTS APPLIED FOR.

No. 319.—"Photographic Cameras." S. D. MCKELLEN.—*Dated January* 2, 1884.

No. 416.—"Apparatus for Storing, Conveying, and Applying Developing and other Chemicals required or suitable for the Production of Photographic Pictures." (Complete.) G. D. MACDOUGALD.—*Dated January* 2, 1884.

No. 712.—"Apparatus for Use in Washing Photographic Prints and other Articles or Materials." (Complete.) F. HAZELDINE.—*Dated Januar* 4, 1884.

No. 741.—"Use or Application of the Camera Principle in Surveying, Sighting, &c." M. GILL.—*Dated January* 5, 1884.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
January 15	Bolton Club....................	The Studio, Chancery-lane.
,, 16	Photographic Club	Anderton's Hotel, Fleet-street.
,, 17	London and Provincial	Mason's Hall, Basinghall-street.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

THE third ordinary meeting of this Society for the present session was held at 5A, Pall Mall East, on Tuesday last, the 8th instant,—Mr. James Glaisher, F.R.S., President, in the chair.

The minutes of the previous meeting having been read and confirmed, the following gentlemen were elected members of the Society:—Messrs. A. Tagliaferro and A. G. Dew-Smith, M.A.

The CHAIRMAN said that he had to communicate to the meeting news which had arrived that day, and which he was sure would give pain to every one. It was the death of Mr. J. H. Dallmeyer. He had died within sight of the shores of New Zealand. He was truly loved and respected by all present, and he (the Chairman) was sure that all would sympathise with his family. He had only heard the news recently, and was much affected himself. The loss was not one to them only, but to England and to optical science generally.

Mr. G. L. ADDENBROOKE exhibited a lantern for use in developing and changing plates, especially when travelling. It was exceedingly light and folded into a very small space. It was constructed of three portions, of the material used for book boards, in one of which was a large window of bookbinders' cloth. Any ordinary lamp or a candle could be placed inside it.

Mr. W. E. DEBENHAM asked the exhibitor if he had experimented on any other colours of medium than ruby for a dark room lamp.

Mr. ADDENBROOKE said he had not.

The CHAIRMAN observed that he was always glad to see anything practical, and he was sure that Mr. Addenbrooke's lantern was not only practical but useful.

The discussion was then taken on a paper read before the Society some time ago, by Mr. J. B. Spurge, on the subject of a standard light by which to test the sensitiveness of photographic plates.

Mr. SPURGE went rapidly over the leading points of his paper, which had been read so long ago as six months. The light which he proposed was a white screen, illuminated by four gas jets, each giving a tall flame, the height of which was carefully adjusted. He (Mr. Spurge) also showed a number of plates exposed under his own sensitometer and under that of Mr. Warnerke.

Mr. DEBENHAM said that elaborate mathematical calculations, such as those of Mr. Spurge, were sometimes necessary and useful; but, to be so, they must be exact, and should rest upon an exact basis. If the basis were not exact they were to a certain extent wasted. In this case they rested upon what appeared to him a very uncertain basis. The radical vice of all sensitometers was that they were read by observing the last of a series of tints, which indicated merely what was the minimum amount of light that would affect the plate; but a plate might be made to render such a tint by other means than such as would make it rapid in the camera, especially if it had been exposed to extraneous light. By such means it might be made to show a sensitiveness sixteen times greater than it really possessed. For this reason he (Mr. Debenham) considered that the exact basis on which such a mathematical calculation should rest was wanting. As to the new unit of light: he certainly considered the use of a gas flame to be more convenient than the burning of a piece of magnesium wire and the sensitising of a phosphorescent tablet; but he considered it to be a less sound scientific unit than Mr. Warnerke's. The gas flame might vary from so many causes—the quality of the gas, the barometrical pressure, &c.

The CHAIRMAN suggested the use of a governor.

Mr. DEBENHAM said that the size of the opening might be true to begin with, but that it would become corroded, and that it was even a question if the heating of the burner might not expand it enough to make an appreciable change. All the matters which he had mentioned appeared to him to make the standard a less sound one than that originally proposed by Mr. Warnerke.

Mr. T. SEBASTIAN DAVIS wished to call attention to one point. In the present instance a gas light was proposed as a standard; in that of another sensitometer a phosphorescent tablet was proposed. The question occurred to him, from a mathematical point of view, whether the ratio of sensitiveness between various plates indicated by those two standards would agree one with the other, or would agree with the ratio shown by exposure in the camera on objects illuminated by solar light. He thought that possibly results of practical utility might be gained, but not of mathematical exactness. In his own experience he had often found that a plate which gave a low sensitometer number might give a high degree of sensitiveness in the camera.

Mr. SPURGE said, in reply, that if the effect of pre-exposing a plate were to make it give a higher sensitometer number it would also be to make it give a corresponding result of greater sensitiveness in the camera. He stated that in the burner which he used the hole was circular, one millimetre in diameter, and that any slight variation in the diameter of this hole made much less than a proportionate difference in the intensity of the flame. He said that the quality of the gas might vary by thirty per cent. before any appreciable difference could be perceived in the brightness of the flame, the height being kept constant. As to the ratio of the sensitiveness of different plates being different according as the source of illumination was a gas light, a phosphorescent tablet, or sunlight: he thought that such variations did not exist when the same salts of silver were used. If different salts were employed it would be necessary to introduce a constant for each salt.

The CHAIRMAN thanked Mr. Spurge for bringing the matter again before the Society.

M. G. L. Addenbrooke and Mr. C. R. Woods were appointed auditors for the accounts of the Society; and Mr. W. Cobb, Mr. A. Cowan, Mr. F. Hollyer, and Mr. W. K. Burton were appointed scrutineers of the voting-papers.

The meeting was then adjourne l till the 12th February.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

THE annual lantern meeting of this Society took place as usual on the 3rd instant in the large hall of the Society of Arts, John-street, Adelphi, it having become the custom during many years past to devote the January meeting to this purpose.

Mr. WILLIAM BROOKS again had charge of the lanterns while Mr. F. A. Bridge, the Secretary and Treasurer, officiated as lecturer and also presided at the piano. The large room was crowded from the platform to the clock by an appreciative audience, who were not backward in applauding the more meritorious pictures as they appeared. The pictures which were most generally admired were those of Messrs. Joseph Gale, York, Brooks, F. Beasley, and the Sciopticon Co. Amongst the principal remaining exhibitors were Messrs. Cobb, Wheeler, Bridge, Ayres, Hepworth, and Brigirshaw.

The interval was, as usual, enlivened by music, the vocalists being Miss Harding, Mr. Page, and Mr. Bridge, the last-named gentleman, as we have said, also filling the duties of accompanist.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AT the meeting of this Society held on Thursday, the 4th inst., the chair was occupied by Mr. W. E. Debenham.

Mr. W. T. WILKINSON inquired whether any member had tried the method suggested by Mr. Brooks of using the same developing solution continuously.

Mr. A. L. HENDERSON had given a formula for the purpose long ago. He did not think, however, that there was much economy in the plan.

Mr. A. MACKIE had a bottle of developer which after having been used was put away for a year. He found on trial that it still developed, although very slowly. It took an hour and a-half for the purpose, whilst with a fresh solution development was complete in four minutes. As to the quality of the resulting negatives: if anything, it was in favour of the old solution, which gave an appearance the nearest approach to that of a wet plate film that he had seen.

Mr. HENDERSON had made up some developer, two and a-half years ago, containing free bromine. It developed fairly well after long keeping. Referring to the use of an acid alum bath before fixing, he said that if the negative were immersed in the hypo. bath before the above was thoroughly washed out there would be a slight clearing and bleaching action, which proved sometimes very beneficial.

Mr. A. COWAN said that for the same purpose he had used a ten-per-cent. solution of sulphuric acid before fixing.

Mr. MACKIE observed that he for some time adopted this plan, but when doing so he first made the hypo. bath alkaline.

Mr. HENDERSON then mentioned the method of reducing intensity of negatives proposed by Mr. J. Spiller, and consisting of a solution of sulphate of copper and common salt. He (Mr. Henderson), however, preferred the vapour from cyanide of potassium.

Mr. MACKIE had tried solution of cyanide of potassium, and had kept a negative in it for four days without producing any result.

Mr. HENDERSON thought that was owing to want of air. The vapour from the cyanide must combine with air to produce a beneficial action.

Mr. F. W. HART had tried Mr. Spiller's plan for reducing negatives, and found it very nice. Pure cupric chloride acted similarly.

Mr. WILKINSON recommended a solution consisting of nitric acid two parts and saturated solution of alum five parts for clearing silver stains from negatives.

Mr. MACKIE said that sometimes cyanide of potassium would remove such stains, and at other times it would not.

Mr. PARSONS showed a finder consisting of a small camera with a reflector like the old camera obscura; there was also a shade over the ground glass.

Mr. COWAN said that Mr. Harrison had shown a similar one with his camera some time since.

Mr. WILKINSON remarked that some time ago Mr. Ashman had spoken of stains as arising from the developing-dish not being perfectly cleaned out with acid. He (Mr. Wilkinson) preferred to have a new surface by coating every night with a black varnish. The kind he used was called lignosote, which was a very thin liquid.

Mr. HENDERSON then said that if a pinhole were made in a piece of card or brown paper, an object looked at closely appeared to be in focus, but a newspaper held at what was before the proper distance for reading, would be out of focus, and could no longer be read. Why was this?

The CHAIRMAN held that the newspaper was not put out of focus by the use of the pinhole diaphragm, but that so much light was cut off that the small print could no longer be read. There might also be some confusion caused by diffraction and by reflection from the sides of the tube which the pin formed in the card.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

THE Board of Management of this Association held its usual monthly meeting on Wednesday, the 2nd inst., at 181, Aldersgate-street.

The minutes of the previous meeting were read and confirmed. Messrs. Carroll, Dugdale, Cotrell, Dubbin, Logan, and Wilkinson were proposed, seconded, and elected members of the Association.

It was then decided that the annual general meeting should be held on Wednesday, the 30th inst., at 181, Aldersgate-street, at eight p.m. All members who can attend are requested to do so, and members of the profession are earnestly invited.

Correspondence.

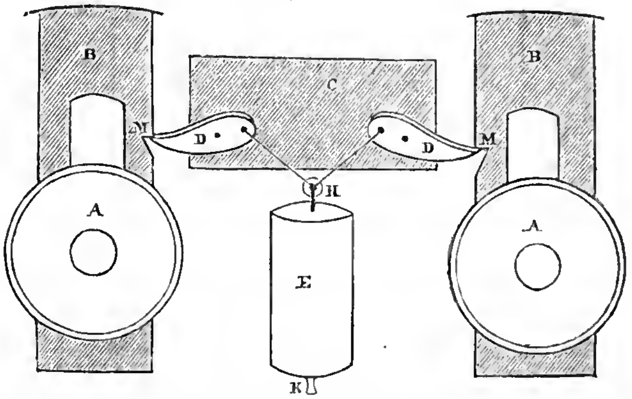
MEETING OF THE PHOTOGRAPHIC SOCIETY OF FRANCE.—LIFE-SIZE PORTRAIT WITHOUT ENLARGEMENT.—A NEW APPARATUS FOR RAPID SHUTTERS.—A DRYING APPARATUS FOR GELATINO-BROMIDE PLATES.—PHOTOGRAPHIC STUDIES: MEDICAL POINT OF VIEW.—LECTURE ON FILMS, BY M. LÉON VIDAL.—ON THE INTRODUCTION OF STARCH IN EMULSIONS, BY M. AUDRA.

THE monthly meeting of the Photographic Society of France was held on Friday evening last, the 4th inst.,—M. Davanne in the chair.

M. CHALOT, successor of M. Franck de Villechole, exhibited the bust of a gentleman, size of nature, taken direct without the aid of an enlargement. The proof was 18 × 24 inches. The result was perfect, and was very much admired by all present. M. Chalot, in answer to questions put to him, said it was obtained by a three-inch aplanatic lens of M. Darlot's, having a focus of forty-four inches. He gave a gelatino-bromide plate an exposure of forty seconds in order to obtain the negative.

M. MAUDUIT presented a new pneumatic apparatus by which a similar exposure can be given with two stereoscopic lenses when guillotine or drop shutters are employed. An india-rubber tube, with air-ball, is put on the instrument at K (see *fig.* 1). By pressing the

FIG. 1.

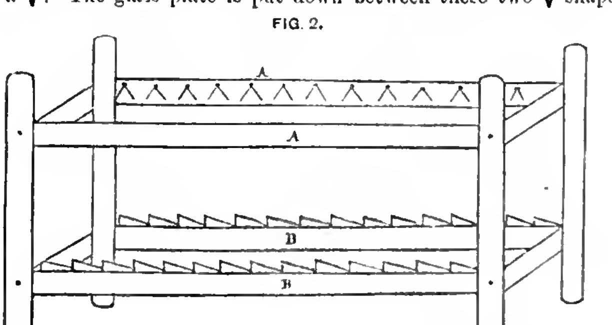


A A, Lenses. B B, Drop shutters. C. Brass plate, to which are riveted the movable levers, D D. E, Cylinder. H, Piston. K, Nibble for india-rubber tubing. MM, Slots in drop.

ball, air enters the cylinders and drives up the piston, H, which causes the movable levers, D, to leave the slots, M M. The steel drops then fall down, and the exposure is finished. Naturally, as can be seen, the exposure can only be regulated by the length of the hole in the drop, or the rapidity of its fall.

M. ROGER presented a drying-stand for the desiccation of gelatino-bromide preparations on glass. It consists of a wooden frame sufficiently long to contain about twelve plates. On the two top cross-bars short pieces of ground glass, about the size of a penholder and about an inch long, are inserted in such a manner as to form an open space like a V. The glass plate is put down between these two V-shaped

FIG. 2.



A A, Cross-bars, in the interior of which are fixed the glass V-shaped pegs B B, Lower cross-bars, to which are fixed the ratched notches to support plates.

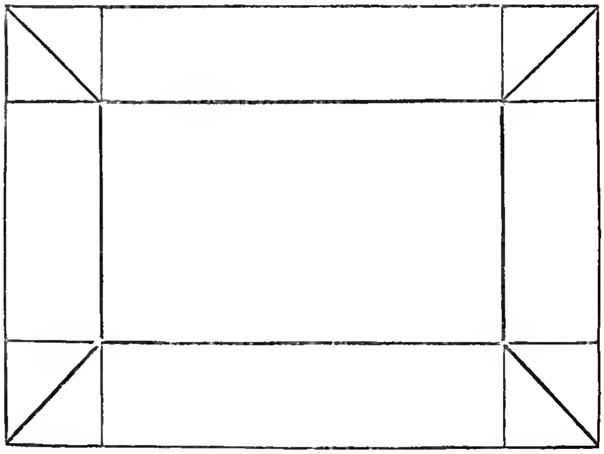
holders, and then falls upon the two lower cross-bars, which are notched to prevent their slipping, and to keep them in their places.

At the bottom of these notches there is a piece of glass, so that the prepared plates do not rest on wood. When one of these plate-holders is full it is carried into the drying-room, where these kinds of frames can be piled one upon the other up to the very ceiling. The air, says M. Roger, can circulate freely and the plates dry rapidly.

M. Londe and Dr. Richer presented some photographic studies taken at the lunatic asylum for females, in Paris. They represented a patient suffering from muscular contractions of the face. Photography had seized and admirably portrayed every expression delineating pain and suffering. M. Londe spoke of the value of stereoscopic pictures. He regretted that this most interesting and beautiful representation of nature was going out of fashion, and hoped that a new impulse would be given to stereoscopic productions by the gelatino-bromide process and new apparatus. He felicitated M. Mauduit on his endeavour towards accomplishing that object. This hope was highly approved of by the President and the members generally.

M. Léon Vidal gave a demonstration upon the value of films for tourists, and counselled the employment of small cameras. He began by saying that he had, like a conjurer, filled his pockets with all that was necessary for an amateur when travelling in order to make photography an amusement and not hard work. M. Vidal then began to empty his pockets of bottles containing developing and fixing solutions, trays, &c. These trays were flat, extremely light, and took up very little space. They were made of ordinary calico or linen cut to the size required, with folds-in, ready to be made into a tray. (*Fig.* 3.)

FIG. 3.



They are made in the following manner:—Take a piece of calico of the size fixed upon for the tray; fold it as in *fig.* 3. and pass a hot iron over the folds to make them indelible. The future tray or trays are then plunged into collodion, and when soaked taken out to drain and dry. When desiccation is complete the linen tray is put into an oven and varnished with a solution of celluloïd. The tray is now impermeable. In order to use it, the sides are raised up and the corners folded. The corners are then nipped by means of a paper-holder or steel spring, and are ready for use. The names of the solutions were written on the bottom of those presented by M. Vidal.

That gentleman then began to fold his trays, and to place the steel springs to hold the corners fast. When this was done, he filled the trays with a solution of alum-water, ferrous oxalate developer, water, hyposulphite of soda, and the last one with water—six trays in all. The two first were not employed, as he was not in a dark room, but in a place inundated with light. He took out of his pocket a piece of ebonite bordered with tinfoil; this he plunged into the ferrous oxalate solution, and, by the aid of a camel's-hair brush, he undid the tinfoil. A film was then seen to appear (which film had been previously exposed), and the development very soon began to bring up the image. In a short time a negative was complete. No precaution was taken to turn down the gas; it was only the red colour of the iron solution which protected the film from fog. No fog was visible. In taking the negative from the ferrous oxalate solution to the washing and hypo. bath the light was a little shaded by the interposition of a piece of cardboard. When sufficiently fixed and washed the film was transferred to a piece of glass which had been previously cleaned with French chalk; blotting-paper was laid upon it, and a small roller passed over its surface, which acted by absorbing the excess of water and making the film negative adhere without air-bells to the surface of the glass. M. Vidal then took narrow strips of gummed paper and bound the negative down to the glass by sticking these bands round the negative —half the band on the negative and the other half on the glass. This negative was passed round, together with others.

M. Vidal then informed the members that, as a precaution, the film, when dry, should be collodionised. Afterwards the collodionised side must be made to adhere to the glass, and the same precaution should be taken to stick the bands of gummed paper round, and collodionise the other side. By this means the gelatine film is enclosed between collodion, which will protect it from damp and danger.

M. Vidal informed the members that the films employed by him for these experiments were the new films of Professor Stebbing. He (M. Vidal) preferred such films—that is to say, loose films ("*pellicules libres*") without any temporary support whatever, such as paper, collodion, mica, celluloïd, &c. If paper films be employed, it is well to tear off the gelatino-bromide film from the paper, and, thus separated, use it as a loose film, for the following reasons:—

1. The development is very easy—much easier than when supported upon paper, &c. No curling up need be feared, caused by the unequal distention of the two surfaces of gelatine and paper.

2. No frilling is to be feared, as the sensitive surface is not in contact with any support, either temporary or permanent.

3. Because the film, being perfectly loose, has entire freedom to extend or expand equally in every direction, and thus an enlargement is obtained which varies in the proportion of 36 to 49.

4. Fixing in the hyposulphite of soda is much more rapid, because the solvent of unreduced silver bromide acts on the back as well as the front of the film containing the silver salts. If the film be fixed in a black tray these loose films have a great advantage over those upon paper, inasmuch as one can easily see if the last trace of unreduced silver bromide be eliminated.

5. These films give sharper definition of the image, and the resulting negative is more brilliant than if the sensitive surface were upon white paper. To prove this assertion it suffices to attach a film to a black surface and another to a white one, give an equal exposure, and develope the two in the same solution. That upon the black ground will be found to be far superior.

How are we to realise the use of films for excursions, &c., and employ our cameras, dark slides, &c.? The solution of this question has been found. Here, said M. Vidal, is a sheet or leaf of thin black ebonite. I now take a piece of diachylon of the same size. I lay it upon the ebonite, the composition side towards the ebonite. I then draw over a squeegee or roller to make the sticking-plaster adhere to the ebonite and to drive out the intervening air. I now damp the back of the linen. I lift up a corner to see if the plaster adheres to the ebonite; if so, I tear off the linen in this way. All can now see that the sticky composition is transferred to the ebonite. The film is laid upon this sticky surface, a piece of clean paper is laid on it, and a roller is passed over it to make it adhere at every point. The film is now ready for the dark slide, offering the double advantage of unbreakability and freedom from halation, not to speak of less weight, &c. These prepared ebonite sheets or leaves can be employed over and over again, as the exposed film can be drawn off it with ease and another film put in its place. If a little plaster adhere to the back it can easily be taken off by a little benzoline or turpentine.

M. Vidal was complimented by the Chairman, and cheered by all the members. The development in full light, under the protecting agency of the iron oxalate solution, had been heard of by some, but had never been seen to such advantage as it was at Friday night's demonstration. In fact, I was asked if I introduced anything into my films to give them immunity from fog.

I must here state that M. Vidal, during all the manipulations, took great care not to touch the film with his fingers. He passed under the film a kind of shovel made out of a piece of celluloïd, and coaxed the film upon it by the aid of a camel's-hair brush.

M. Audra informed the members that he had been experimenting upon divers substances in order to obtain a greater rapidity in gelatino-bromide of silver emulsion. Among other things he had tried starch, and had found that the introduction of the latter into the emulsion did not make it more rapid, but gave a very peculiar effect to the finished negative; it caused it to have the appearance as if the emulsion had been spread upon ground glass. M. Audra showed several positives by contact-printing, which had a very pretty effect. He (M. Audra) informs those who wish to experiment in this way that the emulsion must be well filtered before the starch solution is introduced; the emulsion is then heated until the starch becomes a jelly in the midst of the emulsion.

E. Stebbing, *Prof.*

25, *Rue des Apennins, Paris, January* 7, 1883.

PHOTOGRAPHIC EXHIBITIONS.

To the Editors.

Gentlemen,—The simple and childlike innocence of your correspondent "Bristolite" is perhaps, like the signature, assumed, as he points with such *empressement*:—"You see there is no deception about this; the names are not on the *front* of the exhibits, consequently nobody knows where they come from, and there is no possible source of information besides." Of course not, but let that pass.

I have already said, and again repeat, that it seems a great mistake for the hangers and judges to work independently of each other. Another mistake is to have the medalled pictures placed in bad positions and in out-of-the-way corners. That, if both the hangers and judges worked together, would not be likely to occur. As it is, pictures sent in and got up at considerable expense and trouble are entirely at the mercy of irresponsible persons (whose names are not published), to be kicked out or hung on the line, just as it happens, with charming impartiality.

The instance I gave of pictures being rejected at Pall Mall and medalled at another exhibition is a conclusive argument that exhibits are not hung on their own merits. That, I contend, they should be; and, whether I show good or bad taste, it is an example to the point. In a photographic exhibition, *unless the room be insufficient*, it is a moot point if *all* photographs sent in should not be hung. There are many strong arguments in favour of it. Of course, if the space be too limited for all, the worst should be weeded out; but this operation *ought to be performed by those appointed to judge* the merits of the works, and not by irresponsible persons who are supposed to have no care but that of fitting the frames together on the walls of the rooms.

These are points to be considered at future exhibitions, and which, if adopted, may possibly lessen the dissatisfaction to which all our exhibitions have hitherto given rise.—I am, yours, &c. EDWARD DUNMORE.

January 7, 1884.

TRAVELLING LANTERNS.

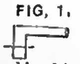
To the EDITORS.

GENTLEMEN,—Your correspondent, Mr. W. H. Harrison, asks for information as to any good *flexible* material for the light of a *travelling lantern* for changing plates and development. He cannot do better than use Thomas's flexible ruby tissue. It looks like oiled silk, gives a beautiful light, and is perfectly safe for *quick* plates. I have used it for some time for changing Wratten and Co.'s *instantaneous* plates at night, in bedrooms of any place at which I am stopping.

My lantern is constructed on this principle (exactly like the little sketch given at page 125 of your ALMANAC); but I started on the basis of convenience in packing, in this way:—I had a tin (triangular) box made just

FIG. 2.

FIG. 1.



Movable chimney to place over hole.

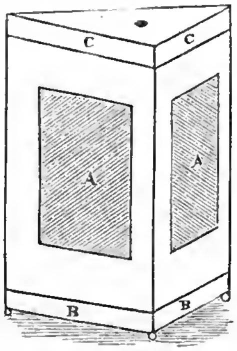
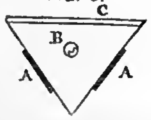


FIG. 3.



Section.

Fig. 2. A, Thomas's ruby fabric. B, Bottom of box. C, Lid of box.
Fig. 3. A, Ruby light. B, Candle. C, Solid pasteboard backs.

the size to cover my tripod-head when shut up inside it. This, when separated (lid from bottom), forms the bottom and top of my lantern, and in it I set up the folding, strong pasteboard sides of the lantern. Provision is made for ingress and egress of air for combustion of a piece of sperm candle.

The joints are made of cloth glued on and covered with a strip of the ruby fabric to make it safe, and when set up for use I close the joints at top and bottom by a broad piece of elastic braid sprung on, which tightens up the lantern and holds all well together.

The advantages are:—When unpacked the lantern occupies very little space, as it folds up quite flat, in the same size as the folded camera body and slides; the top and bottom take little more space than is necessary for the carriage of the tripod-head.—I am, yours, &c., LUX.

January 5, 1884.

DARK ROOM LIGHT.

To the EDITORS.

GENTLEMEN,—I have just seen an article by Mr. G. D. Macdougald on this subject in your last issue, in which he refers to an article of mine in the previous number.

I regret that I did not see his article in time to reply to it this week, but I hope to go into the matter fully next week, and will be most happy if he will join me in a series of experiments on the subject, which, I think, is a most important one, because the tone equivalents (or, in other words, the depth of tint in a photographic film) of different coloured surfaces are, of course, the groundwork of practical photography.—I am, yours, &c.,

Grange Park, New Thornton Heath, HERBERT S. STARNES.
January 7, 1884.

NEWTON'S IODO-CHLORIDE OF MERCURY ACCELERATOR

To the EDITORS.

GENTLEMEN,—Immediately after perusal of the notice of the new accelerator I prepared some of it, carefully following Mr. Newton's formula. On experiment I found that positives and negatives came up with startling celerity, and that plenty of density was obtained, without fog, in a very short time. But the colour! My transparencies of buildings are all yellowish-green. My negatives look horribly bilious. In the course of my experiments I have obtained yellow, red, and other coloured negatives, but this colour never before. Does the experience of others coincide?

The plates used were Nelson's 10 times and Fry's. The developer consisted of commercial carbonate of soda, good pyro., and no bromide. The carbonate of soda *may*, and probably does, contain sulphate, but will not materially differ from the average commercial soda carbonate.—I am, yours, &c., HENRY POCKLINGTON.

Leeds, January 8, 1884.

A PHOTOGRAPHIC WANT.

To the EDITORS.

GENTLEMEN,—Probably many besides myself get waste glass plates when travelling, and if any collodio-chloride emulsion were in the market which would give good lantern transparencies by simple treatment with the ordinary sulphite or iron developer in use for negatives, the waste glass plates would be used for the purpose, and the emulsion be in demand. In advertisements I cannot find a notice of any emulsion which professes to meet these conditions.—I am, yours, &c., W. H. HARRISON.

Hotel du Lac, Lucerne, January 8, 1884.

ENAMELLING.

To the EDITORS.

GENTLEMEN,—Referring to Mr. A. L. Henderson's lecture and your own editorial remarks on *Ceramic Photography*, will you kindly help me with a few queries?

I may state that some years ago I did all the manipulations in photo-enamelling (except burning) for one of our leading photo-enamellers, but that all the formulæ were kept from me. Then I used the substitution process (collodion transparency); but, in commencing photo-enamelling in good earnest again, I should much prefer not having to keep going a wet bath, so I intend trying the "dusting-on" process:—1. Neither in Mr. Henderson's article or your own can I find any definite formula for the sensitive medium which is to be poured over the first coat of collodion, unless you mean to convey that Poitevin's is still as good as any. In the others to which you refer can you name a reliable one?——2. You say "finely-powdered enamel colours are next dusted." Where are these procurable? and what colours would be best for first experiments? I think the experimentalist should know, too, their ingredients.——3. You give instructions for toning, but does not this apply only to cases where the image is composed of *silver*? or does it apply to the dusting-on process as well?——4. In the dusting-on process is the toning done before or after the film is floated?——5. With the collodion transparency I used to "fix" it with ammonia solution (why I don't know). Is any "fixing" necessary with the dusting-on process beyond the "rinsing" you mention?——6. Is the "rinsing" above alluded to for facilitating the removal of the film from the support, or for some other reason?——7. For facilitating the removal of the film Mr. Henderson seems to use sulphuric acid (I have found the same very efficacious), but why does he saturate with boracic acid, I wonder?——8. Where can I obtain the "flux" or "glaze?"——9. Is there any reason why gelatine should not give as suitable a transparency as collodion?——10. Mr. Henderson says one of the secrets of photo-enamelling is to put the glaze on the plate *first*. I am wondering if "first" means before the *plaque* is heated at all; if so, Captain Abney recommends the reverse.——11. Will the sensitised plates keep so that a number may be prepared all ready for use?——12. I fear I am ungrateful in questioning whether Mr. Henderson said all he might on little points upon which he knows success or failure greatly depends. If he has, is he not a generous man? His fee for private instruction is fifty guineas!—I am, yours, &c., J. BERRYMAN.

Rembrandt Studio, Redhill, January 2, 1884.

[In reply to these various queries:—1. Either of the three formulæ first given on page 227 of the ALMANAC for this year may be relied on.—2. Try James How and Co., Farringdon-street, London.—3 and 4. No toning is necessary when employing the dusting-on process.—5 and 6. No.—7 and 8. We cannot tell.—9. Yes.—10. The meaning indicated is correct.—11. We have never tried the long keeping of plates prepared for dusting-on.—12. This is a matter in which each is at liberty to form his own opinion.—EDS.]

Notes and Queries.

WILL any reader acquainted with the facts be so kind as to inform me of the relative remuneration given to fairly good artists in America, either in the United States or Canada, and in England?

IN constructing a glass house for portraiture is there any practical advantage in having the glass arranged approximately in a circle of which the sitter is the centre? I know that according to pure theory this is best, but am desirous that anyone having a practical acquaintance with the subject would give me an opinion.—X. Y. Z.

I HAVE a strong desire to be able to attach the significant letters "Ph.D." to my name. I have been informed that if I can give a certificate of good character and fair attainments in physical science I can, on application, receive the degree to which I aspire. Will any reader enlighten me as to the steps necessary to be taken, stating the fees, place of application, and giving any other information?—ASPIRANT.

IN reply to A. P. F., in *Notes and Queries:* let him try the effect of adding a little tannin to the gelatine. In reply to G. S. Robertson, who inquires if he be not at liberty to exhibit in the lantern engravings taken from a book purchased in the regular way: Although a case of this description does not appear to have been anticipated by the framers of the Copyright Act, I am of opinion that he could not be legally prevented from doing so if he feel so inclined.—LEX.

GENTLEMEN,—I have much pleasure in answering the query by the Rev. G. Morse in your last issue; but if he had referred to my papers on *Astrono-*

mical Photography, published last year in these pages, he would have found the information required. I know of no *rules* by which the *chemical* focus can be found. Its place depends, of course, on whether the lens is *over-* or *under*-corrected. The moon is the best object to try upon. The telescope tube should be marked when focussed for the visual image; then trial plates must be exposed after drawing out the tube (say) one-eighth of an inch or less, until the true chemical focus is found. If lengthening the tube give worse results the reverse plan must be adopted, and when the proper focus is found the tube may be marked, and that always afterwards will be *near* the proper place.—A. BROTHERS, F.R.A.S.

IN reply to the query of Rev. G. Morse, in last Journal, I beg to say that by separating the crown and flint lenses of a telescopic object-glass the foci can be made to coincide at any rate to this extent: that the sharpest plane of visual representation may also be rendered the sharpest plane for photographic delineation. There is no rule by which this coincidence can be secured—nothing but by repeated trials. But here lies the objection to this method of assimilating the chemical with the visual foci:—In proportion as you separate the lenses, so do you impair its capability of defining sharply. In ordinary practice the best way of obtaining definition is to ascertain, by very careful measurement, the distance between the two foci and make allowance for them, by having a dark slide specially constructed, and in which this difference is recognised.—W. H.

Exchange Column.

I will exchange a $2\frac{1}{4}$-inch portrait lens for a folding camera, $8\frac{1}{2} \times 6\frac{1}{2}$ or $4\frac{1}{4} \times 3\frac{1}{4}$.—Address, B. C., 2 York-street, Covent Garden, W.C.

I will exchange a $2\frac{1}{4}$-inch portrait lens for an $8\frac{1}{2} \times 6\frac{1}{2}$ or $4\frac{1}{4} \times 3\frac{1}{4}$ camera, folding for dry plates.—Address, C. D., 8, High-street, Kington, Herefordshire.

I will exchange my sciopticon lantern, quite new, for good standard lantern slides.—Address, LEATHER, photographer, River-street, Bedford Leigh, Lancashire.

I will exchange a large number of copies of THE BRITISH JOURNAL OF PHOTOGRAPHY for anything useful.—Address, A. J. B., 17, Hindon-street, Pimlico, S.W.

I will exchange a good showcase, head-rest (Harrison's), and a 14×11 glass dipping-bath, in pine case, for a whole-plate or 10×8 camera; photographs sent.—Address, O. E., 19, Station-hill, Kidderminster.

I will exchange a half-plate bellows-body camera, Dallmeyer's stereo. lens, and dark tent, new, for a good half-plate bellows-body camera and rectilinear lens.—Address, H., 90, High-street, Upper Sydenham, S.E.

I will exchange a luxographic lamp for taking portraits by night, in good working order, for a cabinet burnisher, fur rug, and interior or exterior background; or offer.—Address, M. GWINN, Photo. Artist, Newport Pagnell, Bucks.

I will exchange a splendid quick-acting whole-plate portrait lens, by Horne and Thornthwaite, three inches diameter, condition equal to new, for a No. 4 landscape lens, by Dallmeyer, or 12×10, by Ross.—Address, W. H. SEDGWICK, South-view, Sedbergh, Yorks.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPHS REGISTERED—

William James Hunter, Scotch-street, Armagh.—*Three Photographs of Lord Rossmore and Party, taken at Rossmore Park, Monaghan.*

J. W. B.—The reflector showed the concave, the curve being a portion of a true circle.

H. BARSTOW.—Refer to the table on page 260 of our ALMANAC. That will give you the desired information.

H. J. T.—Increase the sensitising-bath to at least forty-five grains to the ounce, and you will, no doubt, proceed more satisfactorily.

WARDEN.—The only fault we can see in the negative forwarded is that it is *very* much under-exposed. The plate appears to be of good average quality.

A. J. GRIFFITHS.—The best material of which you can make your tank is slate. We certainly should not advise you to have metal of any kind. Large earthen pans answer the purpose very well for washing prints.

T. B. CONDER.—The reason you cannot get the albumen clear is that you whisked it too much when you added the acetic acid. Had you followed the instructions, as given, you would have experienced no difficulty whatever.

J. W.—The collodio-bromide process will answer admirably for opal enlargements, though it will be found slower than wet collodion. The development may be performed either with pyro. and ammonia, or with ferrous oxalate.

A. W. BOYD.—For the purposes you require, the lens designated "B" on your list will be the most useful. Next in order comes "A," and then "D," "C." The others will be of very little use to you, as their places are well filled by the others.

A. SICARD.—We do not quite see in what way we can aid you. There certainly appears a considerable difference between the prices mentioned, but to estimate this more completely you should obtain quotations for articles of a precisely similar quality.

H. MASON says he has a quantity of old films washed off collodion negatives, and asks if they are worth reducing to recover the silver?——Certainly they are, and they will yield a very good return. This may easily be proved by fusing a little of the films (after burning them) under the blow-pipe with a little borax.

LUX.—You can test the gas for sulphuretted hydrogen with acetate of lead paper. We advise you to put a ventilator in the room close to the ceiling, which will carry off the fumes, and at the same time you might try different burners. It is quite possible that the burners you now have do not ensure perfect combustion of the gas.

W. D. J. (Leeds).—The transparent spots are due to air-bubbles adhering to the film during the development. In future use a broad camel's-hair brush to remove them.

INQUIRER.—The new patent law will not allow you to patent anything that has been done before, even if it has not been patented or worked commercially. Under the new Act, as under the old, an invention to be patented must be new and original.

AMATEUR PRINTER.—The mealiness of the prints arises from your toning-bath being too new. The acetate toning-bath should not be employed directly after it is made, but should be prepared at least twenty-four hours beforehand. The strength of the fixing solution is quite correct.

A. G. HOPKINS.—You will have no difficulty in procuring basil leather from any leather merchant or dealer in bookbinders' materials. Probably, any bookbinder in your neighbourhood will supply you with the small quantity required for your bellows. The imitation basil will be sufficiently good for your purpose, being cheaper, lighter, and more uniform in thickness.

DEMARR.—A two-fold purpose is subserved by having the lens-mount constructed in the manner described. First, by having the draw-tube portability is ensured; and, secondly, by enabling the stop to be brought nearer to the lens the circle of delineation is increased. This latter quality is obtained at the expense of marginal definition, to secure which the size of aperture in the stop must be reduced.

S. SIBLEY.—The curious marking on the collodion plate, which you describe as being "like as if a worm had crawled over the plate and left a dark mark behind," is caused by an air-bubble in the developing solution. If there are any air-bubbles in the iron solution when it is on the plate these markings are almost sure to be produced, and the curious forms they have are due to the motion they take when the solution is flowed backward and forward on the plate.

W. W. R.—The opaque spots on the negative are due, in your case, to the same cause as in that of many others, namely, that the whole of the hyposulphite of soda was not thoroughly removed from the gelatine film before the plate was varnished. Consequently, the silver in the plate has caused the spots, notwithstanding a film of varnish intervened. Varnish, however good, is not a sure protection in such a case as you appear to imagine, and as your experience proves.

A BERKSHIRE PHOTO.—As some of the prints which have faded have been kept unmounted, while others which are mounted have not faded, we do not see how you can for a moment believe that the mounts are at fault. Neither can you, we think, suspect the starch you have used. Why not suspect the manipulations? They are far more likely to be at the root of the evil than either the cards, the mountant, or the albumenised paper.

W. MANDON.—Shake the bitumen up with the benzole and allow it to digest for two or three days. Then decant the clear portion, and keep it as a stock solution to be diluted as required for use. As different samples of bitumen vary considerably, it is impossible to give any definite strength as being the best. A very few experiments will easily settle the point. You must bear in mind that the thinnest possible film on the plate is all that is required. Many fail with the bitumen process through having the film too thick.

J. S. TOOK.—If the parcel was lost during transit through the post the authorities will not recoup you. Had you, however, sent by rail, or through any of the carrying agents, you might have recovered its value. In future when you have a parcel of great value—such as a painting—you will do better to forward it direct by rail. For a small extra charge the railway company will ensure the safety of parcels for larger amounts if declared at the time. Without a declaration of value at the time of booking the amount that can be recovered in case of damage is limited.

G. T. GRAMMER says:—"In order to make a longer exposure with dry plates on landscape subjects with a rapid rectilinear lens, I have been in the habit of using the smallest stop $\frac{f}{40}$, which, with Swan's plates of 10 times rapidity, allows me to give an exposure of about two seconds on a bright day—open landscape. What I desire to know is, does the picture suffer in any way (say) with regard to atmospheric effect, perspective, &c., by using such a small stop? Or would it be better (if definition be correct) to use a larger stop and swing-back if necessary, of course making a proportionately less exposure? I shall be glad if you will favour me with a reply through the medium of your valuable Journal. I have read all the recent articles on lenses and stops, but cannot find anything to touch my case."——In reply:—The stop here mentioned ($\frac{f}{40}$) is much too small to enable the best effects to be obtained. The practice of the ablest landscape photographers is invariably to employ the largest stop by which the requisite definition can be secured.

RECEIVED.—"Omega;" J. Gloag. In our next.

PHOTOGRAPHIC CLUB.—At the forthcoming meeting of this Club, at Anderton's Hotel, Fleet-street, on Wednesday next, the 16th inst., the subject for discussion will be *On Gelatine Plates for Lantern Slides for Camera Exposures.*

LONDON GAZETTE, *Friday, January* 4, 1884.

BANKRUPT.

ROBERT SNOWDEN, 12, Brook-street, and 17, Castle-street, Hull, photographer and furniture broker, late a toy dealer.

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FERRIC AND FERRIC-POTASSIC SULPHATES.

Ferric sulphate or, to employ a title more familiar to photographers, persulphate of iron has not hitherto found any very serious applications in connection with photography. In the days of collodion positives it was, indeed, recommended as an addition to the developer for the purpose of giving a whiteness to the deposited silver; but it is rather in the character of one of the products of the oxidation of the iron developer that our readers will have more frequently met with it.

About three years ago, however, at one of the meetings of the Photographic Club, Mr. Warnerke mentioned persulphate of iron as a possible reducing agent for over-dense negatives, in virtue of its solvent action upon metallic silver. Since that time but little attention has been paid to the matter, probably owing to the fact that, while reducing the density of the image, an unpleasant stain of more or less depth is, under ordinary circumstances, left in the film. There are, moreover, other possible applications for this salt which may render it worth investigation.

Ferric sulphate is obtainable in two forms—the hydrated and the anhydrous. The former is a dirty yellow, deliquescent mass, difficult, if not impossible, of crystallisation and extremely soluble in water. The latter—which is formed by submitting the hydrated salt to heat until the water of combination is driven off—is obtained as a buff-coloured powder, dissolving slowly and to a far less extent in water. Those who are unable to procure the salt may readily make it in the following manner:—To a strong solution of ferrous sulphate or protosulphate of iron add an equivalent of sulphuric acid and well mix. Now drop in cautiously strong nitric acid until the liquid ceases to blacken and no more nitrous fumes are given off. After filtration the resulting deep red solution consists of persulphate of iron.

This solution possesses some peculiar properties which render it in many ways useful. It is, as has been said, a solvent of silver. If metallic silver be boiled in the solution of ferric sulphate it is vigorously attacked, the liquid at the same time losing its clearness and depositing a yellowish sediment, which consists of a basic ferric sulphate. If the solution of ferric sulphate be strongly acidified with sulphuric acid, the formation of this sediment is almost, if not entirely, arrested, the solvent action upon the silver, however, remaining intact.

If now the clear solutions (filtered, if necessary, after boiling with silver) be placed aside in a couple of tall precipitating glasses, it will be found in a few hours' time that the acidified solution has deposited the whole of its silver in the metallic state in perfectly-white crystalline spangles of great beauty. The neutral solution (filtered while still hot) shows less tendency to deposit its silver, though it does so to some extent. Any scratches on the interior of the glass will be found to attract a deposit of metallic silver, but the bulk of the dissolved metal remains in solution.

This curious effect of solution and subsequent reduction of the silver appears to be due to the spontaneous change that occurs in the somewhat unstable ferric solution, in the course of which the latter becomes a reducing agent.

Very similar in its action, as it is in constitution, is the ferric-potassic sulphate, which is formed by mixing in equivalent proportions ferric and potassic sulphates, when the double salt crystallises. This is well known under the name of "iron alum," or, more definitely, as "potassium iron alum;" for there are similar compounds of iron with ammonium and sodium which also bear the generic title from their resemblance in composition to the real alums. Iron alum crystallises in precisely the same form as common alum, which it closely resembles in taste and sometimes also in colour (or absence of colour), though usually it possesses a pale brownish-pink tint. Upon dissolving in water, which it does with great readiness, the solution strikes a deep red colour, from which, on evaporation, the salt re-crystallises with the same faint tinge of brown, a quantity of basic iron salt being thrown down in the course of the operation. Indeed, so unstable is this combination in its normal state that a temperature very much short of boiling point suffices to decompose it. If, however, it be acidified with sulphuric acid, it may be heated without decomposition.

In general behaviour this solution acts in a manner precisely similar to ferric sulphate in every respect; but, as it is very much cheaper, that will prove an element in its favour should any permanent use be found for either.

The action upon a photographic image is in perfect accord with what has been said in connection with metallic silver. A saturated solution of anhydrous ferric sulphate (which is probably about twenty grains to the ounce), or a solution of similar strength of iron alum, will almost immediately attack the image, dissolving the silver completely, and, so far as that metal is concerned, removing the picture. But it does not entirely obliterate the image, for a faint yellow picture remains behind, however long the application may be continued, together with a yellow stain over the whole film. This ghostly image appears to consist of basic ferric sulphate, which is substituted for the silver; in fact, the image is converted from one of silver to one of iron. Treatment with sulphuric, hydrochloric, nitric, or other acid will remove both image and stain, though these are not applicable to gelatine films. In weaker solution the action is, of course, slower and not so complete, and the stain produced is not so prominent.

Another application suggested to us by Mr. William Bedford is that of acting upon the unfixed picture in order to produce a duplicate negative in one operation, after the manner of the nitric acid process, which is inapplicable to gelatine. On putting this to the test, however, we found it fail on account of the deposition of the basic ferric salt, of which we have spoken above, in the place of the dissolved silver image. The result at first startled us; for, combined with the inevitable stain, so great is the resemblance in colour between the ferric salt and the undissolved silver bromide, that the effect appeared to be the re-conversion of the metallic image to the state of bromide, the film after treatment exhibiting no signs of an image of any kind. By treatment with dilute hydrochloric acid, however, it became faintly visible from partial solution of the ferric salt.

If any means can be discovered of preventing or removing the objectionable stain, ferric sulphate will form the most useful reducing agent for negatives that we have, acting as it does directly upon the image. For other purposes, where a solvent of silver is required, it will also find uses, as for the purpose of cleaning dishes and other vessels and in recovering some descriptions of residues. Other combinations of ferric sulphate we have not tried, but there is no reason to suppose they will behave in any way differently from the potassium double salt.

FUMING SENSITISED PAPER.

Among the subjects which were prominently brought forward in the course of the discussion upon Mr. W. M. Ashman's lecturette, at the meeting of the London and Provincial Photographic Association on Thursday in last week, that of the ammonia fuming of albumenised paper occupied a prominent place. Whether it was during his residence in America that Mr. Ashman acquired a knowledge of the properties and advantages of the ammoniacal treatment we are unaware, but of one thing we are certain, namely, that in this gentleman it has an earnest advocate.

It is so well known as to need no reiteration that the fuming of paper is, in America, a recognised department in the routine of ordinary silver printing, whereas in England it is practised by comparatively few. We shall not here go back so far as to inquire into the reasons by which Mr. H. T. Anthony, the originator of the system of ammonia fuming, was first induced to adopt it, but shall accept the situation as it now exists. One of the most singular things in connection with the matter of fuming is that of its being considered as a necessity in one country and one which is quite a matter of indifference in another. When visiting the great printing establishment of Messrs. Elliott and Fry last autumn—an account of which was published in our issue for October 5th, 1883—we made special inquiry as to whether the paper used by them in printing was fumed. They had not, we were told in reply, considered it desirable or necessary to adopt it. This is also the experience of many others who conduct printing operations in this country on a large scale. We look in vain through the published accounts of the printing process as carried on by England, of London, and Wilson, of Aberdeen, for any allusion to ammonia fuming; indeed, in the work on *Silver Printing: its Difficulties and their Remedies*, by "Aliquis" (Mr. A. J. Wilson), whose connection with the great Aberdeen printing establishment was of the most intimate practical character previous to his removal to London and taking up the high position in the world of letters he has since done, no mention of fuming is made.

That ammonia fuming possesses certain advantages well recognised by nearly all American and a few English photographers there exists no room for doubt. In America no printer would so much as think of conducting his printing operations without fuming; and this being the case we turn to the ablest exponents of the practice in that country to give us the reasons for this preference in manipulation. These advantages, when briefly summed up, are—increased sensitiveness, a richer tone, and a smaller expenditure of gold to obtain that tone than when fuming is omitted.

But even among American authorities there are some who do not display an overweening amount of enthusiasm respecting the existence of the alleged virtues of fuming. For example: the well-known author Professor Towler, in his work, *The Photographer's Guide*, says:—"When the sensitised sheets are perfectly dry they may be submitted or not submitted to the fumes of ammonia, just as you feel inclined about the matter. The advantage of fuming is, after all, not very great, and the finished print is equally good whether the sensitised paper was fumed or not." This, it will be observed, is decidedly non-committing, and shows at anyrate that at the date of his writing as above (1866) this gentleman was not enthusiastic in the matter. A later writer, Mr. Charles W. Hearn, in a work entitled *The Practical Printer*, speaks of the merits of fuming in a much more decided tone. He claims for it certain definite advantages, such as these—that the paper prints richer, quicker, and more brilliant, while the prints tone easier, and the finished pictures are much more pleasing and satisfactory. These claims, we may observe, are those which are still made on behalf of ammonia fuming.

Not until the paper is thoroughly dry must the fuming be proceeded with. In a common wooden box, or close cupboard, of sufficient dimensions, the sensitised sheets of paper are suspended in such a manner as to allow their surfaces to be exposed. At the bottom is placed a saucer containing four or five drachms of ammonia, the fumes from which are allowed to rise somewhat evenly, by covering the vessel with a sheet of perforated zinc or board covered, in some cases, by a thin layer of cotton wool. To obviate the tendency of the paper to become yellow or otherwise discoloured, a little chloride of lime is frequently introduced into the cupboard or fuming box. This discolouration is much more apt to take place during damp than dry weather. When the weather is very cold, a heated brick is placed on the bottom of the fuming cupboard with some advantage. No hard-and-fast rule can be laid down for fuming, but from ten to fifteen minutes may be considered as sufficient.

The precise duration of the exposure to the ammonia fumes must be determined by a variety of circumstances, such as the temperature, the light, and the class of negative to be printed from. American authorities seem to agree that a longer fuming is required for paper sensitised on an acid bath than on a neutral or alkaline one. Weak negatives also require more fuming than strong ones; less fuming being necessary on a dark than on a bright day. This is a matter the proper regulating of which requires practice and experience. From the remarks of Mr. Ashman at the meeting of Thursday week, we also infer that a more brilliant print will be obtained from a weak bath with fuming than from a stronger bath without it.

The fuming of sensitised paper is so easily accomplished as to give little or no trouble to anyone desirous of trying it; we shall, therefore, hope to learn that many of our readers have placed themselves in a position to be able to say from tentative experiment to what extent it is likely to prove beneficial in their own practice.

COMBINATION PRINTING.

In the article on this subject, last week, we described the plans usually adopted when a background has to be printed-in, either as a plain one or one from a second negative; but it is clear that the same principle of masking can be applied to the production of combination prints from different negatives. Indeed, it is the method followed by many artists, who have achieved considerable success in the production of *genre* pictures in which several negatives had to be employed.

There is another plan of combination printing by which, with skill, very artistic results can be obtained. Instead of the image being masked abruptly it is shaded off, so that the impression from one negative is, so to speak, vignetted into that from another. This was the method adopted by the late Mr. O. G. Rejlander in the production of his famous picture, *The Two Ways of Life*, in which, if we are not mistaken, over thirty different negatives were combined. We have an impression that the actual number was thirty-six. Mr. Rejlander covered up all the paper to preserve it from light, except the part under the negative. Then so much of the negative as was not required was shaded off while it was printing, so that no sharp outline was ever produced, as must always be the case with the more common method of masking. When one negative was printed the next was taken in hand, adjusted in position, and then judiciously shaded like the previous one, so that the juncture of the two in the print was vignetted into each other. If by chance the juncture should happen to show, through its being too light, Mr. Rejlander had a very ingenious method of remedying it, which he facetiously termed "touching it up with the pencil of light." This he did by bringing the sun's rays to bear upon those parts which were too light with a condensing lens, used *à la* burning glass—but, of course, avoiding the burning focus—while all the other portions of the picture were covered up.

Mr. Rejlander was very skilful in manipulating the sun's rays with a lens. We remember once seeing an ass's head in outline on a white ground, which he had produced in this manner on a piece of albumenised paper. This novel sketch he humourously entitled a portrait of some of the critics who had written unkindly of his large combination picture.

Now, the masking-in of backgrounds or combination printing from several negatives in silver, where the progress of the work can be watched as it proceeds, is an easy matter compared with doing the same in carbon, or making combination negatives or transparencies by any of the processes usually employed for the purpose. In these processes the result of the labour cannot be seen until the picture is finally developed, when, as a matter of course, if an error in masking has been committed it is too late to apply a remedy; consequently the work has to be gone through afresh. However, combination printing can be successfully accomplished in carbon or, indeed, in any other process.

The most simple form of double printing in carbon is the production of the toned margins to "chromotype" portraits. For this purpose specially-constructed registering frames were constructed, but we believe they are now seldom used. Here is a simple plan by which the same end may be obtained with certainty. The principle involved—which, by the way, is similar to that employed by lithographers for securing an accurate "lay"—may be applied in securing registration in all other processes; so we shall give it in detail. In the first place, a templet with an opening—say, for example, an oval—of the size suitable for the portrait is required. This may be made of cardboard, or, better still, of thin sheet zinc. Now take a piece of opaque paper, somewhat larger than the templet, and on it near one corner, which we will suppose to be the top left-hand one, rule two fine pencil lines at right angles to each other. A pencil drawn along the side and top of the templet is the best plan of doing this. Then adjust the templet so that its top and left-hand side just touch the two pencil lines, hold it firmly in position, and with a sharp penknife cut out the opening. The mask thus produced is now fixed on the negative with a few touches of gum or india-rubber solution. The negative is then ready for printing from.

We now require a tinting mask. For this we take a piece of glass and on it cement, with india-rubber solution, a piece of opaque paper, and on that rule a couple of pencil lines, as we did on the mask for the negative. The templet is then adjusted to them, and the paper cut through as was done in the previous case, but the oval must not be removed from the glass. We now require another templet of the same outer dimensions as the former one, but with an opening corresponding with the size required for the tinted border. This templet is then adjusted to the lines and its opening cut through. All that now remains is to remove the paper from the glass which is between the cuts made with the two templets, leaving the oval blank still adherent to the glass. On the opening thus made can be fitted any design or imprint that may be desired.

Now, it is clear that the oval opening in the mask upon the negative and the blank upon the glass must bear the same relation to the pencil marks or register lines. Consequently, it follows that if a print be made from the negative with the tissue adjusted to the lines, and is then removed and adjusted to the lines on the tinting mask, that portion of the tissue which was before exposed will now be covered, and *vice versâ*. In practice it will be found convenient to gum a couple of strips of cardboard on to the registered lines, so that the tissue or templet can be pushed against them, and accuracy of registration more easily secured than when it has to be adjusted to simple pencil marks.

In double printing, or masking-in backgrounds into large pictures, instead of having pencil lines or cardboard against which to adjust the tissue, the sides of the pressure-frame, or even the edges of the negative itself, may be more conveniently utilised as a means of registration. Here is a method which we happen to know is largely employed in printing-in backgrounds to carbon enlargements:—First, while the enlarged negative is on the retouching desk, a piece of tracing-paper is placed upon it, and on this the outline of the figure is carefully traced with a pencil. This tracing is then laid on a sheet of brown paper, and with a sharp penknife the outline is cut through both papers; this gives us the two masks. The tracing-paper is then thrown away, as its only purpose was to enable an accurate mask to be obtained in the brown paper—that being too opaque for the outline of the picture to be seen through it. The background mask is then fitted on to the negative, and secured with gum or india-rubber solution. The edges are then trimmed off even with those of the negative, which is now ready for printing. When the negative is put into the frame it is pressed close into one angle, and secured there with a strip or two of gum paper. The tissue is then placed on the negative, care being taken that it, too, is pressed closely into the same angle of the frame, the edges of it being previously cut perfectly true to enable this to be done with accuracy. Now, it is clear that, as the negative is fixed, if the tissue be carefully placed in the angle of the frame in the first instance, it can be removed and replaced again in the same position with the greatest certainty.

When the figure has been printed the frame is opened and the tissue removed. Then the figure mask is taken and adjusted on the negative in the opening from which it was cut, and, as the paper is thick, this is easily accomplished. The back of the figure mask is now touched in several places with india-rubber solution. The tissue is then replaced on the now entirely covered-up negative and the frame closed, care being taken that the figure mask is not misplaced, and that the tissue is pressed close into the angle of the frame.

After resting for a quarter of an hour or so—or until it is judged that the rubber cement has dried—the frame is opened and the tissue removed, when the figure mask will be found firmly adherent to it and in accurate position. The background is now printed in, being shaded or toned as desired. When this is done, the mask pulled off the tissue, and any adherent india-rubber gently rubbed off with a clean finger, the print is then ready for development. The india-rubber, if carefully removed, will be found to have no injurious action whatever on the print.

Next week we shall describe the ingenious method adopted by M. Lambert in combination printing, as we witnessed it carried out at one of his demonstrations of the so-called "Lambertype process."

A WORD ABOUT STUDIO BUILDING.

We would direct attention to a most useful article under the above title, which appeared in our columns of the 4th instant, from the pen of Herr Emil Fuchs. It is pregnant with suggestions of a practical nature, and may be read with advantage by any of our readers interested in, or contemplating the construction of, studios. Only those who number among their acquaintances a few possessors of glass roofs have any conception of the constant annoyances that are liable to crop up so continually in connection with one phase or another of the roof and lights. These annoyances are by no means of a sentimental kind, as witness many a spoiled carpet or piece of furniture, not to speak of clients' dresses, or, still worse, of a picture brought to be copied and altered, but not "improved" by the falling of a drop or two of dirty water from the roof upon the features of the portrait. Then, again, there is the usual round of dirt and discomfort inseparably attendant upon the advent of the plumber and painter.

That such difficulties should exist is by no means a necessity of the case, and possibly Herr Fuchs points out the true cause of their presence when he speaks of the photographer knowing what he wants and the architect not taking the trouble to understand. The instructions and directions of the former, he says, do not combine easily with the manner of execution customary in the building trade, and they are rather allowed to fall to the ground, since "an experienced builder is sure to know best." When he assures one that this or that drawback can be removed in some other way, the photographer is overruled, is fain to be persuaded that the builder's way is the right one, and the result is, and remains, the usual one—mistakes are made, and only observed when too late. This is too much like the experience of all who have to do with specialist workers to be anything but true, and quite bears out what we have ourselves been told.

With regard to the actual details: some practical hints are given which are very valuable, but we would dissent from the writer's contention about the width of the squares of glass. He recommends, when plate glass is not employed, that the width of the pane should not much exceed twenty centimetres—that is, about eight inches. Now, this would be all very well for a greenhouse, but for a studio window would look too petty to find favour with English photographers, who prefer bold squares of large size—some studios, indeed, being glazed with plate glass. Apart from the appearance or effect of large *versus* small squares, there is another consideration that must not be lost sight of, and it is one which from a sitter's point of view we—having been much photographed —can speak from experience. We refer to the effect produced upon the eye by the window astragals. When they are at all numerous they are, even in a brief sitting, excessively fatiguing or irritating to the eye, even when the head is turned well away towards the shaded side of the room.

Some time ago we gave our readers a hint, imparted to us by an old glazier during an experience with greenhouse work, but naturally equally applicable to studio building. It was that, preparatory to putting the panes of glass into their place in the roof, they should have a preliminary treatment by giving a narrow margin of paint on each side, along the edges that were to rest in the frame or astragals. By this means the putty, to use the expression of the trade, will "grow to" the glass; in other words, adhere more firmly. Another hint may here be given, and that is, wherever ground glass is being employed in lieu of clear glass, it should first have a thin coating of "size" on the rough side. When this is done that disagreeable greasy effect caused by the oil of the paint spreading by capillary attraction, and which cannot be removed at first for fear of disturbing the setting of the putty, may be entirely avoided.

Herr Fuchs says he writes as a "glazier of twenty years' standing;" hence his words must be received with the more respect that they bear upon them the impress of thought. There is, however, a point raised in them so opposed to the common practice of most glaziers with whom we have had to do that we here refer to it with the hope that, as it is a very important question, some practised hand among our readers may give us the benefit of their actual experience upon these matters; for though theory guides, practice must decide. The writer says:—"It is of very special importance that the putty should be prepared with varnish and not with linseed oil, because the former dries slowly from without inwards, whereby an external skin is formed, which prevents any air from penetrating, and the putty always remains fatty. On the contrary, putty prepared with linseed oil puts on no skin, and is, therefore, very soon soaked off." This is opposed to our view of what happens, but there is putty *and* putty. When good oil is used and no water is mixed up with the mass to give weight, after the plan of the ingenious sophisticator of the period, we should imagine the putty would soon harden at the outside. Besides, it is often recommended by the authorities that this very skin-forming should be prevented, as being conducive to the production of cracks by the expansion and contraction following upon the heat from the sun's rays striking the roof; and receipts for making putty for the special purpose of roof or skylight glazing are to be found in which tallow is mixed in large proportion in order to render the putty pliable and cause it to remain so to a slight extent.

We conclude by drawing attention to an important and humane recommendation he makes, analogous to one which appeared in our pages nine or ten years ago. This is to provide the roof with some kind of permanent arrangement to aid the safety of the workmen who have to go upon it to paint or repair. When workmen pass over a slate roof they have no fear; if they stumble the slates form a safe support for their hands, and there is no danger of an accidental step plunging them through the roof. With glass, on the contrary, there is no foothold except the extemporised planks, which are difficult to make very secure, and no support but the sash-bars, when, if the body fall forward by any chance, the hands are thrown out to avoid a fall. Herr Fuchs recommends small pegs permanently let into the astragals to support any plank that may be required for the workman's use. The writer to whom we referred used—and we think it a still readier and better plan—pieces of angle-iron screwed at regular intervals into the astragals or bars.

In addition to this plan being advisable on the ground of humanity it evidently saves expense, as a platform can be much more readily and quickly arranged when workmen are needed. In addition to these pieces of angle-iron, the gentleman we speak of described also a platform he had constructed with the same object in view, so that in case of a stumble, which might otherwise result in a fatal accident, no harm could befal the workman. He described a wooden platform, more than a foot wide, at the eaves of the roof, further protected by a light iron fencing, hurdle fashion, secured to its place by strong iron staunchions bolted into the wall. Such precautions are advisable on all grounds, and we should like to hear of their becoming more common. There would, we are assured, be less delay and more comfort in getting workmen overhead to repair or put in order photographers' glass roofs.

We this week give a portrait of Mr. Leon Warnerke, being the first of series—which will appear, at short intervals—of individuals well known in connection with modern photographic progress. We trust that this method of familiarising our readers with the *personnel* of many of those whose names are well known to them will prove interesting.

Our next portrait will be that of Captain W. de W. Abney, R.E., F.R.S.

The "Traveller in Search of Sunshine" of the *Daily Telegraph* in saying that Naples "does not photograph well" only states his own experience, which probably, at the best, goes no further than to prove that Neapolitan or Italian photographers take but a minimum amount of trouble over their work, and leave difficult subjects to take care of themselves. A charming picture of the town and bay of Naples, given to us by Mr. Woodbury some few years ago, and which is now before us, affords the fullest refutation to the statement alluded to. A more difficult subject could scarcely be selected. A foreground of dense foliage in close proximity to the camera is backed up in the extreme distance by Vesuvius, with the whole sweep of the bay and town in bright sunshine intervening. Yet, from the light clouds in the sky and the faint line of smoke drifting away from the summit of the volcano, through the whole gamut of tints to the deepest shades of the foreground foliage, in every part of the picture there is detail, the *tout ensemble* being anything but confirmatory of the *Telegraph* correspondent's *dictum*. The picture is one of Mr. Woodbury's well-known Italian series, taken upon collodion emulsion plates.

Speaking of collodion emulsion: we could not help remarking a few days ago, when examining some negatives of this very series, that there is a beauty about a fine collodion emulsion negative which neither gelatine nor wet collodion will give. Why will not some of our experimentalists give us a dry collodion process as rapid as gelatine?

It was only the other day that the astounding news of the liquefaction of the "permanent" gases—oxygen and nitrogen—was given to the scientific world, yet, now, the fact has become so old a record that all novelty is gone from it; and the philosophers are calmly engaged in noting particulars of the mode in which liquid oxygen boils, and in endeavouring to ascertain its boiling point—that is, the temperature of ebullition of a liquid which bubbles and boils at a temperature far lower than any that has been met with by explorers who have been nearest the North Pole. M. M. S. Wroblewski has presented to the *Académie des Sciences*, of Paris, an account of his experiments in this direction, in which he states that—reserving details for a future communication—he may give one hundred and eighty-six degrees below zero (— 186° C.) as the first approximation to the temperature produced by the sudden release from pressure of liquefied oxygen. Nitrogen he solidified by the action of boiling oxygen. With regard to the latter liquid, he says:—"Indeed, the industrial production of liquid oxygen is, I may almost say, only a question of the material means at the disposal of the experimentalist." Still, notwithstanding all this, we cannot but fear that the time has not yet approached when we can order a bottle of oxygen and a dozen lantern slides to be sent home as a common matter of business.

It is stated that, during the earlier appearance of the wonderful coloured twilights which have evoked such interest during the last month or two, the light was put down in some places as due to the effect of a conflagration. At Poughkeepsie, on the Hudson, the fire engines were called out on the morning of November 27th last. We are still without information of any attempt to obtain a photograph by its light, or of the spectrum it would give.

Possibly it would meet with no more success than has followed attempts to photograph displays of the *aurora borealis*, with which it was at first confused, but with which, as we said long ago, it is not connected in any way. The report by Captain H. P. Dawson, of the circumpolar expedition to Fort Rae, states that it was found impossible to obtain photographs either of the *aurora* or of its spectrum. Surely this very impossibility of photographing what might be termed a really brilliant light may help to gain some knowledge of its cause. It was but a few weeks ago that we described a similar want of success following the efforts of a Norwegian investigator.

It could not have been very pleasant work, this photographing at Fort Rae; for, at the outset of the final stage of their journey, the party had an upset—provisions, instruments, and everything being submerged in the water through the storm staving in their boat and sinking it. The food was damaged, one barometer and one thermometer broken, the object-glass of the telescopes of most of the magnetic instruments were nearly opaque through the cementing having gone wrong, and, finally, not a single instrument was in working order through the case being full of water. When they were cleaned and set up the transit instrument was found not half strong enough to bear the necessary rough usage without risk of jarring it so as to upset its adjustments. We presume the authorities did not deem it necessary to send valuable and delicate instruments in water-tight packages to the North Pole. Probably they expected they would form their own casing of ice.

If the *aurora*, so far, has eluded the eye of the camera, the Liverpool Astronomical Society has scored another success in other directions in celestial photography. The Rev. T. E. Espin, writing under date of January 1st, states that they had succeeded the day before Christmas Day in photographing the Pons-Brook comet. "The exposure was fifty-three minutes, and the comet comes out on the plate as a circular haze without any trace of a tail. * * * A heavy dew was falling, and the lenses were badly covered." This latter circumstance may very possibly account for the hazy appearance of the image.

M. Trepiod also has been examining this comet, but with the spectroscope, and an account of his observations appear in the *Comptes Rendus* for the 31st ult. He found a tail two degrees in length, and, when examining the appearance of the comet's spectrum almost at the same time when Mr. Espin was photographing it, he found several bands which, strange to say, were practically identical with those of alcohol. When it is remembered that Captain Abney, at the meeting of the British Association for the Advancement of Science, in 1882, also found evidences of alcohol being distributed through space, one cannot avoid echoing the speech of the President of the Section, who asked if the total abstainers might like to make any remarks upon the discovery.

The paper by Mr. Hume Nisbet, read before the Edinburgh Photographic Society (a portion of which we print in abstract in another page), is said to have attracted a large number of the artists of Modern Athens to the meeting. A friend who was present informs us that "Mr. Nisbet is a 'free lance' who has been tilting at the Royal Scottish Academicians, and whose weapon was poisoned or rather barbed with truth, which made his attacks all the more cruelly telling. The R.S.A's present maintained a sullen but discreet silence. Mr. Nisbet illustrated his remarks by rapid sketches in charcoal, executed with marvellous rapidity and great ability, using either hand at once, producing quite a sensation by his startling effects by apparently simple means."

Who says that the pulpit is now opposed to science? We gladly place on record a sentence from a sermon by the Rev. J. E. Manning, M.A., of Swansea, just published, entitled *In Memoriam: Sir William Siemens*:—"Let me beg of you to notice," says Mr. Manning, "that the spread of science has had the same humanising effect as pure religion. If there is one thing clear in the present day it is that science, with the industrial arts and the industrial spirit it has called into existence, is the great prime mover in our modern civilisation, bringing the nations into even nearer and more friendly relations, and spreading one common interest over many lands."

Dr. Gore recently read a paper recording a number of instances in which various solutions of metals were reduced to the metallic state by contact with gases. Among the most beautiful films so obtained he stated was that of chloride of gold. He suggests that the films of metal thus produced might prove of service in some optical and other physical investigations.

The House of Peers has held few, if any, more worthy representatives of science than the present Lord Rayleigh, and we need not say that photography has not been left unstudied by him. He has lately printed, for private circulation, a pamphlet containing several of his most valuable optical papers, including those on the manufacture, reproduction by photography, and theory of diffraction gratings.

A new electrical incandescence lamp has been introduced by Mr. J. C. Fuller, of Finsbury Pavement, for philosophical purposes. For occasional dark-room work, photomicrography, or any similar class of experimenting, it may form a most useful aid, as we learn that it is merely a zinc and carbon battery excited by a solution of bichromate, one excitation causing the light to last thirty hours, and the cost being only about threepence for each charge.

Most of our readers have heard of diatoms—small objects upon the investigation of which some philosophers spend nearly a lifetime, while microscopes of vast power are constructed almost for the sole purpose of examining them. Before the Royal Microscopical Society last month several of Mr. W. H. Walmsley's photographs of these structures were shown and admired. A paper upon the cell walls of these diatoms, by Dr. J. H. Flögel, was read and illustrated by many photographs of the subjects of his communication. These are naturally very minute; yet we read that as many as one hundred and seventy-four transverse sections were made from a single diatom! This feat (which is something like cutting off the extreme point of a needle and shaving into a hundred or two slices) displays an amount of skill and patience marvellous to contemplate.

THE LATE MR. J. H. DALLMEYER, F.R.A.S.

It was our painful duty, last week, to briefly announce the death of Mr. Dallmeyer. We now supplement that announcement by a few particulars of the career of this eminent photographic optician.

For a considerable period Mr. Dallmeyer's health, impaired by a too close attention to business, was such as to lead him to seek for recuperation by taking long sea voyages and making visits to other and distant climes. About a month since, when we last made inquiry relative to his health, we were informed that the accounts just previously received were of a most cheerful nature. On the morning of Friday week, however, the obituaries of the London morning papers gave notice of his death on the 30th of December, when off the coast of New Zealand, at the comparatively early age of fifty-three.

The influence exercised upon photography by his writings, and especially by the excellence of his lenses, has been of a marked character, and his name has become familiar in this connection throughout the world wherever photography is known or practised. Born and educated in Prussia, he came to this country at an early period of his life and entered the workshop of Mr. W. Hewitt, optician (a former pupil of Mr. Andrew Ross), who with the various *employés* soon afterwards became again transferred to the larger business factory of Mr. Andrew Ross, optician, under whose tuition Mr. Dallmeyer acquired his knowledge of optics, eventually becoming that gentleman's son-in-law.

At the death of the senior Ross, in September, 1859, Mr. Dallmeyer entered into business for himself, that of Mr. Andrew Ross being carried on by his son, Mr. Thomas Ross, and now known as that of Ross and Co. In his new sphere Mr. Dallmeyer devoted himself mainly to the manufacture of photographic lenses, although telescopes also received a considerable share of his attention.

The first appearance of Mr. Dallmeyer before the photographic public was at the meeting of the Photographic Society, in June, 1860, where he read a paper on *The Nature of Distortion as Produced by the Present Forms of View Lenses, and on a Lens or Combination of Lenses Free from this Defect.* Shortly after this Mr. Dallmeyer introduced his modification of the triple achromatic lens, which proved very useful in architectural photography, copying, and, indeed, for every purpose where entire freedom from distortion was required. Still later he modified the construction of this combination by increasing the diameter of the central concave lens so as to render it suitable for groups.

We may here observe that ever since Mr. Dallmeyer commenced business the excellence of his portrait lenses has been so thoroughly recognised as to have led him to bring out several series of them—all, with one exception, constructed on the same principle (that of Petzval), but differing as regards relative apertures and focus, so as to secure varying degrees of rapidity and covering power. The exception to which we here refer is that form of portrait objective in which the relative positions of the flint and crown in the posterior combination are reversed, so as to render it possible, by slightly unscrewing them, to introduce spherical aberration at will, and thus produce definition of a lower order.

The wide angle and rapid rectilinear group of lenses introduced by Mr. Dallmeyer are well known. With regard to the latter a considerable amount of discussion of a slightly energetic description arose, some years ago, relative to the respective claims for priority of its introduction as between Steinheil and Dallmeyer.

The single wide-angle lens, patented in 1864, by Mr. Dallmeyer, is one of great excellence. It consists of two crowns and one flint cemented together, the external form of the complete lens being a meniscus of rather deeper curvature than that commonly adopted previously. The latest patent obtained by Mr. Dallmeyer was for a lantern condenser formed by the union of two lenses, one of these being a plano-convex, the other a double convex, one surface of which was so nearly flat as to lead to its being supposed to be so by an inattentive observer. This side is placed next to the picture.

The deceased gentleman was a member of the Council of the Photographic Society of Great Britain at the time of his demise, and was for some time on the Council of the Royal Astronomical Society. He wore the Cross of the Legion of Honour and the Russian Order of St. Stanislaus, conferred upon him in recognition of his services to optical science. Medals were awarded to him at the following exhibitions for the excellence of his work:—London, 1862 (2); Dublin, 1865; Berlin, 1865; Paris, 1867 (gold and silver); Philadelphia, 1876 (highest award); Paris, 1878 (two gold medals and the Cross of the Legion of Honour). We need scarcely add that his death is lamented by a large circle of friends.

During the past few years the late Mr. Dallmeyer has taken no active part in the direction of the business, but had confided it to his son, Mr. T. Ross Dallmeyer; and, as a matter of course, it will be carried on, as hitherto, under his active management.

THE MERCURY DEVELOPER.—THE SENSITOMETER.

It is little wonder that when a new formula for development is given, and when we are told that the use of it will result in the possibility of reducing our exposures to one-fifth of what we have been accustomed to, there is some excitement in photographic circles, and that the matter is talked of at the meetings of associations. Yet I have seen no description at all of any definite experiments on Mr. H. J. Newton's mercury developer, although I have looked anxiously for such. In the absence of them I commenced a series myself and shall give the results, hoping they may be of some use. Lest it turn out (as I hope it may) that the only *very* partial success I have met with is due to my having received a "foolish version" of the formula, I describe the experiments.

I dissolved thirty grains of corrosive sublimate in four ounces of water, and at the same time ninety grains of iodide of potassium in one ounce of water. The latter solution was slowly added to the former, when a red precipitate of iodide of mercury was formed, which was quickly redissolved when the whole of the iodide of potassium had been added. I then made up the ordinary soda developer. This I did because it is only fair when a new formula is brought out to give it at least one trial keeping strictly to the quantities mentioned. I may remark, however, that a set of experiments made some time ago, with washing soda and other alkalies, persuaded me that none of those tried gave better results than did ammonia, and that washing soda gave results considerably inferior.

The formula then used was as follows:—

Washing soda (dried)........................	25 grains.
Sulphite of soda	4 „
Pyro...	2 „
Water (up to)	1 ounce.

A large plate was cut into a number of small pieces, so that there might be no chance of differences of sensitiveness. A slow, but very clear, plate was selected, as by its use there was less likelihood of a disturbance in the sensitometer readings from the action of extraneous light.

The small pieces of plate were each exposed under Warnerke's sensitometer screen. The exposure was not made by the phosphorescent table, but to a paraffine lamp, as the object was not to ascertain the sensitiveness of the plates, but merely the comparative results of different developers. As the exposures were pretty long (20 seconds), and were made one immediately after another, there was little chance of variation in the light.

Two of the plates were placed in a developing dish, and the soda developer was poured over them. Development was continued for about five minutes, long before the end of which period all action appeared to have ceased. One plate was now removed to the washing water, and into the developing cup were dropped for each ounce of developer three minims of the iodide of mercury solution. The developer was poured into the cup, then returned to the dish. There was almost immediately perceived a slight further action of the developer. After this further action had ceased the second plate was placed beside the first. On comparing the two the second showed two figures more of the sensitometer than the first, and, on fixing both, the last figures of the mercury-developed plate appeared slightly more vigorous than those of the others. Had I got the same result in developing two different kinds of plates with the same developer I should have pronounced the one about double as sensitive as the other.

I now proceeded to develope a plate with my ordinary ammonia developer, which, for the particular plates I was using, consisted of—

Ammonia	3 minims.
Bromide..	1 grain.
Pyro.	$1\frac{1}{2}$ „
Water (up to)	1 ounce.

I got a result not to be distinguished from that got by the soda and mercury developer.

I now tried the result of adding the mercury solution to the ammonia developer. I used the formula just given, but with an addition of four grains of sulphite of soda. Two plates were, as in the first experiment, developed in this. When all action had ceased one was removed and placed in water. The mercury solution was then added to the developer as before, when it appeared that a *very* slight further action took place. On examining the two plates afterwards there was found to be an advantage of one figure in the case of the mercury-developed plate.

One further experiment was tried. The object was to discover the result of *forcing* both with ammonia and with the mercury solution, and to find by which means the highest figure could be got. A plate was developed first in the ordinary ammonia developer, ammonia being added little by little till slight fog resulted. The same was then done with another plate, except that mercury iodide was added in small portions till slight fog became visible. It did so when about seven or eight minims of the solution had been added to each ounce of developer. The two results are not to be distinguished one from the other.

The conclusion to be arrived at from these experiments is that the mercury developer shows over the ordinary ammonia developer an advantage which is at the best so small that it is not worth taking note of. Certainly, for my own part, I should think so doubtful an advantage was dearly purchased by the introduction of a new complication which is not our method of development.

I have read the article by Mr. Henry J. Newton in the December number of the *Photographic Times*, and found, after his description of the developer described above, the two following statements, which appear to me very extraordinary:—"A fifty-grain solution of iodide of sodium used in the same way acts as a good accelerator." "A thirty-grain solution of iodine in alcohol, to which forty grains of pyrogallic acid are added, makes a good stock solution for accelerating development used the same as the other."

I have found all soluble iodides that I have tried to be restrainers in almost the same way that a soluble bromide is. Certainly iodine solution is a powerful restrainer.

Mention of the use of the sensitometer in the above experiments leads up to another matter on which I would say a few words, even at

LEON WARNERKE.

the risk of repeating what has already been said by Mr. W. E. Debenham and myself. What I wish to repeat is this:—*The indications of a sensitometer whose action depends on showing what is the least amount of light which will produce a perceptible effect on a plate are not reliable, unless we can be certain that the plate has received* NO *exposure to actinic light before development except through the sensitometer.* My reason for bringing up this matter again is that it was discussed at the last meeting of the Photographic Society of Great Britain, and that so acute an observer as Mr. Spurge failed to perceive the truth of the matter. I quote, from the report of the meeting referred to, the remarks of Mr. Debenham and the reply of Mr. Spurge:—

"The radical vice of all sensitometers was that they were read by observing the last of a series of tints which indicated merely what was the minimum amount of light which would affect a plate; but a plate might be made to render such a tint by other means than such as would render it rapid in the camera, especially if it had been exposed to extraneous light."

"Mr. Spurge, in reply, said that if the effect of pre-exposing a plate were to make it give a higher sensitometer number, it would also be to make it give a corresponding result of greater sensitiveness in the camera."

I think I can easily show that Mr. Debenham is right and Mr. Spurge wrong in this matter. Let us suppose a certain plate, which is being tested under a sensitometer—either Warnerke's or Spurge's or any other. We will suppose that the plate has had no pre-exposure to light. A certain figure appears on the last which is seen on the developed plate. What is now indicated is this:—The amount of light producing this figure is the least which will make any visible impression on the plate. Such amount of light reaching the plate at any time before development will produce a visible effect. No less amount will. We will suppose that the amount of light required is ten units, that being the amount which reaches the plate through the last tint or hole of the sensitometer which gave an impression. Now let us suppose that before the sensitometer was brought into requisition at all we had given the plate an exposure so that it received nine units of light all over: no appreciable effect would have been produced, as it requires ten units in all to do so. But the plate is then in such a condition that *one* additional unit will produce an appreciable effect, and the figure of the sensitometer which corresponds to one unit of light will now be visible, in place of, as before, that which corresponded to ten units of light. The plate will appear ten times more rapid than it did before it received the general exposure. But does Mr. Spurge imagine that it will be ten times more rapid in the camera on account of the pre-exposure? Certainly it will not. There may, for certain subjects, be a *very slight* advantage; but probably not, at the best, more than fifty per cent.

It may be asked—If the sensitometer be liable to give such grave mis-indications, of what use is it? I would reply that, except where we know the particulars of the manufacture of an emulsion and of the coating and subsequent treatment of the plates covered with it, the sensitometer is of *no* use as a precise measure of sensitiveness. It is useful, notwithstanding, as a practical guide whereby to form an approximate estimation. Such estimation, however, is not to be made by reading the last figure only, but by taking into consideration the general appearance of the image after fixing, and especially by noticing, as suggested by Mr. Debenham, what is the highest figure which shows any marked advance of density as compared with the next one higher.

Although the sensitometer does not by the reading of the last figure only give reliable results when comparing different plates, it gives perfectly reliable results when comparing different developers on the same batch of plates, as here any disturbance which may have crept in from pre-exposure in the case of one plate will show itself equally in all. W. K. Burton.

LEON WARNERKE.

Mr. Leon Warnerke, the subject of our illustration, is by nationality a Hungarian, though long residence in this country and his intimate connection with a large circle of English friends have in a great measure Anglicised him. A civil engineer by profession, Mr. Warnerke settled in England some years ago, when his tastes led him to adopt photography as a recreation; but, in the course of many years' devotion to the art, photography has been the gainer by many practical contributions made by him in connection with its progress.

Mr. Warnerke first appeared prominently before the photographic public in 1875, when, at a meeting of the South London Photographic Society, he read a communication on *Paper v. Glass*, and exhibited and described his "roller slide" and sensitive collodion tissue. In the same year he contributed to our columns articles on the proposed use of methylal as an accelerator in development. In the following year, before the Parent Society, he read a paper entitled *Investigations in Collodion Emulsions*, in which were embodied the results of a careful series of experiments on the relative values of different salts for emulsion purposes. Since that time Mr. Warnerke has been a constant contributor of papers to various photographic societies in this country and on the continent, much of his time during the past few years having been spent abroad.

The introduction of the Warnerke actinometer, based upon the employment of a phosphorescent tablet upon which to record the impress of the light's action, will be fresh in the recollection of many of our readers; while the sensitometer which bears his name and which also utilises the phosphorescent principle is now the recognised standard of measurement in connection with dry plates. The establishment of the lens standards of the Photographic Society of Great Britain is also due to Mr. Warnerke's breaking ground in that direction, a committee having been appointed by the Society at his suggestion to consider the matter.

Mr. Warnerke was in 1877 awarded the prize offered by the Photographic Association of Belgium for the best dry process, and three years ago he received the progress medal of the Photographic Society of Great Britain, of which he is one of the most active members.

Though England is his permanent home, Mr. Warnerke is quite as well known in photographic circles in Russia, Belgium, Germany, and France, the greater portion of his time abroad being spent in St. Petersburg, where by his energy, in the first instance, a photographic society and a photographic journal were started some three or four years since.

Personally Mr. Warnerke is of the most sociable and genial disposition, and ever ready to assist, by his advice or otherwise, in any matters photographic; and few of the regular frequenters of the meetings of the metropolitan photographic societies, or of those who have enjoyed his hospitality, but have cause to be grateful for his kindly assistance in some photographic difficulty.

THE RENAISSANCE OF GOLD AND HYPOSULPHITE TONING.

It will not do to dogmatise on the conditions of permanence or fading as regards silver printing. Freedom from every trace of hyposulphite of soda is, with much justice, considered one of the indispensable conditions through which permanence is secured; and still, in face of this we, and others, are aware of prints from which the fixing agent has not been thus removed, yet which, after the lapse of a considerable period, are as good as when freshly made.

Another instance of this occurs in connection with a certain item in the experience of our predecessor, as described by him at the meeting of one of our metropolitan local societies. From this it appears that about fifteen years ago he received from Mr. W. M. Ayres, who is well known as one of the most experienced of London printers, several photographs produced by a system of toning which left nothing to be desired as regards beauty, but as respects the principle involved in the toning of which it might be possible to entertain inimical feelings. As, however, Mr. Ayres's experience embraced the extensive printing operations carried on in connection with the Great Exhibition of 1862, and as, further, he was well known to have for several years taken the leading position in the printing works of Mr. William England, he was prevailed upon by the then Editor of The British Journal Photographic Almanac to give to its numerous readers an account of the method of printing adopted in the production of certain prints which are now declared to have retained their pristine vigour and beauty. But the process by which they were produced would seem to have been apparently so heterodox as to have induced the Editor to attach a semi-apologetic foot-note to the effect that, whatever theoretical objections might be urged against the addition of gold to the hyposulphite of soda bath, the fact of its being recommended by a printer so experienced as Mr. Ayres should induce those who desired to emulate his work to give the method a careful and thorough trial.

As the Almanac, in which the details of the process in question by which these unfaded prints were produced, has been out of print for fourteen years, we here give a brief synopsis of it:—Albumenised paper prints having been executed on a sixty-grain silver bath are treated in the usual way up to immersion in the toning bath, which is composed of—

Chloride of gold	1 grain.
Acetate of soda	30 grains.
Water	8 ounces.

In this the prints are placed, but care is taken to remove them before the toning has been quite completed. They receive their full tone in the following manner:—

A fixing bath is made by a saturated solution of hyposulphite of soda, which is diluted with an equal bulk of water, and to this is added a solution of chloride of gold in the proportion of half-a-grain of the gold to each full sheet of paper. In this bath the prints acquire a considerable degree of richness. Washing in water follows this fixing and toning operation. In the event of any prints having suffered from over-printing they are removed from the others and kept damp until the day's fixing is done, after which they are immersed in a weak solution of iodine and iodide of potassium. In this way they become of a blue-colour, more or less deep according to the amount of reduction. They are then placed in the gold and hyposulphite bath, by which they are restored, the whites being rendered of great purity.

The foregoing is substantially the process by which these fine prints were produced. Where a caution is required, or a suspicion capable of being hinted at in the soundness of the system, lies not in its use when correctly carried out, but in its abuse in making the toning and fixing bath do more work than it is capable of doing, by which gold toning gives place to sulphur toning. This, however, is no argument against the adoption of the system described, but only against its misuse.

CAMERA LUCIDA.—PALETTA OBSCURA. A STUDY IN LIGHT AND SHADOW.

[Abstract of a communication to the Edinburgh Photographic Society.]

My subject—the union of painting and photography—is not so short as you or I might wish it to be, yet I have tried to make it as terse as a subject so crammed with incident and so exhaustless in matter could be made. If you will try to endure it to the end I trust you will not be disappointed.

Photographers, as far as I have seen of them, are a jealous-minded race. They do not think enough of their art or of themselves. They are too apt to think that the painters despise them, while in reality the painters of today hang on to them as a drunken husband is apt to hang on to his good-templar wife during this festive New Year season, or, to be more poetic in simile, as a half-drowned sailor will clutch on, teeth and nails, to the hard rock, which may have broken up his rotten old boat, but now keeps him alive in the middle of the surf.

The painters of today have become realists, and photography is realism or nothing. A photographer, to be able to produce a good picture, must be a true painter in the highest sense of the word; so a painter ought to know the right qualities about a good photograph, whether he knows the mixing of the chemicals or length of exposure, or process of focussing, &c., or not, although to be able to compete, the tricks of the trade have to be learned. Witness Napoleon Sarony, Mora,* and such men, with their fancy dodges and splendid effects, and Seavey with his unapproachable backgrounds.

Thus my title is almost superfluous, for painting and photography, requiring the same direction of talent, are already united; only it may be of a little service to hear a painter avow the marriage publicly which is so constantly being consummated on the quiet.

It is in your work, as in ours, the doom to be often annoyed with talented triflers who dip a finger into all the sciences, and are for ever ready to dispute the point with the originators—buyers of brains, who imagine that their cash gives them full liberty to find all sorts of faults, or suggest improvements upon the worker's designs; who will not buy unless their idiotic improvements are executed to the last letter, and who afterwards lay the whole blame of the spoiling of the pie upon the baker when the guests condemn.

Having a direct object in view, I need not trouble you about chemicals or lenses, aurora lights, or secrets that you all now know much better than I, but will come direct to what is of vital interest to us both in our wedded state, viz., the seeking how we may put as much of the soul of Nature, with her innate force and feeling of motion, into our pictures as possible; the men, modern and ancient, who may best aid us by the examples and teachings they have left as a legacy to us; a quiet consideration of what they really have done for us; a right straight look at the men themselves, unbiassed by veneration or prejudice, with a consideration as to how much we have taken advantage of the legacies left to us.

The first aim of our investigation is, therefore, the exact imitation of Nature; that is, the outward form and appearances of Nature—the body, in fact, of that mystic Deity whom all men worship, no matter what is the dogma, whether they have a creed or whether they be creedless. Secondly, the feeling, sentiment, or sensations of Nature—how her appearance touches us, as we look upon her in the wealth and loveliness of her colouring, also how we may keep that sentiment alive in our light and shade. Here the painter, with his colours, gets a better hand and a long start ahead of the photographer, engraver, and etcher; and it is here that if those workers in light and shade can keep the sentiment as well as the painter in colours, they gain a double and richer triumph—the triumph of a racer who has been heavily and unfairly handicapped at the beginning of the race. Thirdly, the motions, actions, passages, expressions, and impressions of Nature. There, both in photographer and painter, the man himself is brought out, whether he be a trained mechanic or a born genius. Lastly, the perfect image, the whole innate force, which is the spirit and soul of that matchless creation toward which we must all constantly turn (as the sunflower turns or the daisy opens to the glance of day) for the light and life of our artistic beings.

Let us drop the weak word "artist" out of our consideration altogether. Personally I abhor it as denoting nigger minstrel, sword-swallower, or that undefinable member of society who plays with single foils and sable hairs inside a studio, enriched with Turkey ruggery, old armour, and marble busts. Let us, who are workers, be plain painters and photographers, never heeding the comforts of our surroundings, having only to do with objects as accessories to our work, thinking only upon the *utility* of every knickknack we may have, aiming only at the result without considering the trouble or the inconvenience to the animal who is bringing it all about, every conception or experiment being an undiscovered country which we mean to find all out and make our own—Stanleys or Thompsens with our Africas; Pizzaros conquering and annexing our Mexicos; plain, hard-working, earnest painters and photographers; brothers in one grand service—Art.

I think, at the present day, painters recognise this fraternal stand even more than photographers give them credit for doing; they know how much they are indebted to the camera for making matters lucid which were before obscure. Witness the galloping horses done by instantaneous processes, the shape of waves in full action, the rushing of waterfalls, and the contortions of muscles in moments of great excitement. How many of the old masters knew what a horse at full speed was like? and what eye-openers to battle painters those photographs have been! None of the sea painters were able to draw a wave in all its subtleties and froth accessories as painters nowadays may do if they study the imprint of a flying second; we may also have clouds in their strata, as they actually are, with shadows perfect in those artistic studies coming, like the institution of Christmas cards, more and more into vogue every year that we live. And painters do use them constantly, whether they admit the fact or, induced by a false pride, pretend that they do not. I see in every exhibition glaring evidences of hay carts and field horses, yachts and ships of all degrees, blankly copied, with hardly any disguise, from the photographic studies suspended in the shop windows.

Clear photographic studies, faithfully drawn out, and in the painting knocked about a little, sometimes not so true as the original to Nature, blurred and mystified into that obscurity which does for feeling with the crowd, the most original bit of painting being the man's signature who sells it, that strictly being his own, and not the copyright of either the photographer or the horse. And why not? Clouds will not wait on our pencils and palettes being set; horses will not stand until we draw out a faithful enough study of their forms, nor ships pause until we get in all the rigging. The winds are against it, and the waves. The hours flying along and tearing down the sun-shadows before we have fixed one line of them on our paper or canvas join in the protest, jeering at our deliberation, and mocking us as slow coaches in these steam engine days, we trying to crawl on six miles an hour, and dreaming that we can enter into competition with the mile-a-minute express.

The pride which keeps the artist silent, or makes him deny the charge of photo-borrowing, is an utterly false pride, and the sooner it is knocked out of sight the better for all parties. Why should we not correct our sketches—done for the sake of the colour and feeling, and not for the form—from faithful photographs? It does not hinder us from being original in the after-treatment, although it may save us much time in the elaboration of sketch-details. Why not save our precious time for something so much more worthy of it—the picture?*

Hitherto I have wanted so much to be original that out of conscientious scruples I would not use the photographic studies which some of my friends have sent me. I looked upon them longingly, and put them out of sight reluctantly, and so went down to seaboards and meadows, catching rheumatics and toothache, and wasting hours upon hours, and many valuable sheets of Whatman's hand-made paper, trying to draw out all the rigging of ships, and the shapes of cows, losing the effect often in my endeavours to get the manipulation, and in reality not getting a hundredth part of what I might have got with half an hour's rapid dashing on of colour effects, and a moment's focussing. At

* Three of the photographs shown at the meeting were by Sarony and Mora, kindly lent by Mr. J. L. Cox, representative of the firm of G. Mason and Co.

* Only not to the encouragement of lazy habits. At times (for the sake of practice), a painter ought to draw the most minute point-detail with the pencil, as a singer practises his scales, otherwise for the object the photograph is most to be relied upon for truth in all, *except perspective.*

present I know little or nothing about the art of photography, but I intend to make it my duty to learn a little more—enough to be able to sight a picture correctly, take and develope a dry plate, and afterwards fix a print; for I can perceive plainly that time is coming on with rapid strides to the point when, along with his present utensils of colour-boxes and sketching block, the painter will require to carry his camera and stand, box of dry plates, and head covering.

And how proper it is that it should be so a little experience will prove to every one. An old castle or abbey, or the view of a town, or even the markings upon the trees would take us days to outline—the buildings of the town, the fretwork about the abbey and castle, or knots and gnarling of the woodland, and even then it would be incomplete. To illustrate my meaning: look at even the most careful outline pencil drawings of Turner—one of the most delicate of outline draughtsmen, *when he liked*—or the scrupulous and untiring delicacy of his admirer, Professor John Ruskin, with his pencil, and compare those efforts with the lines about even the most commonplace photograph of a building or tree-trunk, and I need say no more on that point. The painter has lost the half and distorted the rest; and although the drawing may appear more attractive at first sight, the photograph will be the best, for it embodies the first grand principle of a painter's training—faithful imitation of the object which he desires to represent.

Photographers are apt to labour under the mistaken notion that we do not recognise this plain fact of artistic necessity; but we do, and if we do not have the manliness to own it that is our cowardice and not our blindness.

Be content, therefore, when you go into exhibitions and see the misty result of your photographic studies in the realism of to-day hanging all round, that this is recognition enough of the obligations palette owes to camera. HUME NISBET.

(To be continued in our next.)

SHEFFIELD PHOTOGRAPHIC SOCIETY'S EXHIBITION.

OUR correspondent, in his notice of the recent exhibition, did a slight injustice to our Liverpool friends, for which we now desire to make amends.

The Liverpool Amateur Photographic Association sent a large number of exhibits to the Cutler's Hall, and their work was greatly admired and appreciated. The whole of the competition pictures for 1883 were displayed. Mr. R. Crowe showed a fine collection of prints, mainly of instantaneous pictures in the streets of Liverpool. The Rev. H. J. Palmer gave a lantern lecture on the glaciers of Switzerland to a crowded and appreciative audience, and on the walls were displayed a considerable number of his pictures abroad. Mr. J. A. Forrest showed some excellent specimens of his work in North Wales; and Messrs. Earp, Pierce, J. W. Kirby, Twigge, and Tyrer, sent fine specimens of their photographic skill.

Among the most interesting of the exhibits were six pictures by Mr. Craddock from calotype negatives, taken in 1851, and exhibited in the Great Exhibition of that year. Although toned in the old way—in a hypo. and gold bath—no trace of fading is manifest; and the sparkle and vigour of these prints testify to the value of the now-discarded paper process.

PRINTING.

[A communication to the London and Provincial Photographic Association.]

THE subject of this evening's lecturette or paper, whichever you prefer to call it, has been entitled *Printing*. The vastness of this subject is, however, far beyond my capabilities, since we find it dating back as an art to a very remote period. My remarks will, therefore, be confined to that kind of printing adopted by photographers, and known as silver printing on albumenised paper; or what might with truth be designated "the fugitive photographic printing process."

I do not wish to occupy your time this evening with a lengthy description of all the various methods of printing, photographic or otherwise; neither shall I reiterate all the discoveries which led up to their elaboration, as I have little doubt but that our worthy curator, who was the instigator of this effort of mine, will not rest contented until he has made you acquainted with the secret workings of all and every process based on photographic research. Unfortunately for me there are no secrets attached to this subject which are not known to you all, unless it be that the ordinary silver print is not the most imperishable *souvenir* of photographic art one can possess.

Example 1.—Here are some samples which speak for themselves. These were all printed on the 19th May last. The faded ones have been exposed in a damp atmosphere, namely, a cellar. Those prints which have not faded have been kept under the ordinary conditions of the atmosphere. You will notice the extraordinary influence of damp on these prints.

The subject, then, we have to deal with to-night is the means employed to obtain positive images on a suitably-prepared surface of silver chloride, incorporated in albumen, by the direct action of light; and, if you will allow me, I will deal with this matter in successive steps.

If we expose ordinary white paper to the sunlight no change is seen to take place; neither should we notice much difference if we soaked a piece of pure Swedish filtering-paper in a solution of pure nitrate of silver, dried it, and exposed it to light; but if we were to coat the Swedish paper with gelatine, arrowroot, or some similar organic substance previous to silvering it, we should find that the paper would readily darken in the light. From this we gather that an organic compound of silver is formed, which is more easily acted upon by light than a layer of the pure salt would be.

Example 2.—Here are some prints which have been produced on filtering-paper soaked in gelatine, and silvered in the ordinary manner.

Chloride of silver behaves in a somewhat similar manner to nitrate when exposed to light in the presence of organic matter, excepting that chloride of silver is more sensitive; for this reason, as a sensitising salt for making prints, it has long been the photographer's sheet anchor. If I may be allowed to speculate, I would say that chloride of silver will in all probability be the printing process of the future; not in combination with albumen, however, but a mixture of gelatine and collodion on a sulphate of barium surfaced paper. At no distant date I shall endeavour to show you some examples printed as I have indicated.

In this tube we have a solution of silver nitrate in water; you will notice it is quite transparent. I will add a few drops of hydrochloric acid, and immediately a copious flocculent precipitate of silver chloride is formed. If I wash some of this chloride of silver, and expose it to light, it readily darkens. The same also happens when a soluble chloride, such as common salt, is added.

Example 3.—I will take one of these tubes, containing silver chloride, and expose it to burning magnesium ribbon. You will notice it has darkened considerably.

For the purposes of printing, we find it more convenient to form our silver chloride in a very much finer state of division on the surfac we intend to act on as a base for the picture, and chemical decomposition is resorted to for the attainment of that end, but not quite in the same manner as I have just shown you. A given proportion of one or more of the soluble chloride salts is incorporated in the albumen coating given to the paper. When this salted albumenised paper is floated on a moderately strong solution of silver nitrate the soluble salt becomes changed, and an extremely finely-divided layer of silver chloride results, the coating of albumen being rendered insoluble, or coagulated by the silver nitrate,

In this tube I have some white of egg (albumen); upon the addition of a small quantity of this silver nitrate solution you will notice a white cloud formed. This is coagulated albumen.

Dilute silver solution does not coagulate albumen perfectly; for this reason stronger solutions are used than would otherwise be necessary. When weak solutions are used, portions of albumen will be dissolved, producing an effect called stripping, and may be recognised by a semi-opaque scum floating on the surface of the sensitising bath; also dull patches and streaks on the paper itself.

Here are some examples of albumenised paper which have been floated for the space of three minutes each on silver solutions of six grains, nine grains, and twelve grains per ounce respectively, fuming thirty minutes.

Example 4.—It will be noticed that the nine- and twelve-grain examples are very good, but those on six grains have very little albumen left. Nearly all the paper used by silver printers throughout the universe is manufactured in the south-east of France, or in Saxony, and is designated, according to the mill from which it issues, either Saxe, Rives, or Renat "New Rives." These papers are sent out sized, ready for albumenising, which latter operation is performed very extensively in this country and in Germany. Each albumeniser has his own pet formula, and some degree of secrecy is observed by them all. The formula here appended is a fair specimen, and yields excellent results. To every gallon of fresh albumen, free from yolk or germ, add the following :—

Ammonium chloride	$1\frac{1}{2}$ ounce.
Barium chloride	$\frac{1}{2}$,,
Glacial acetic acid	$\frac{1}{2}$,,
Soft water previously boiled	4 ounces.

When dissolved add gradually to the albumen, beating constantly until the whole is a froth; after twenty-four hours subsidence, the mixture may be strained through fine cambric, and is ready for use. Coating is performed by floating the smoothest side of the paper on the albumen bath for the space of thirty or forty seconds, according to the nature of the paper; the sheet is then dried on laths or rods at a temperature of about 90° F. In Germany the sheets are pinned up by two corners to dry. The coarseness of texture sometimes noticed in silver prints is due to the paper being coated on the wrong side. Drying at too high a temperature gives a brilliant surface, but causes blistering in the after process. Drying at too low a temperature causes dullness. The quantity of albumen required to coat a ream of paper weighing ten kilogrammes will be about two gallons. Various tints may be given to the paper by the addition of suitable liquid dyes mixed with the albumen. Albumenising and sensitising cannot at present be successfully performed at one operation; as far as experiments have been made all attempts to preserve the paper have failed and the results have not proved satisfactory. Sensitising, therefore, becomes a distinct operation.

I may fairly assume that many present indulge in the luxury of ready sensitised paper; still I have taken the liberty of introducing this subject as one of the stages necessary to obtain a result. Silver nitrate and sodium chloride, if permitted to attack each other in the presence of water, form, as everybody knows, silver chloride and sodium nitrate. In practice it is not necessary to deal with exact equivalent proportions, it being sufficient to ensure an excess of silver nitrate strong enough to prevent stripping, and not strong enough to produce bronzing of the shadows to any appreciable extent. It has been pointed out in "Text-Books," "Lessons," and other places, what happens when silver chloride is exposed to light, and, no doubt, you are all familiar with the reaction from a practical point of view. We will suppose we are using a paper salted as above mentioned, viz., a paper coated with six grains of soluble chloride per ounce of albumen. We should make up the sensitising bath at least five or six times that strength, say forty grains of silver nitrate per fluid ounce of water. Half a gallon of this solution would give us a bath on which half a quire of paper could be sensitised. It would then be necessary to replenish with more silver, as about 290 grains of silver nitrate would have been converted into chloride or absorbed in the paper. Other nitrates with silver are used by some printers, the principal being the nitrates of soda and potash. They are said to effect a saving of silver, but they are seldom used by practical printers. I have appended a formula which has worked well in my hands:—

Nitrate of potash	35 grains.
Nitrate of silver	30 ,,
Water	1 ounce.

The time required for floating on such a bath will be from six to eight minutes, and ammonia fuming will be found advantageous when good results are desired. There is really no distinct advantage gained by the addition of any other substance to the silver solution. In proof of this statement, I now show you untoned prints sensitised on the following:—

Nitrate of silver	10 grains.
Nitrate of potash	10 ,,
Sugar-candy	10 ,,
Water	1 ounce.

Also,

Nitrate of silver	5 grains.
Nitrate of potash	5 ,,
Sugar-candy	5 ,,
Water	1 ounce.

The results are very little, if any, better than the prints shown from a weak, plain silver bath.

Fuming, for some reason or other, is not looked upon with much favour in this country, but why I cannot say. My experience commenced in this city fully twenty years ago, and I have continually practised it both here and in America since that time. It has been said that the climate of America is of such a nature that fuming is necessary, but that here there is no advantage gained. This is simply nonsense. America is far too large a country to be placed in the category of any particular climate. She possesses climates of all sorts; and, as my experience of fuming extends over some thousands of miles, I hold that fuming is desirable in any climate.

When hydrate of ammonia is exposed to the atmosphere pungent fumes of the gas are given off. If these fumes be collected in a closed box, and sensitised paper is placed therein, the sensitiveness is considerably increased—in fact, nearly doubled—and the colour of the print becomes purple, or blue, according to the energy of the gas and the duration of its action. Among other advantages, fuming permits less concentrated silver solutions to be employed in sensitising. Less time is occupied in printing, also in toning, meaning economy in time and material, and mealiness is never seen. It is for this latter reason that pictures printed on fumed paper give such better results in copying than those pictures which are printed on unfumed paper.

W. M. Ashman.

(To be concluded in our next.)

RECENT PATENTS.

PATENTS APPLIED FOR.

No. 1,042.—"Photographic Exposing Apparatus." S. D. McKellan. *Dated January* 9, 1884.

No. 1,113.—"Construction of Apparatus for Photographing without the Aid of Daylight." T. S. Davis.—*Dated January* 10, 1884.

No. 1,206.—"Shutters for Photographic Purposes." L. Warnerke.—*Dated January* 11, 1884.

No. 1,251. — "Treating and Producing Coloured Photographic Transparencies for Decoration and Production of Various Designs on Sheet or Plate Glass, Talc, Bladder, Parchment, or Paper, so as to Represent Stained, Cut, Embossed, or Enamelled Glass in One or Any Number of Colours or Designs."—G. Rydill.—*Dated January* 11, 1884.

AMERICAN PATENTS.

No. 290,587.—"Box for Photographic Dry Plates." E. Klauber.

No. 290,217.—"Machine for Retouching Photographic Negatives." J. Densmore.

No. 290,655.—"Colouring Photographs." C. L. Wright.

MANUFACTURE AND TREATMENT OF PHOTOGRAPHIC PAPER.

This invention, which received provisional protection only, emanates from Charles Cros and Auguste Vergeraud, both of Paris.

It relates to the manufacture and treatment of photographic paper for the purpose of reproducing by the action of light the dark lines of designs drawn on transparent surfaces—such as tracing-paper, glass, and the like—or the images of flat objects that can be applied to the prepared paper. The paper can be prepared either during its manufacture by mingling with the pulp the sensitive materials, or these can be applied to the paper at some stage of its manufacture (when it can be moistened) or after its manufacture, whether the paper be sized or not. Thus, there may be added to the pulp which is to be converted into paper a sensitising solution of about 11 parts bichromate of potassa and 120 parts of dry glucose in 1,000 parts water, the quantity of the solution being such that the sensitising ingredients constitute an addition of about sixteen per cent. to the weight of the dry paper. For sized paper the proportion of sensitising material may be considerably less. Or, again, manufactured paper may be gelatinised in the usual way, impregnating it with a solution of about 10 parts bichromate of potassa, 100 parts dry glucose, and 25 parts gelatine, in 1,000 parts water. Paper thus prepared is particularly applicable for obtaining designs in organic colouring matters.

For developing, a solution of about ten parts nitrate of silver, twenty parts acetic acid, and fifty parts alcohol in 1,000 parts water, gives a ruddy colour, which after washing and drying in the light becomes dark brown. Hydrosulphuric acid gas, reducing salts of copper or iron, such as oxalates or ammoniaco-sulphites, carbonates of soda and potassa, may be then applied. By the action of the latter substances carbonate of silver is produced, which becomes blackened by exposure to light. Another developing solution consists of about twenty parts acetate of lead, twenty parts acetic acid, and fifty parts alcohol in 1,000 parts water. This gives a yellow, which is blackened by hydrosulphuric acid gas. Development in dark violet colour may be effected by applying a mixture of about twenty parts extract of logwood, fifty parts alcohol, and five parts carbonate of potassa, with 1,000 parts water, and then washing with water acidulated with oxalic acid to remove the colour from the ground. In all these operations alcoholic liquids are preferable to pure water, as they dissolve less the bichromate. For the glucose employed in the sensitising mixture dextrine, sugar, or gelatine may be substituted.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
January 22	Bolton Club	The Studio, Chancery-lane.
,, 23	Bristol Amateur	Studio, Portland-st., Kingsdown.
,, 23	Photographic Club	Anderton's Hotel, Fleet-street.
,, 24	London and Provincial	Mason's Hall, Basinghall-street.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of the above Association, held on Thursday, the 10th instant, the chair was occupied by Mr. W. K. Burton. This being one of the "lecturette" nights,

Mr. W. M. Ashman, as previously arranged, read his paper ***On Printing*** [see page 41], and illustrated it by experiments exhibiting the reaction of nitrate of silver with soluble chlorides and with albumen; and by handing round various specimens of silver printing produced with differing details of treatment.

At the conclusion of the lecture,

The Chairman, after thanking Mr. Ashman, said that he should be glad to hear if any member would say how sensitised paper could be prepared for keeping, so as to give results similar to those obtained with the commercial article. Mr. Ashman had said that he had made paper and kept it for a year, but that it required fuming before use. He (the Chairman) had tried all the formulæ that he had seen, but none of them gave results like that which was sold by the makers for the trade. It was remarkable how well the secret of the manufacture had been kept. These commercial papers did not require fuming, and were not acid to test paper.

Mr. W. E. Debenham inquired whether the Chairman had tried the method, which he had published some years since, of adding perchloric acid to the sensitising bath. Paper so prepared did not require fuming, and toned just as freely as those floated upon the ordinary bath. With respect to the practice of fuming paper with ammonia, which Mr. Ashman had remarked was so general in America but not in this country, perhaps one reason why it was not adopted (in London, at all events) was that after fuming the paper so soon discoloured, and with the winter light here sometimes the prints would not come off in one day or even in two.

The Chairman had not seen Mr. Debenham's formula, but would try it.

Mr. F. York prepared paper for keeping by floating it for three minutes upon the usual sixty-grain bath, and then for one minute upon a bath containing thirty grains of nitrate of silver and thirty grains of citric acid to the ounce. One grain more of citric acid was added to the bath for every sheet of paper floated. The nitrate of silver did not require to be replenished in the second bath. The paper so prepared would keep for a month, but he generally sensitised once a week. The paper did not require fuming, but as a final wash before toning the prints were immersed in a solution of common soda—about one ounce to the gallon.

Mr. PRESTWICH endorsed Mr. York's observations as to the advantage of a wash of soda before toning.

Mr. A. L. HENDERSON said that Mr. Ashman had spoken of his intention to prepare paper with gelatine and collodion for printing. He thought that there would be no gain in any way from the proceeding. The lecturer also had said that there was no advantage in the addition of nitrate of soda to the sensitising bath. He (Mr. Henderson) thought that there was a great advantage in doing so, and that if a five-grain plain solution of nitrate of silver were used to float upon the albumen would be dissolved, but if the solution were saturated with nitrate of potash this would not be the case. With a bath so saturated ten or fifteen grains of nitrate of silver to the ounce were quite enough. He had tried Mr. Debenham's plan of preparing sensitive paper long ago, and had found it wanting. Nothing had so much puzzled him as a method of preparing sensitised paper so that it would keep. He could prepare a paper as good as any in the market by the addition to the sensitive bath of a small quantity of oxalate of ammonia and honey. A trace of citric acid in the bath—one in five hundred—would also suffice to make paper keep. Mr. Debenham had said that fumed paper did not keep. His (Mr. Henderson's) experience was all the other way. Let any one wrap up some and try. Fumed paper kept better than paper that was not fumed; for what discolouration might come on would fix out, or nearly so.

Mr. J. TRAILL TAYLOR said that his experience of the keeping properties of paper after it had been fumed was not in harmony with that of Mr. Henderson. As to the relative permanence of prints produced by different methods: he would mention that some years ago Mr. W. M. Ayres had published, in one of the early volumes of THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC, a formula which he (Mr. Taylor) could not at the time recommend, as it was a variety of the old method in which the gold and hypo. were used mixed. He had by him, however, some prints which were produced by that formula at that time, and they were now brilliant and beautiful.

Mr. Ayres showed some unmounted prints produced twenty-two years ago.

The CHAIRMAN remarked that they might have been produced yesterday.

In reply to a question,

Mr. AYRES attributed their permanency to a liberal use of gold. The fixing was performed in a solution of hyposulphite of soda, one in twenty, and the prints kept in it for fifteen minutes. The toning bath, which was what he still used, was composed only of chloride of gold and lime water, made the same day as used.

Mr. HENDEASON believed that the old method of mixed hypo. and gold gave the most permanent prints of all. As to the paper itself, he believed that it was not nearly so good as that which was made twenty years ago.

Mr. F. W. HART said that the great danger of fading was from the use of an old acid bath for fixing. He made a practice of having fixing and toning solutions and washing waters all in the proportion of a pint for thirty *carte* prints on each whole sheet of paper. The gold used was in the proportion of half-a-grain to the sheet, and the fixing solution one part of hypo. to ten of water. He did not allow the prints to remain all night in water; but, commencing at five in the afternoon, they were washed in many changes of water, then immersed in a dilute solution of hypochlorite of lime to eliminate the last trace of hypo., again washed, and dried. This occupied till about nine o'clock.

Mr. W. T. WILKINSON had used Mr. Blanchard's plan of preparing paper, by adding citric acid to the nitrate bath and redissolving precipitate with nitric acid for keeping, whilst he was in India. The paper did not require fuming except in very dry weather, and then it was necessary in order to get rich prints.

Mr. HENDERSON thought it a great pity that alkaline toning ever came in. The only advantage that he could see was that it cost less for gold than the older method. As it is he toned four sheets of paper with one grain of chloride of gold.

Mr. DEBENHAM said that, as some prints produced by both methods had stood very well—Mr. Ayres's lime-toned prints on the table being good examples of permanence by the alkaline plan, and some prints by both methods had faded very rapidly—they would do well to look out for some other cause of fading than the adoption of either of the plans. One cause that he thought very active was the decomposition of the sizing of the paper, or of the mounting material caused by damp or immersion in water. Let any ordinary photograph be stood in a pickle jar containing a little water at the bottom, covered over, and placed outside a window, and in a fortnight it would be found to have faded fearfully. Any print that would stand that treatment might be considered, as photographs go, permanent.

Mr. ASHMAN, in conclusion, said that sensitised paper kept with him for a twelvemonth. Fumed paper remained very well for a fortnight if kept from air in a box or frame. The padding of his frame was a sheet of red india-rubber. This was a good material in many ways; it equalised the pressure, and preserved the paper from air and moisture.

On the motion of the CHAIRMAN, seconded by Mr. DEBENHAM, a cordial vote of thanks was given to Mr. Ashman, who promised on a future occasion to continue the subject by going into the questions of toning and fixing, at which the present paper had stopped short.

Mr. HENDERSON showed some examples of negatives, one of which was developed by Mr. Newton's corrected formula for the addition of mercuric iodide to the sal. soda developing solution, consisting of the use, with each ounce of developer, of three minims of a mixture of thirty grains of bichloride of mercury and ninety grains of iodide of potassium in four ounces of water. He considered that there was a gain in exposure of two to one compared either with the ordinary sal. soda developer or that in general use with ammonia.

It was announced that at the second meeting, in February, Mr. F. W. Hart would give his "lecturette" on *Residues*, and that in March and April Mr. T. Bolas and Mr. W. E. Debenham would give theirs on the subjects respectively of *Photo-Block Printing* and *Lenses*; and the meeting concluded with a hearty vote of thanks to the Chairman.

EDINBURGH PHOTOGRAPHIC SOCIETY.

THE third meeting of the session was held at 18, George-street, on Monday, the 7th instant,—Mr. William Nielson, President, in the chair. The room was inconveniently crowded, between eighty and ninety members being present.

The minutes of the last meeting having been passed, the following were unanimously elected ordinary members:—Messrs. W. Adams, H. B. Melville, William Peek, William H. Muir, J. Clinton Nott, William Meikle, James Lessels, W. Cuthbertson, Andrew Paterson, and Miss Ann C. S. Calder.

Mr. H. H. PILLANS proposed:—That the Council be empowered to expend a sum, not exceeding £5 every year, in purchasing books towards forming a library for the Society; that the Council may suspend this payment any year they think that the funds of the Society do not warrant such expenditure; that the Council determine what books shall be purchased, where kept, and how made available to members.

In the discussion of this motion the President, Mr. J. Smart, R.S.A., Mr. J. M. Turnbull, Mr. J. B. Stewart, and Mr. Fraser took part. The latter gentleman suggested that the Secretary might communicate with other societies in Edinburgh to bring about united action for the securing of suitable rooms where various bodies might hold their stated meetings, with accommodation for books, apparatus, &c., and a permanent caretaker. There was a general expression of opinion that such premises were greatly needed in Edinburgh. Ultimately it was agreed, on the motion of Mr. J. Henderson, that the question of rooms, &c., be referred to the Council with full powers.

Mr. HUME NISBET then delivered a lecture entitled—*Camera-Lucida, Paletta Obscura, The Union of Painting and Photography*. [See page 40.] Mr. Nisbet illustrated his remarks by a number of photographs from various sources, and by rapid charcoal sketching. The lecture was listened to with marked attention, and the beautiful word-painting elicited frequent applause. At its conclusion,

The PRESIDENT said the Society was much obliged to Mr. Nisbet for his interesting and practical address, which was both instructive and suggestive. In some respects, however, he differed from what had been advanced. He was afraid that the painter who relied on photography would find that it tended to interfere with the freedom of his brush, and conduced to a mere hard rendering of details. Photography had its own province in black and white; but coloured canvas involved a different principle—the principle of selection. The details of nature were grand by their dimension; but if these were crowded into a small canvas they became paltry, not conveying a feeling of nature. The business of the painter was not to give a paltry imitation of nature, but to translate nature into art, by missing out non-essential details so as to enhance the leading features of the scene on which its character depended. In concluding he alluded to this mode of treatment in Turner's grand picture of *Loch Awe*.

Mr. J. G. TUNNY said the meeting could not separate without according to Mr. Nisbet a hearty vote of thanks for his most interesting and instructive lecture. There must be few, if any, in the audience who had not felt their souls stirred by the graphic word-pictures that had been presented. The perusal of the lecture, he hoped, would make every photographer proud of his art, and awake in each a stronger ambition to realise the ideal he had placed before him; and he hoped it would also have the effect of lessening the unconcealed prejudice that is sometimes evinced against the productions of the camera by those who use exclusively the palette and the brush.

Dr. THOMPSON seconded the motion, which was carried with applause.

Mr. J. M. TURNBULL exhibited an ether generator and Dickson's improved burner for the lantern.

Mr. J. CRIGHTON exhibited a large collection of photographs by Mr. Foster, of Coldstream. These were hung round the walls of the room, and were examined with great interest, Mr. Nisbet making use of many to illustrate his lecture.

A number of photographs by Messrs. Crighton, Matheson, Murray, and Dr. Sidey were distributed by ballot.

The attention of members was directed to the first "popular" meeting, to be held on Wednesday, the 23rd instant, and members were requested to send in their transparencies to the Curator or Secretary as soon as possible. None would be exhibited if received after the 19th instant.

After a hearty vote of thanks to Mr. Turnbull, Mr. Crighton, the contributors to the ballot, and the Chairman, the meeting adjourned, to meet again in 5, St. Andrew Square, on Wednesday, the 7th February.

PHOTOGRAPHIC SOCIETY OF IRELAND.

THE usual monthly meeting of this Society was held in the Royal College of Science, Stephen's Green, E., on Friday last, the 11th instant,—Mr. Greenwood Pim in the chair.

The minutes of the previous meeting having been read and confirmed, the following gentlemen were elected members:—Messrs. Joseph Dollard, William Rigby, J. C. King, and P. Crosthwaite.

Mr. ALEXANDER CONAN gave a most interesting account of a visit to the recent exhibition of the Photographic Society of Great Britain. He also passed round a number of copies of photographs which were there exhibited, some of Professor Donkin's Alpine views being particularly beautiful. In the discussion which followed,

Dr. PEARSALL thought that amateurs as well as professionals might learn a great deal from colour artists in the way of producing picturesque as well as really artistic pictures; for, as he remarked, often by shifting the camera a little to one side or the other and by using a little judgment in the choosing of the subject, very much better pictures would be produced than they were at present accustomed to see.

Mr. Watson exhibited Messrs. Atkinson's new camera and instantaneous shutter, kindly lent for the occasion.

The next meeting is intended to be held on Friday, the 8th February.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.

The annual meeting of the above Association was held in the College of Physical Science, Newcastle-on-Tyne, on Tuesday, the 8th instant,—Mr. James Downey in the chair.

The third annual report was read by the Secretary as follows:—

Annual Report.

Your Council have pleasure in offering to you the third annual report. The past year has been a busy and prosperous one.

Since the last report was issued, four members have resigned, and five names have been removed from the books.

The Society now numbers 81 members. Eleven gentlemen have joined during the year.

The ordinary monthly meetings have been well attended. Four outdoor meetings were held, and were very successful; Mr. Maling's kind offer of a medal contributing largely to this result.

Three practical demonstrations have been given, and two lantern demonstrations. These were highly appreciated.

The success of the Society's exhibition, held in the Central Exchange Art Gallery, was well assured—the list of contributors containing as it did the names of numerous well-known prize winners. The exhibition was highly spoken of by the local press and by the photographic journals.

The best thanks of the Association are due to the Council of the College of Physical Science for placing their rooms at our service; to the Rev. T. F. Hardwich, Messrs. Edgar Goold, Thomas M. Laws, J. B. Payne, J. Pike (two), Lyddell Sawyer (two), and A. A. Campbell Swinton for the contribution of papers; also to the President, Mr. R. Jobling, and Mr. George Bruce for acting as judges at the exhibition.

Your Council trust that a liberal supply of papers will be forthcoming at the ensuing meetings, and rely on your generous support and assistance.

J. Pike, Hon. Sec.

The Treasurer (Mr. P. M. Laws), en presenting the financial statement, said it was satisfactory, considering the severe strain there had been upon the funds, to be able to show a balance on the right side at all. Not only had the expenses incidental to the exhibition to be met, but the presentation prints for the preceding year had to be paid for. To defray the cost of the latter alone the balance from 1882 was reduced to less than five pounds. The entire cost of the exhibition was £31 1s. 5d., and when the sum realised by advertisements in the catalogue was deducted, the actual disbursement for the exhibition was £24 8s. 4d. As a set-off against these two items in the balance sheet, each member received, for 1882, a print nearly, if not quite, equal in value to his annual subscription, whilst for last year members received an exhibition ticket entitling them to a fortnight's free admission to the Art Gallery. The balance sheet shows an advance of eight subscriptions over last year, and three more were received after the accounts were audited. There were still, however, six subscriptions in arrears. All things considered, the Association was financially in a very satisfactory position, there being a small balance on the right side.

General Statement of Receipts and Expenditure, 1883.

Receipts.	£	s.	d.	Expenditure.	£	s.	d.
To Balance from last year	19	5	6	By Printing and Stationery..	7	17	3
,, Five Subscriptions from last year	2	12	6	,, ,, Association's Transactions and Rules, 1882	6	7	0
,, Seventy Subscriptions for 1883	36	15	0	,, Printing Exhibition Catalogue	8	13	8
,, Prints of the late Professor Marreco to the Berwickshire Naturalists' Field Club	1	5	0	,, Printing Exhibition Diplomas	1	11	6
,, Seven Copies *View on Tees*	1	15	0	,, Postage, Telegrams, and Envelopes	7	12	2
,, Advertisement in Association's Transactions, 1882	2	2	0	,, Expenses at Meetings and Exhibition	3	9	7
,, Advertisements in Exhibition Catalogue, 1883 ..	6	12	6	,, Attendance of College Janitors	2	0	0
				,, Reporter attending Four Meetings, 1881 and 1882	1	10	0
				,, Mr. McLeish for Presentation Prints...........	13	15	9
				,, Carriage and Packing ditto	0	12	6
				,, Exhibition Prize Medals ..	12	19	6
				,, Woodburytypes	1	5	6
				,, Balance in Bank..........	2	13	7
	£70	7	6		£70	7	6

31st December, 1883.

Examined and found correct,
E. Schumann.

The reports were favourably criticised and unanimously passed.

Mr. J. P. Gibson proposed, in eulogistic terms, a vote of thanks to the Secretary and Treasurer.

After remarks by Mr. Sawyer and the Chairman the vote was carried with acclamation, as were also thanks to the President, the Auditor, and the Exhibition Sub-Committee.

The Chairman presented to the Association, on behalf of Colonel Sheppee, a handsome portfolio.

The Secretary was requested to convey the thanks of the Association to Col. Sheppee for his useful and much-wanted gift.

The scrutineers (Messrs. T. M. Laws, Ridley, and Gray) appointed to examine the voting papers reported the result of their investigation as appended:—*President:* Col. Sheppee.—*Vice-Presidents:* Prof. A. S. Herschel and Prof. P. Bedson.—*Hon. Treasurer:* Mr. P. M. Laws.—*Council:* Messrs. Auty, Dodds, Downey, Gibson, Goold, Galloway, Payne, Maling, Ridley, and Sawyer.—*Hon. Secretary:* Mr. J. Pike, 11, Grey Street, Newcastle.—*Auditor:* Mr. E. Schumann.

In accordance with notice given at the previous meeting the Hon. Secretary moved to alter rule 61 by making the subscription for ladies 5/- per annum, and said that his object was to increase the number of members, to assist the funds, and to make the Association more social in character. Of course such lady members would receive presentation prints and be on the same footing as other members, except with regard to holding office. The motion was, after some little discussion, passed.

The adjourned discussion on Mr. A. A. C. Swinton's paper, entitled *The Past, Present, and Future of Photography in Natural Colours*, read before the Association, December 11th, 1883, was opened by the Secretary, and was sustained with much animation by Mr. Gibson, Mr. Downey, Mr. Pae, Mr. Sawyer, Mr. Laws, Mr. Swinton, and other gentlemen. At the suggestion of Mr. J. P. Gibson the discussion was again adjourned, pending the result of some promised further experiment.

GLASGOW AND WEST OF SCOTLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

A meeting of this Association was held in the Religious Institution Rooms, on Tuesday, the 8th instant,—Mr. Hugh Reid, President, occupying the chair.

After the reading of the minutes the following new members were admitted:—Messrs. Ross, Wingate, Horsefield, Bannerman, Barr, Smillie, Percy, and McKenzie.

Mr W. Snell Anderson was called upon to give a demonstration of enlarging on argentine gelatine-bromide paper. He employed an optical lantern fitted with a double-wick lamp, and made two successful enlargements from half-plate negatives. The demonstration was watched with interest by a large number of members.

Mr. J. Parker was then asked to explain his sky-shade, which, he said, he had pleasure in doing on that occasion in order to call attention to an improvement that had been made on it by Mr. Skinner. The improvement consisted in replacing the brass collar fitting the hood of the lens by a strong rubber band, by which means the shade could be fixed to any size of lens. In reply to the President, he (Mr. Parker) said that the exposure, when using the shade, was about doubled.

The British Journal Photographic Almanac and *Year-Book*, presented by the respective Editors, were laid upon the table.

It was intimated that at the February meeting Mr. T. N. Armstrong would give a demonstration of transparency-printing and mounting on glass.

Votes of thanks having been awarded to Messrs. Anderson, Parker, and the editors of the annuals, the meeting was adjourned.

BRISTOL AND WEST OF ENGLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

The deferred annual meeting was held on Saturday, December 1st, at the Association Studio, Portland-street, Kingsdown,—Mr. T. Davey, Vice-President, in the chair. The previous meeting's minutes having been confirmed,

Mr. E. Brightman, the Treasurer, read the accounts and balance-sheet, which showed the Association to be in a healthy financial condition. The accounts were audited by Messrs. Boyden and Phillips.

Mr. H. A. Hood Daniel, the Honorary Secretary, stated that the next business was the election of officers.

Colonel Playfair suggested that it might save time to re-elect all the officers together; but as there seemed to be a feeling that it would be better to elect each officer separately,

Mr. J. Phillips said he felt much pleasure in proposing the name of Mr. T. Davey, one of their Vice-Presidents, as President for the ensuing year. He thought that it would be impossible to find one of their members who took more practical interest in the Association than Mr. Davey, who was almost always present to preside over their meetings, and as it was he who nearly always did preside he did not think they could do better than elect him as their official President.

Mr. Boyden said he had very much pleasure in seconding Mr. Phillips's proposition, which, on being put, was carried unanimously.

The Honorary Secretary stated that there were now two vacancies to fill, namely, the Vice-Presidents.

On the motion of Messrs. Boyden and Phillips, the Rev. W. J. Whiting was re-elected; and, on the motion of Messrs. Davey and Brightman, Colonel Playfair was elected to the other vice-chair.

Mr. Davey proposed the re-election of Mr. Edward Brightman as Treasurer, and he did not think a more satisfactory banker could be found; for, although the Association paid its way, as every respectable institution should, still there was of course sometimes a cash balance against the Treasurer, and the way in which Mr. Brightman bore it was most exemplary.

Colonel Playfair had much pleasure in seconding the proposition, and did not think the accounts and funds of the Association could be in better hands.—Carried *nem. con.*

The re-election of Mr. H. A. Hood Daniel as Honorary Secretary (if he would once more accept the duties, which were not light, but such as to occupy a great deal of time) was proposed by the President in eulogistic and complimentary terms, and, on being seconded by Colonel Playfair, was carried *nem. con.*

One of the existing vacancies in the Council was filled by the election of Mr. J. Phillips.

The meeting then formed itself into Committee and discussed the extensive arrangements requisite to be made for the successful carrying out of the International Photographic Exhibition, with regard to which the report given by the Honorary Secretary was of a very satisfactory nature, especially with reference to the number of foreign exhibits and the gentlemen who had kindly signified their willingness to act as jurors.

At the conclusion of the meeting the Honorary Secretary expressed a hope that every member who could would do his utmost to contribute a paper or communication of some sort during the session.

LEEDS PHOTOGRAPHIC SOCIETY.

THE usual monthly meeting was held on Thursday, the 10th inst.,—when the newly-elected President, Professor Thorpe, F.R.S., presided. There was a very large attendance. In delivering his presidental address,

Dr. THORPE said:—It is unnecessary to take up your time by recalling the circumstances which have led to the formation, or rather to the reorganisation, of the Society. I would merely say that the extraordinary development of photography in these latter-day dry-plate days, and the extent to which the art is intelligently practised by scores of people in this district, to whom it is the chief delight and occupation of their leisure hours, have seemed to many of us to afford sufficient reasons for the establishment of a society on an independent basis and with an independent existence. We have every reason to believe that our confidence in the vitality of our Society is well founded. At present it numbers upwards of fifty members, and includes, I think, the names of most well-known amateurs in the district, and not a few of our leading professionals. Justice, however, should be done to those who have preceded us in our efforts to create a society here which has for its object the furtherance and development of the art. Leeds was amongst the earliest of the provincial towns in which the process of Daguerre gained a local habitation and a name, and to the late Mr. William Huggon must be given the credit of being the first resident portrait photographer in our town who taught and otherwise spread a knowledge of the process. More than thirty years ago a small band of enthusiastic workers centered round our Vice-President, Mr. J. W. Ramsden; but the Society seems to have become merged into a general scientific society, the photographic section of which lost its existence on the creation of the Photographic Society of London. Under the leadership of Mr. Washington Teasdale the Leeds Society was resuscitated about two years ago as a section of our local Natural History Society, and from this has sprung our present body. I have observed that it is a common practice of the Chairman of the initial meeting of a photographic society to give a more or less succinct account of the rise and progress of the art from the time of Robert Boyle, who first observed that silver chloride darkened on exposure to light, down to the present day. I trust you will agree with me, however, that this is a custom which, on this occasion at least, will be more honoured in the breach than in the observance. I would prefer to say a word or two on what I conceive to be the functions and uses of a society such as ours. Primarily we are, of course, a mutual improvement society. One of our main objects is the dissemination amongst ourselves of knowledge of all matters relating to photography. We meet to exchange ideas and opinions and to give and solicit information respecting such of the various branches of photographic work as our members have been or may be engaged upon. There are, as you are aware, various modes by which this object may be secured, such as exhibitions, *conversazioni*, lantern exhibitions, short papers, the question-box, &c. There is, however, one other function which it appears to me a society such as this ought to have if it would make any pretension to be a photographic society in a real sense. We should never lose sight of the fact that of all the pictorial arts photography has the most direct and immediate connection with physical science. Photography is essentially a branch of applied chemistry and physics. Everybody, of course, recognises this, but from what I can gather from a perusal of the contributions to our various metropolitan and provincial societies and of the discussions which follow them, as these are reported in the photographic journals, all is not done that might be done towards the solution of many of the problems which are essentially connected with the scientific or, rather, the theoretical side of photography. Let me take an example: it is known that a gelatino-bromide plate after exposure will, if kept in the dark, gradually lose that impress which we call the "latent image," so that after a certain length of time it may be re-exposed without a trace of the original impression being visible on treatment with the developer; but, practically, nothing is known of this phenomenon beyond the fact, and yet a dozen questions instantly suggest themselves in connection with it. It would be interesting, for instance, to determine the conditions under which the destruction of the latent image occurs. Is there any connection between the length of time and the sensitiveness of the plate? Do all the haloid salts of silver exhibit the same phenomenon and to the same extent? I have no doubt whatever that a systematic examination of this problem would afford us a great amount of information concerning the true theory of the formation of the latent image, and would, in all probability, have important practical consequences on the preparation and development of gelatine plates. Again: can anybody say that the true theory of the conditions which determine sensitiveness is accurately known? We have learned by practical experience that one among several possible conditions is prolonged heating of the emulsion; but is anybody prepared to say that he accurately knows what this means? Now, this question of sensitiveness is certainly susceptible of being resolved by systematic attack. No doubt, in this special case, the problem presents considerable experimental difficulties; but I should imagine, on trial, it would be found to quickly resolve itself into two or three comparatively simple issues. But there is no lack of questions relating to the scientific, and especially the chemical, side of photography—many of which are possibly simpler in character and admit of more ready solution than that of sensitiveness—which await answer. Now what, therefore, I think this Society might usefully do, among other things, is to try and cultivate the scientific and experimental side of photography. No doubt some of the problems which might be started would require the resources of a well-equipped chemical laboratory to solve them; but there are a large number of others which might be attacked by the apparatus and chemicals ordinarily found in the work-room of a photographer. The number of scientific workers in photography is really very small, and yet all the great advances in the art are due to their labours. The field is by no means exhausted; indeed, I do not know any branch of applied chemical physics which seems to be so rich in promise to the intelligent worker. But I am quite aware that there are many, and no doubt the majority, who approach photography from an entirely different standpoint; they are attracted to it simply from the artistic side or, if you like, from the pictorial side. Others, again, take up photography as a helpmate to their other work. The biologist concentrates his energies on microphotography, and the lecturer on physical science cares only for the production of lantern transparencies. No doubt those who regard photography solely from the artistic point of view, and whose main object is to get striking or brilliant pictures, will have little active sympathy with the scientific aspect of their work. It is a perfectly trite observation that the scientific and artistic perceptions are rarely united in the same individual. It is probably from this cause that the scientific side of his business is so generally neglected by the photographer. But we welcome the artist and the specialist with no less cordiality than we do the man who attempts to throw light upon the occult mysteries of our art. To some there is, no doubt, as much mental satisfaction in tackling with success an awkward or a striking "bit" of landscape, or in recording an admirable piece of composition in a technically perfect manner, as there would be in the discovery of a new fact. To such our Society offers the promise of the fullest appreciation; and even on this side of its work I hope our Society will bear permanent fruit. Why should we not attempt by our joint efforts to illustrate our county in a manner that has never been attempted before? Few counties in England are richer in natural beauties than Yorkshire, and certainly none is richer in historical associations. It would surely not be beyond our powers to attempt from time to time the publication, or at all events the distribution amongst ourselves, of a set piece of illustrative work. Work of this kind, if gone about in a systematic and intelligent manner, might have considerable historical value, and our efforts might not only contribute to the satisfaction of ourselves and to the pleasure of our friends, but be of service to those who come after us.

The address was very warmly received, and at its conclusion Messrs. Teasdale, Ramsden, Branson, &c., joined in the discussion.

The following exhibits were made:—Multiplex camera back, by Messrs. H. and E. J. Dale, London; portable camera as used thirty years ago, by Mr. J. W. Ramsden; instantaneous shutters, by Mr. A. A. Pearson; a carrier for lantern slides, a universal joint for camera finder, a series of fifteen gelatino-chloride plates showing gradation of colours from black to ruby (own emulsion), by Mr. T. W. Thornton; lantern slides, by Mr. W. Denham and Mr. W. Teasdale; and silver prints, by Mr. H. Rodwell.

The following questions were taken from the question-box and suitably discussed:—1. Is the presence of ferric oxalate any advantage in the ordinary ferrous oxalate developer?—2. Is there any disadvantage in using the hypo. bath for fixing after it has become discoloured from constant use?—3. Is there any advantage in using alum in the fixing bath for gelatine plates?

The meeting was shortly afterwards adjourned.

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION.

THE fourth regular meeting for the present season was held on Thursday, the 3rd inst., in Lamb's Hotel. There was a good attendance, about forty members being present. In the absence of the President, Mr. G. D. Macdougald occupied the chair.

The minutes of last meeting having been read and approved, the seven members proposed at last meeting were admitted, the membership now numbering close on 100. Four new applications were handed in.

Mr. JOHN THOMSON read an interesting paper on *A Question in Photographic Optics*, which was listened to with attention, and a hearty vote of thanks was passed to Mr. Thomson.

Mr. Magnus Jackson, Perth, sent a number of pretty snow scenes, which were much admired.

Some time ago it was suggested that a dark room be fitted up in connection with the Society for the use of those members who might not be able to have a dark room at home, and Mr. J. C. Cox, President of the Association, made a handsome offer to the Society to get a suitable room fitted up at his own expense. This has now been done, and a room in Reform-street will shortly be opened, those members wishing to avail themselves of it paying five shillings per annum. The dark room has been fitted with sinks and gas and water connections, and it is expected it will be taken advantage of by a large number of the amateur members.

The next popular evening is to be held in the Y.M.C.A. Large Hall on Wednesday the 30th inst. Subject: *A Tour in Bavaria and the Tyrol*, by the Secretary, Mr. D. Ireland, Jun., illustrated by about seventy photographic lantern transparencies.

HALIFAX PHOTOGRAPHIC CLUB.

THE monthly meeting of this Society was held on Tuesday, the 8th inst.,—Mr. T. Birtwhistle, President, in the chair. The ordinary business of the evening was postponed to enable the Chairman to introduce the subject of the proposed exhibition.

After a lengthy discussion as to the rules to be observed, the number and classes in which prizes should be offered, and the question of the jury considered—all of which were satisfactorily settled—it was unanimously decided that the exhibition should be held as early as arrangements could be made, and a committee of management was appointed to settle all details.

The question-box was found to contain the following query:—The opinion of the Society is solicited as to the relative merits of ferrous oxalate on the one hand, and alkaline pyrogallic on the other, as developers, more especially bearing on the latitude each afforded for meeting the extremes of over- and under-exposure.

Mr. ILLINGWORTH, Mr. DAVIES, and Mr. SMITH (of Sowerby Bridge), in offering their opinions as professional photographers, concurred in giving preference to the alkaline pyro. developer. Their experience was that if the exposure were not finely hit upon there was a great difficulty in producing a good negative, and the loss of time involved under such circumstances meant to professionals money as well as inconvenience. When a plate required forcing the results would be harsh and hard. Mr. Illingworth was, however, able to counteract this evil, to a certain extent, by reducing the ferrous salt and increasing the oxalate of potash. He was also under the impression that up to a certain point an under-exposed plate developed quicker with ferrous oxalate than with pyro., but, beyond this, much slower. Pyro. certainly held the palm when taken as an all-round developer.

Mr. J. E. JONES believed that when strong contrasts of light and shade were desirable—*à la* Rembrandt, for instance—ferrous oxalate was the best; but he pinned his faith to pyro. for general purposes.

Mr. E. GLEDHILL liked pyro. best, because of the greater latitude it afforded by modification; however, when good blacks were required, as in the case of transparencies, then ferrous oxalate was to be recommended.

Mr. BULMER had heard a great deal said about pyro. staining; but he could get as clean and bright negatives with pyro. as it was possible to do with ferrous oxalate. Most advocates of the latter principle made much of this evil; but in his experience stains could be produced with any developer if not used intelligently. He was not prejudiced in giving this opinion, but he preferred pyro. on account of the great power it afforded for regulating the character of the negative.

Mr. COUNCILLOR SMITH well knew there would always be exponents of, or advocates on, both sides of the pyro. and iron question, and it was only natural that parties should stand up for the one that pleased them the most. He would point to the striking fact that on the continent ferrous oxalate as a developer reigned almost supreme, being used by a large body of workers eminent in their profession. There could be no question that France, Germany, and Italy could compete favourably with the very best results produced in England; and he was sure the iron developer was not properly appreciated on this side of the channel because it was very imperfectly understood. One of the chief causes of failure was attributable to development being stopped too soon. He allowed the action to proceed until all trace of a picture became lost to sight. When viewed by reflected light, in fact, the plate should appear dense to blackness. When fixed such pictures would be found to possess all the qualities necessary for a good negative. Possibly many who tried the ferrous oxalate in its early days, being a new thing and almost an innovation, put it aside condemned without sufficient trial, and he felt confident that if it had received anything like the same amount of study or attention bestowed upon pyro. it would today have held the place of honour in the first rank of developers. As regards latitude, he claimed for it everything that could be conceded for the alkaline method. Dr. Eder, and other eminent scientists, distinctly stated that any amount of latitude was obtainable, and if he (Mr. Smith) erred in this, his own, conviction, it was one consolation he did so in distinguished company. Dr. Eder's concentrated iron developer certainly gave as much latitude for forcing as ammonia did, and that without its drawbacks. Mr. Williams once made the suggestion that two plates of the same description should be exposed, or, rather, under-exposed, and afterwards developed with pyro. and iron respectively. If this were carried out, he (Mr. Smith) was confident the sequel would be the means of removing much misconception. The proportions he generally adopted were one part of a saturated solution of iron to four parts of saturated solution of oxalate of potash, varying at times from one to three. He began development by using very little iron, gradually increasing the quantity as development proceeded, removing the plate as each addition was made. For bromo-argentic paper he used half-an-ounce of iron solution to three and a-half ounces of oxalate, added to about twenty-four ounces of water. Referring to Mr. Gledhill's remarks, he (Mr. Smith) thought the colour of a transparency depended as much on the character of plate used as on the developer. He had obtained beautiful warm brown tones with ferrous oxalate. He had tried Newton's soda developer, but had not succeeded in getting negatives free from a yellow cast of stain, which deepened if any forcing was attempted.

The CHAIRMAN agreed with all Mr. Smith had said in favour of the iron developer. It was a magnificent discovery, and he believed it to be the developer of the future. He was at a loss to account for so much conflicting evidence, for he had never found it weak or wanting, although he only used one part of iron to eight of oxalate. He liked slow development, often getting the best results by first bringing out the details with an old and almost worn-out developer, and finishing off with a new one. He believed the real meaning and bearing of a "saturated" solution to be only imperfectly understood, and did not think the mere dissolving of the oxalate or iron until crystals remained deposited was a saturated solution, giving the greatest concentrated developing energy possible. The addition of citric acid was a grand step forward, altering all this wonderfully. If both solutions were not perfectly saturated a precipitate would be the result of bringing them together, to the sacrifice of developing energy.

Mr. W. C. WILLIAMS, while acknowledging he had not given Dr. Eder's modified developer a trial, conceded a high place to ferrous oxalate. Still he felt bound, by past experience, to give his unprejudiced verdict in favour of alkaline pyro. He agreed with the previous speakers who attributed a greater latitude to the latter; but although this was a great power to recommend a system, he was afraid, however, that undue prominence had been given to this aspect of the question, while the quality of results had to some extent been lost sight of. He believed that iron had a stronger proportionate affinity or energy for developing the higher lights, and rapidly bringing these out, than for parts acted upon more feebly by light, and, consequently, a want of roundness followed its use. With pyro., the conditions being different, the high lights and deep shadows are brought forward more in harmony with one another, a wider scale of light and shade following. This irregularity of action, or special affinity, as he termed it, was also marked in other chemical operations in connection with photography. He quite agreed with the Chairman as to slow development, but always liked to complete this part of the process on the "same day of the month" it was commenced, which did not happen on one occasion when using ferrous oxalate. When using pyro., and under-exposure was suspected, a preliminary soaking of the plate in a four-grain solution of pyro. having the least possible trace of ammonia, but no bromide, previous to development proper, would be found advantageous. And, again: soaking the plate in the ammonia solution for some time, and, after washing, soaking in pyro. having a trace of bromide after well washing, is another good plan. For many years he had used glycerine and water to soak plates in (glycerine two parts, water twenty) for about ten minutes before developing. This prepared them for the even and rapid action of the developer to the back of the film, and so tended to reduce the amount of ammonia used. He gave it as his opinion, however, that no amount of dodging or patience ever made either an under- or over-exposed negative a good one.

The thanks of the Society was then passed unanimously to the proprietor of THE BRITISH JOURNAL OF PHOTOGRAPHY for the Journal forwarded during the past year, and for the current ALMANAC. Also to the *News* for the *Year Book* to hand.

A very instructive evening was then brought to a close.

Correspondence.

RECOVERING SILVER FROM OLD COLLODION FILMS.

To the EDITORS.

GENTLEMEN,—Having noticed in last week's Journal an inquiry as to whether collodion films washed off old negatives are of any value, and thinking it may interest some of your readers, I venture to give my experience.

I cleaned some hundreds of negatives with common washing soda and water, boiled down the residue in an iron pot, and heated till red hot; then smelted in a clay crucible, till white hot, for half to three-quarters of an hour. I then removed it from the fire and let it cool for ten minutes or so. Wishing to cool quicker, I immersed the pot in a bucket of water, and in about twenty seconds it began to give indications of trouble. I then made myself "scarce"—not any too soon, as a most violent explosion took place, rending the iron bucket and blowing it out of shape, actually making holes in the iron.

This, in my opinion, is rather a dangerous experiment, and, considering I had only about a pound of residue (including a good percentage of soda), what might the consequences have been with more? I have since reduced successfully a portion of the same residue, by mistake omitting the cold water bath.—I am, yours, &c., FREDK. T. WEBB.

11, *Portland-place, Wolverhampton, January* 15, 1884.

A CORRECTION.

To the EDITORS.

GENTLEMEN.—Allow me to correct an error inadvertently made by me in your issue of last week regarding Mr. A. Cowan's gelatino-chloride plates. I said in that article that the *manufacture* of these plates had passed into the hands of Messrs. Marion & Co.; but Mr. Cowan kindly informs me that the *business arrangements only* have passed from him, and that, as I understand, Mr. Cowan himself continues to prepare the plates. In future, therefore, time and trouble will be saved by applying to Messrs. Marion and Co. direct for these plates.—I am, yours, &c., ANDREW PRINGLE.

Craigcleugh, January 16, 1884.

PHOTOGRAPHIC EXHIBITIONS.

To the EDITORS.

GENTLEMEN,—I think with Mr. E. Dunmore that there is much necessity for revisal of the present method of treating the pictures sent to photographic exhibitions; although, had the matter not been immediately on the *tapis*, it was not my intention to allude to the following case in point.

At the request of the Secretary of the Newcastle-on-Tyne Photographic Association, I promised to send to their last exhibition half-a-dozen pictures which I had then at Pall Mall. As there was very little interval between the closing of the latter and the opening of the Newcastle display, it was only with considerable expense and trouble that I got them to the exhibition gallery by the first hanging night. As I was in Newcastle at the time I took my pictures there personally, and the exhibits were just beginning to be arranged when I arrived. I drew the attention of one of the Hanging Committee to them, and explained to him that, while I had no intention of biassing his judgment as to *where* my exhibits were to be hung, yet I had arranged the subjects, taken them, and framed them all with a view to their being companion pictures, and I should be glad if he would allot them a place together in the ample space at his command. His reply was worth noting. He said that *he* saw no reason for their being hung together, and, besides, he could promise no such thing, *as there might be odd spaces which they would help to fill!* Accordingly, this gentleman in a few minutes afterwards proceeded to fill a couple of these same odd spaces with two of my pictures, and I am convinced that the other four were only saved from a similar fate through the intervention of one or two others of the Committee.

I do not wish to allude to the discourtesy of this gentleman, so I shall keep my opinion to myself. But I should like to ask if the system is not deserving every censure which makes it a case of sheer chance whether the efforts of the essayist receive scant justice or are worse than rejected; for, to see all the subtleties with which he has endeavoured to breathe art life into the (in itself) inanimate photography wantonly shattered at the pleasure of the unthinking or incompetent hanging committeeman, is surely death to those noble ambitions and efforts which do more than all besides to elevate photography to a prouder position.—I am, yours, &c.,

Victoria House, Upper Bedford Place, W.C. LYDDELL SAWYER.

January 15, 1884.

MR. ANDREW PRINGLE AND "GELATINO-CHLORIDE FOR TRANSPARENCIES."

To the EDITORS.

GENTLEMEN,—In the Journal of last week I read with much interest Mr. A. Pringle's article on *Gelatino-Chloride for Transparencies*, and thank him for it. Yet there are in that article one or two things I should like to comment upon.

He says he does not recommend gelatino-chloride plates for camera work, but exposes in *contact* with a negative, and an unvarnished one by choice. I should like to ask him by what means he retains them in contact (say a 10 × 8 negative) in a pressure-frame? Seeing how many good negatives there are on gelatino-bromide plates, the glass of which is so uneven that it is a risky affair to print them with silvered paper, how much more in contact with another glass! Would that be advisable? And, again: how would he manage an unvarnished collodion negative?

I agree with him that a positive on glass far transcends a positive on paper, and, there is little doubt, would meet with a ready sale. Yet I would ask him—Would it be advisable for a photographer, who having at considerable cost of time and labour secured a good negative, to sell glass transparencies from it, thus putting it in the power of others to reproduce negatives from it, and it might, and probably would, enable them to compete with him in the market?—I am, yours, &c., DEMARR.

January 15, 1884.

A TRADE QUESTION.

To the EDITORS.

GENTLEMEN,—I am informed that a large wholesale firm of dealers in general photographic materials has entered into arrangements with a well-known West-End co-operative stores to supply them with finished enlargements, which are retailed by the stores at an advance of 4s. on the wholesale price charged to the members of the profession. Now I should like to ask the profession if they think that a wholesale house is acting fairly by them, in thus indisputably taking away their most profitable work?

If my information be correct, I should surmise that photographers will not care to deal with those who, not satisfied with doing a wholesale business, seek to undersell the whole profession in this and, I firmly believe, in every other branch of our business.—I am, yours, &c.,

January 14, 1884. X. Y. Z.

PHOTOGRAPHY IN ITALY.—In the course of an article on *Travels in Search of Sunshine*, the *Daily Telegraph* speaks as follows of the state of photography in Italy:—But the mild climate and society-loving patrons of the Roman season are a very different class from the sightseer, and these again may be divided into two sections. The first I may call the flying sightseers, the second the sedentary ones. The former gallop through the city, so to speak, rushing literally from pillar to post—from St. Peter's to the Lateran, from the Pantheon to St. Paul's without the Walls, from the Coliseum to the Baths of Caracalla, from the Tomb of Cecilia Metella to the Catacombs, from the Forum of Trajan to the Vatican, from the Ponte Molle to the Pyramid of Caius Cestius. "The Capital," once significantly remarked Pio Nono, in a political harangue, referring to the seizure of Rome by the Italians, "is close to the Tarpeian Rock." The flying sightseers "do" the Campidoglio, its museum, the Church of the Ara Cœli, and half a dozen more churches to boot in the course of a single morning; and when you meet them in the evening at the *table d'hôte* they enumerate the achievements of the day as though the sights which they had seen were so many scalps ravished by ruthless tomahawks from inimical skulls, and to be dried and hung up as trophies in their lodges in the far distant West. Other substitutes for scalps do they find in the amazing number of photographs which they purchase. Commercially, I should say that a photograph all the world over is an article which can be produced at the cost of about a penny, and which is sold at from a shilling to eighteen-pence. Somebody must be making a vast fortune every year by the sale of Roman photographs. They beat the Neapolitan ones—those of Pompeii excepted—most signally. The Bay of Naples does not photograph well, and Vesuvius under the sun's pencilling comes out but poorly. The modern architecture of Neapolis is uninteresting; the huge Royal Palace resembles a barrack; the façade of the San Carlo is vast, but not imposing; and the exteriors of the churches are naught. The costume of the people is as deplorably ragged as ever, but it has ceased to be picturesque. But at Rome everything, with the exception of the staring brand new houses in the Via Nazionale and the new quarter of Macao is worth photographing. There are said to be 11,000 rooms in the Vatican; and, could they be all photographed, I have little doubt that customers could be found for prints of every *loggia* and every *stanza*. It is pleasant to think of so many thousands of these photographs—ruins, churches, palaces, aqueducts, obelisks, fountains, tombs, pictures, and statues going to embellish the apartments of brown-stone houses with marble façades at Chicago or on "Nobs' Hill," San Francisco; but at the same time the artistic sense grows a little wearied when in the most frequented streets of Rome every other shop seems to be one for the sale of photographs. The Romans, however, may with justice plead that photograph selling is extremely profitable. A Roman shawl of brightly-dyed silk, a Roman bronze of the Triumphal Augustus, and Roman jewellery and mosaic work, cannot, I should say, be sold at a profit of more than 150 per cent. But a much wider margin of gain is presented by the photographs, which in such astonishing profusion are vended to the flying sightseers.

Notes and Queries.

I HAVE frequently seen reduced etchings of large engravings executed in a nice, open style. I should greatly like to know by what means they are produced.——PHOTOTYPER.

HAVE working directions for preparing extra sensitive collodion emulsion plates by Newton's process ever been published by that gentleman in America or elsewhere? And will any one who is conversant with its details kindly afford a little information?—GEO. S. KING.

G. B. B. inquires:—"Is there not an omission in the No. 4 formula for the dusting-on process on page 227 in the ALMANAC for this year? Ought there not to be some water?"——In reply: It will be found to be all right by the addition of an aqueous solution of bichromate of potash—one ounce of the salt in a pint of water.

DEAR SIR,—I have several pupils in photography, and the method I recommend them to adopt is to bring their negatives to me, and I then develope them in their presence. You may guess the erratic exposures that they sometimes give, and I often feel at a loss when one negative, perhaps, will scarcely come up with any amount of forcing, while the next springs into existence at once. The former class take care of themselves, but the latter do not. What is the best plan to adopt in developing that, without losing too much time, I may get through a good number of plates in a reasonable time, and yet not lose the grossly over-exposed ones? If any of your readers can help me I should be much obliged.—TEACHER.

A. B. asks:—What is the best way of utilising plates exposed to full light by custom house officers or others? Will bichromate of potash, weak chlorine water, or weak acid nitrate of silver render them useful for any purpose whatever? He also asks:—Will any substances but alum harden gelatine; which other substances produce no opaque precipitate with hyposulphite of soda or anything contained in ordinary pyrogallic developer?——In reply: We should like to have the opinions of any correspondents who have acquired a practical acquaintance with what we may term the art of de-illuminating dry-plates, either by treatment with a solution of bichromate of potash or otherwise. We have employed this solution with good effect, but never yet in a manner sufficiently systematised to warrant our writing concerning its advantages.

THE best way for X.Y.Z. to satisfy himself as to the existing non-necessity for having his glass interposed at a right angle to the direction in which the light falls upon the sitter, is to hold up in front of him a clean plate of glass and examine any object, such as a piece of printed matter, through it. When it is held quite squarely the light upon the paper is seen at its very best; but if he turn it in a slanting direction he will not fail to observe that a very considerable deviation from perfect squareness takes place before any diminution in the amount of light transmitted can be observed. This, I think, affords X.Y.Z. an answer to his query.—J. H. F.

WITH reference to the degree "Ph.D.": it is not at all necessary for "Aspirant" to incur any trouble or expense connected therewith if he be serious in regard to the alternative intended by him. He has merely to affix the letters to his name in the absolute certainty of no one putting himself to the trouble of investigating the truth or falsity of the claim. There is no moral difference between adopting this course and that of giving twenty pounds to the agent of the Philadelphia bogus diploma manufacturer who was lately "run to earth" by the local police for his practice in "degrees" *in absentia*. Why should not "Aspirant" aim a little higher and dub himself "Professor" or "Colonel" or even "General," according to use and wont in certain countries of the world?—M.A., (Oxon).

Exchange Column.

I will exchange a powerful binocular field glass for a bellows-body camera or anything useful in photography.—Address, PHOTOGRAPHER, Fore-street, Abingdon, Berks.

Stoves: George's patent gas calorigen, £3 3s., for £2, tortoise slow combustion, cost £2, for 30s., or exchange; used three months only.—Address, G. P. ABRAHAM, Keswick.

Wanted, in exchange for a pair of short focus rectilinear lenses, by a good maker, a 5 × 4 camera, for dry plates, with double backs.—Address, F. W. DEW, Norton-street, Jesson-street, Coventry.

I will exchange a splendid dark tent, on wheels, for anything useful in photography; camera and lens preferred; difference in price adjusted.—Address, J. LEACH, Dolgelly, Merionethshire, N. W.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

Vero—Write to Messrs. Marion and Co. They supply the Warnerke sensitometer.

N. Solter.—About a drachm of the emulsion to each quarter-size plate will be sufficient.

Charles G. Williams.—You do not say what surface you wish to sensitise, so how is it possible to answer your query?

J. Wagstaff.—It is clearly the fault of the limes; they are very inferior. Procure another sample, and from a different source.

J. H. Reinhold (Cincinnati, U.S.A.).—Thanks for seasonable greetings and good wishes. Your instructions shall have attention.

W. H. Sherman (Milwaukee, U.S.A.).—Your instructions shall be carried out. Thanks for your high opinion of our journalistic labours.

A. Venic—If you send the prints to us, together with one-and-sixpence for each one, in postal orders, we will effect the registration for you.

A. B. C.—See The British Journal of Photography for July and August, 1879. We cannot, in this column, devote the space to giving lengthy formulæ.

Victoria.—If you do not know a member of the Society who will propose you as a member write to the Secretary, and he will doubtless propose you for membership.

George B.—Although the mount bears the name, the glasses were not made by that optician. The mount is genuine; the lenses not. The lens is returned by parcels post, as requested.

R. R. Burrows.—You will find a solution of the perchloride a far better and more agreeable etching fluid for copper than nitric acid. Try it, and you will find several of your troubles disappear.

W. Rubens (Elberfeld).—The instructions and copies of advertisements have reached the Publisher, but not the remittance referred to. On receipt of the latter (if found sufficient) the order will be carried out.

A. S. Sexton.—Ordinary enamelled paper, such as that employed by lithographers, will answer quite well. Messrs. Spicer Brothers, Bridge-street, will supply it. Get the hardest that is made, as that will answer best.

Oliphant.—Better purchase a cheap manual on electrotyping. That will give you all the information you require. We cannot afford sufficient space in this column to give such practical details as would be of assistance to you.

H. Couch.—1. Try filtering the emulsion more carefully, having previously allowed it to stand for a quarter of an hour in hot water. This will frequently prevent the formation of the "scum."—2. The method is equally adapted for the preparation of slow plates. Boil for a shorter period, and either add ammonia or else bring the silver and bromide in the emulsion as nearly as possible to the point of neutrality, when the silver bromide will subside very rapidly.

R. D. N. B.—1. The lens will do quite well.—2. All will depend upon the density of the negatives. No definite time can, of course, be given.—3. A formula is supplied with the paper; you had better keep to that.—4. Either way, according as you require a correct or reversed position.

M.—The slight yellow stain on the negatives will not interfere with your producing good transparencies from them suitable for the lantern; that is, if they, as you say, produce good and brilliant prints on paper. The only disadvantage of the stained film is that a slightly longer exposure will be necessary.

Pyro.—All will depend upon how you effected the reduction with the perchloride of iron. If you treated the negatives with hyposulphite of soda after the perchloride, we fear you will not succeed very well. Try intensifying with silver in this case. If the hypo. were not used then ferrous oxalate will doubtless answer quite well.

T. Clarke (Brighton).—We have distinctly stated, on several occasions, that the Publisher is not—will not be—responsible for specimens enclosed to advertisers in these pages. He has interested himself before in order to have specimens returned—sometimes successfully and at other times unsuccessfully. He will endeavour to trace those alluded to by our correspondent, and, if possible, have them returned.

H. N. Bates.—1. The *data* are too slight to enable us to form an opinion. Try longer boiling.—2. The emulsion should give a clear picture immediately after boiling, though frequently a slight veil may be present at that stage which clears off afterwards.—3. The means you have adopted seem to be suited to the purpose. See the report of the last meeting of the London and Provincial Photographic Association.

A. C. M.—1. Plain collodion may be used as a makeshift; but it should be of a very porous character. You will find it best to employ what is recommended.—2. Yes; the film is very hard indeed.—3. The plates will keep for years if kept in a dry place. If, in place of employing opal glass, you had used ground glass, you would have found it answer the purpose, and with this additional advantage a shorter exposure would have been required.

R. W.—1. The same form of condenser employed in the ordinary lantern. They may be had of any diameter up to eighteen or twenty inches.—2. The use of the condenser is to concentrate the light. If you dispense with the condenser and substitute ground glass, you will have to give a much longer exposure.—3. The distance of the light is dependent upon the focus of the condenser.—4. An ordinary concave reflector may be employed.—5. The oxalate of potash will keep in solution. The iron undergoes a change by keeping.—6. Yes; to get the best effects.

E. Yeoman.—The proportions of your present studio appear to be very good, except, perhaps, it may be a little too high. If you had stated the aspect of the building it would have been better. Certainly, from the photograph, we can see no reason why portraits taken in such a studio should be hard, as we should imagine that in a room such as you at present have, any effects of light and shade could be produced with a little management of the blinds. It is more a question of lighting the model than the construction of the studio in this case. If in the new studio you make the roof lower, we should advise you to have the same amount of light stopped off at the ends as at present. The prints enclosed are very nice, indeed.

In Type.—Communications by W. E. Debenham; Herbert S. Starnes; G. H. Martyn; A. Donald; "Free Lance."

Photographic Society of Great Britain.—The next monthly technical meeting of this Society will take place on Tuesday next, the 22nd instant, at 8 p.m., at the Gallery, 5a, Pall Mall East.

Photographic Club.—At the forthcoming meeting of this Club, at Anderton's Hotel, Fleet-street, on Wednesday next, the 23rd inst., the subject for discussion will be—*On the Production and Use of Sky Negatives.*

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician,
For two Weeks ending January 16, 1884.
These Observations are Taken at 8.30 a.m.

Jan.	Barometer.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max. Shade Temp.	Min. Tem.	Remarks.
3	29·97	SW	49	49	—	52	38	Raining.
4	30·05	SW	49	48	—	52	47	Overcast.
5	30·06	S	49	48	—	50	46	Overcast.
7	29·99	W	45	44	—	49	44	Hazy.
8	30·23	W	41	39	—	50	37	Cloudy.
9	30·32	W	46	45	—	50	39	Cloudy.
10	30·47	W	46	44	—	53	44	Cloudy.
11	30·06	W	47	45	—	51	43	Cloudy.
12	30·42	NW	39	37	—	45	35	Overcast.
14	30·47	W	44	42	—	52	41	Overcast.
15	30·59	N	49	47	—	53	42	Overcast.
16	30·66	NE	40	40	—	42	39	Foggy.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1238. Vol. XXXI.—JANUARY 25, 1884.

POTASSIUM BICHROMATE AND THE UNDEVELOPED IMAGE.

In our *Notes and Queries*, last week, an inquiry as to the best means of utilising sensitive plates spoilt by accidental exposure to light induced us to make a few systematic experiments in connection with bichromate of potassium upon plates which had received various exposures to light. The results arrived at are sufficiently interesting to be placed on record.

Captain Abney was the first to point out that most oxidising agents act as destroyers of the latent or undeveloped image—notably bichromate of potash, ozone, nitric acid, and permanganate of potash. With gelatine plates the first of these is, for various reasons, the only one which is practically applicable, though with collodion films we have proved the correctness of Captain Abney's observations. Our experiments were, therefore, confined to the bichromate.

For some time it has been the practice of many emulsion workers to submit the solidified emulsion, at a certain stage of its preparation, to the influence of a ten-per-cent. solution of potassium in order to remove any chance veil or fog arising from stray light in the preparing room. This purpose it, no doubt, answers admirably, and it has come to be believed that bichromate is capable of entirely undoing the action set up by light—a view which, so far, our experiments go far to contradict.

The first experiment was made by exposing one half of a plate to diffused daylight, in an ordinary room, for three or four seconds. It was then cut into a number of strips, one half of each of which had received exposure. These were immersed in a five-per-cent. solution of bichromate of potash for periods varying from one minute to one hour, and then very thoroughly washed in several changes of water for at least another hour. The whole were placed together in a dish and developed simultaneously with ferrous oxalate, when every strip showed distinctly the mark of exposure, the different periods of immersion having successively made the impression weaker in proportion to the prolongation of the action. The deposit formed upon the strip which had had one hour's immersion in the bichromate bath was of a decidedly stronger type than would be described as "fog," being strong enough for the half-tones of an average negative. It should be remarked that the development was prolonged until all further change appeared to have ceased.

From this it seemed that, so far as a comparatively strong impression of light is concerned, a solution of ordinary strength of bichromate of potash is incapable of removing it; or that, to bring about that end, it is necessary to employ a stronger solution, or to greatly prolong the duration of its application. In order to test to what extent impressions of varying degrees of strength are affected by treatment with bichromate, a number of similar exposures were made under a Warnerke sensitometer screen. A plate was cut up into fragments two and a-half inches square (sufficient to cover the whole of the figures), and these were exposed successively under the standard conditions to the light of the phosphorescent tablet. They were then immersed in the five-per-cent. bichromate solution, as before, for periods varying from one minute to sixty, and thoroughly washed, one square being left unbichromated for comparison. The whole series were developed simultaneously in fresh ferrous oxalate the action of which was allowed to continue for two hours until all further developing action had long ceased.

After careful washing the plates were examined, unfixed, in daylight, when the unbichromated square exhibited No. 20 very distinctly and 21 faintly, the general image being bold and vigorous. But, upon examining the remainder, we were surprised to find that every one, even to the longest immersed in the bichromate, showed No. 20, the images, however, becoming feebler and presenting less contrast between the different tints in proportion as the immersion in the bichromate had been longer. So feeble were the higher tints, indeed, that after a short exposure to daylight several of them were entirely masked by the discolouration of the film, especially when examined by reflected light.

An interesting fact in connection with the image produced upon the bichromated films is that, despite the prolonged development, it is confined almost entirely to the surface, and except in the case of the very shortest immersions in the bichromate is entirely invisible from the back of the plate. It is possible that this may have arisen from the presence of traces of bichromate which had escaped elimination from the under layers of gelatine. If this be so, then the question arises as to how far *perfect* elimination of the bichromate would destroy its action on the image. A plate immersed in the bichromate for one minute and then merely rinsed under the tap for thirty seconds or so exhibited far more of the bichromate influence than another immersed for one hour and well washed.

But if bichromate alone be practically insufficient to undo the effect of even faint impressions of light, it is different with solutions containing free chromic acid. A five-per-cent solution of bichromate to which a few drops of sulphuric acid were added was found, after one minute's immersion, to have completely destroyed the image, or, at least, to have put it beyond the reach of the developer, even after several hours' action.

Now, though in the above experiments bichromate has been shown to fail in destroying the impression of light, it does not follow that it is not useful as a fog-remover, inasmuch as the conditions may be entirely different. If the fog to be removed be but slight, and no subsequent forcing be resorted to in development, it is pretty certain the treatment with bichromate will suffice, as we have proved by bichromating, washing, and re-exposing a plate successfully. But where it is desired to entirely eliminate any previous impression of light free chromic acid must be resorted to.

CAMERAS FOR FLYING SHOTS.

It was a fundamental article in the photographic faith of the late Mr. J. R. Johnson that camera stands were quite a mistake in all cases in which instantaneous views were to be taken by means of small cameras.

This, too, appears to be the opinion of an American photographer, who has obtained a patent in that country for a gun-stock attachment to a camera, by the aid of which the camera is aimed at the object to be captured. By means of some mechanism not explained, but the nature of which one can readily guess, the trigger of the gun-stock is attached to the lever by which the drop or instantaneous shutter is actuated, and thus when the camera has been brought "to the shoulder" and the central point of the subject sighted, the trigger is touched and the picture secured.

From what we have just written the more experienced readers of the Journal will already have recalled the "pistolgraph" by which Mr. Skaife, more than twenty years ago, obtained numerous charming little instantaneous views. This camera being constructed in the form of a pistol, and operated in a manner somewhat analogous, was the source of many clever *bon mots* which appeared in the comic serial literature of the period, especially with reference to the capability of the instrument for "shooting" or "pistolgraphing" babies.

With a view to test the capabilities of the gun-stock attachment we lost no time in securing, from a second-hand gun shop, an old rifle, which was quickly *dis*barreled, and the stock, after a few alterations, attached to the base-board of a 5 × 4 camera, a string being employed to connect the discharging bolt of the shutter with the trigger. This answered quite well; but we found the gun-stock an effectual barrier to the employment of the camera in public, in consequence not merely of its weight and shape, but of the unwelcome degree of attractiveness discovered in it by the public, and especially by the omnipresent "small boy." For these reasons —especially as we had found an equally effective and less obtrusive substitute—we laid aside the gun-stock, adopting in its stead a thick, short, round handle, which we screwed into the bottom of the camera, and grasped with the left-hand when taking a picture. This we found to answer the purpose of supporting the camera exceedingly well when about to take a flying shot at a subject.

But out of this has been evolved the still simpler and equally excellent method of employing the camera without any addition whatever. The camera is grasped by both hands, and by means of sights placed on the top the object intended to be in the centre of the picture is brought into line, the forefinger of the right hand being in convenient proximity to a lever or trigger which projects slightly below the bottom at the right side. By this arrangement instantaneous views may be taken having the subject as well arranged on the plate as if the camera had been carefully erected upon a rigid stand susceptible of every adjustment.

Those who try this method of taking instantaneous views without the stand will not only be surprised at the ease with which it can be done and the sharpness of the negatives, but will also discover that the sighting of the central object in the composition may be accurately effected by glancing along any of the corners of the camera.

COMBINATION PRINTING.

Redeeming the promise we gave in our last issue, we shall now proceed to describe the method employed by M. Lambert in combination printing in the carbon process—or we might, perhaps, more correctly have said "one of the methods;" for we believe that gentleman frequently introduced considerable modifications in his plan of working in order to attain the end in view. However, all the modifications were based on the same general principle. The plan about to be described was the one we had the pleasure of seeing carried out by him at one of his demonstrations, and, although in this instance it was simply changing one background for another, yet we learnt that in more complicated cases the same principle was always adhered to.

Before proceeding farther, it may be well to explain to some of our younger readers that, at the time they were first shown, the results produced by M. Lambert excited the greatest interest. The enlargements exhibited by him—many of them from paper prints—had all the appearance of being most elaborately finished; yet the prints themselves were absolutely untouched, as the whole of the retouching was effected on the enlarged negative and intermediate transparency. Not only was one background replaced with the greatest success by another, but, in some instances, the costume of the model was changed or very considerably modified. Indeed, nothing appeared to be too difficult for him to accomplish in the way of double printing, even in carbon. With these few remarks we shall at once proceed to describe the method of substituting one background for another, as we saw it practised.

The enlarged negative employed on the occasion referred to measured about two feet by one foot and a-half, and was of one figure out of a group of several. It was also from a paper print. This negative had previously been retouched according to the Lambert plan. It may here be advisable to explain that this plan consists of covering both sides of the negative—which, by the way, must be a very thin one—with a thin kind of tracing-paper termed "*papier mineral*." On these two papers the whole of the retouching is done, and not on the surface of the negative itself. After the lights have been strengthened, and all the coarser portion of the work done on the back paper with a coarse stump and plumbago, the negative is turned over, and the finer details dealt with on the front paper, a finer stump and a blacklead pencil being used for this purpose.

When the negative is finished, and while it is still on the retouching desk, the outline of the figure is carefully traced over with a blacklead pencil on that paper which is on the reverse side of the negative. This mark is simply to serve as a guide line in the masking. Next, a piece of somewhat transparent yellow paper is laid on the negative, and the outline also traced upon that. The figure is then cut out of this yellow paper, roughly, about a quarter of an inch inside the pencil mark. Then the background is cut out about the same distance outside the mark, so that the figure-mark is about half-an-inch or so less in size than the background one. The negative is now placed in the pressure-frame. In doing this it must be carefully fitted into one of its angles, as we described in another method of masking last week. The tissue, having been carefully trimmed so that its edges are true, is then placed on the negative, and at the same time, also, adjusted accurately in the angle of the frame. This is imperative.

It is necessary to mention here that the glass of the pressure-frame should be somewhat thinner than that with which large sizes are usually fitted; otherwise the light will be more diffused in the printing than is desirable, as the masking has to be done from the outer surface of the pressure-frame glass. The glass of the frame we saw in use did not exceed a quarter of an inch. We have an impression that it was even less than this. Next some non-actinic colour oil paint—such as the Indian red, which is sold in tubes for artists' use—is mixed with olive, or some other non-drying, oil. With this the outline of the background is painted round, on the glass of the pressure-frame, for half-an-inch or so, the pencil-mark on the paper of the negative serving as the guide line. In doing this the outline of the figure is slightly overlapped, and the paint applied somewhat thinner at the edge where it overlaps. The paper background mask, which has been previously described, is then taken and laid on the glass, and kept in position by another piece of glass being laid upon it. The frame is now exposed in diffused light, its position being changed occasionally as the printing proceeds, in order to ensure even diffusion of the light between the paint and the negative. The only object of the roughly-cut paper mask, it may be explained, is to avoid the necessity there otherwise would be of covering the whole of the glass over the background with the red paint, and cleaning it off afterwards—a somewhat disagreeable operation.

The figure being printed the frame is taken in, the paper mask removed, and the red paint wiped off with a duster. If at this stage the print were developed we should, of course, have the figure only with a white background, but, instead of the outline being—as in the case of ordinary masking, when employed in silver printing—sharp and abrupt, it will be graduated off or slightly vignetted. Now, as a second background has to be introduced, it is necessary to protect the already printed figure while it is printing. This is done in the following manner:—Before the negative and tissue are disturbed the outline of the figure is painted round on the glass of the pressure-frame, in the same manner as was done with the background—the same precautions being observed in slightly overlapping the line, and applying the colour more thinly at the edges, as in the former case. This done, the frame is turned over, opened, and the negative and tissue removed. The second negative is now substituted for the first, and arranged in its proper position. This may be judged of by looking through it at the painted outline on the pressure-frame glass. The tissue is then adjusted in the angle, as before, and the frame closed. It is then turned over and the rough figure mask placed in position on the painted outline, as in the case of the background, and the second printing proceeded with—the same precautions as before being taken that the position of the frame is shifted from time to time as it proceeds. After the printing is completed the picture is developed in the ordinary way. It need scarcely be mentioned that on no account must any trace of the oil paint be allowed to get into contact with the surface of the tissue, or it will be sure to cause blisters in the development of the picture.

These details may appear somwhat troublesome, but they are not really so in practice; though it must be admitted that a certain amount of care and judgment is required to carry them out successfully.

In the demonstration referred to the print was developed on a glass plate as a transparency, and afterwards intensified with the permanganate of potash. It was then slightly retouched, and afterwards employed to make a new negative, from which impressions could be produced with one printing. Sometimes, we are informed, M. Lambert proceeded somewhat differently and made the enlargement direct from the small negative, the full size, as a transparency. He then worked this up, masked and double-printed it as just described, producing a negative which in turn was also worked up, if necessary. By this means much time and trouble was saved in obtaining the final printing negative.

We intend to continue the subject of combination printing next week, and give some practical hints on the production of combination negatives by other methods.

ENGLISH AND FRENCH WEIGHTS AND MEASURES.

Photography is cosmopolitan enough to render the abstraction and compilation of foreign formulæ in English journals a matter of commen occurrence—a fact which, in combination with the general tendency among scientific men to adopt the French or metrical system to express the results of their investigations, causes an acquaintance with the relative values of the two systems to become an actual necessity if a photographer is to read the literature of his profession with profit or understanding. This is no place to discuss the merits of the various systems, we must take the facts as we find them; otherwise it would be very easy to show that the metrical system has not the basis of exactitude that was once claimed for it, nor is it, in many respects, as useful as our own system of weights and measures which it is now the fashion so much to decry.

So far, however, is such knowledge of the equivalent values of the terms employed in the two systems a common possession—whether among photographers or other technical workers—that if all formulæ published in this country were to be couched in the metrical system they would find few readers who could readily understand them. Alterations in weights and measures, above almost any innovations, are difficult to establish; but, apart from this, the very elaborate and difficultly-worked English equivalents of French measures hitherto given by authority have much to answer for in this direction, and any simplification of calculation that shall give results which may be considered scientifically exact will be thankfully received by the general public.

With such thoughts in mind we welcome a most excellent move in this direction recently made by Dr. G. Johnstone Stoney, F.R.S. He has proposed a series of equivalents which, if employed, would greatly facilitate calculations; and they differ in a very slight degree only from the present accepted measurements and weighings. The actual comparison of standards is a very interesting series of observations, but cannot here be touched upon, and though of late years older processes have been much improved, still, for all practical purposes, Dr. Stoney's figures may well be accepted for operations in photography as in other sciences. There is nothing finite in the results of calculations and measurements of equivalents; a British act of parliament exists in which a legalised value is given that does not accord with the equivalents now accepted by scientific men and Dr. Stoney's figures. One of the earlier accepted equivalents was Captain Clarke's determination of the yard in metrical measure, and this was followed by that made for the Ordnance Survey by Captain Kater. The two measurements were not exactly alike, and the difference between them is greater than that between the present (Dr. Stoney's) suggested, easily-calculated equivalents and those of Captain Kater.

The French system, as many of our readers are aware, is based on a measurement of a certain portion of the earth's surface—a fourth part of a terrestrial meridian, the ten-millionth part of which was adopted as a unit and termed "a metre." A cube having its sides one-tenth part of a metre in length was adopted as a unit of capacity, and called "a litre." For a unit of weight a litre measure of distilled water was taken, and called a "kilogramme," and its thousandth part adopted as the weight unit, under the denomination of a "gramme." Multiples of these, reckoning by ten times, were called "deca," "hecto," "kilo," and smaller divisions by tenths, "deci," "centi," and "milli." The system is very simple, and the units are easily interchangable; but, as we have said, they are less convenient in some respects than our own.

Turning, now, to Dr. Stoney's equivalents: he would take the yard as 914·4 millimetres, which would leave an outstanding error not appreciable in work that might be called really scientific—a difference from present accepted measurements less than would be caused by the lengthening or expansion by heat of an iron yard measure when raised one degree in temperature. Next, for the equivalent of a pound, he suggests—the pound = 453·6 grammes. This differs from the most elaborate equivalent yet made—namely, Professor Miller's—by only a-quarter of a grain in a kilogramme, the small importance of which may be judged of when it is stated that the difference shown between weighing a litre of water in air and in vacuo would be seventy times as much. For the gallon he suggests 4544 cubic centimetres as an equivalent, which would not be one drop wrong in a pint.

If, now, these equivalents be accepted, the following tables will follow from them, and will be found far easier to remember and use than the usual elaborate equivalents taken to many decimal places usually employed:—

Table I.—Measure of Length.

The yard	=	914·4 millimetres.
The foot.............................	,,	304·8 ,,
The inch	,,	25·4 ,,

Table II.—Weights.

The pound............................	=	453·6 grammes.
The half-pound......................	,,	226·8 ,,
The quarter-pound	,,	113·4 ,,
The ounce	,,	28·35 ,,
The grain	,,	·0648 gramme.

("This last gives the gramme = 15·4321 grains, a number which it is singularly easy to recollect.")

Table III.—Measure of Capacity.

The gallon	=	4544 cubic centimetres.
The quart....................	,,	1136 ,,
The pint	,,	568 ,,
The half-pint	,,	284 ,,
The noggin	,,	142 ,,
The fluid ounce	,,	28·4 ,,

It is further stated that the utmost limits of accuracy may be obtained by making the following corrections in these tables:—

Table I.—	Substract one in every hundred thousand.	
,, II.—	,, ,, sixty	,,
,, III.—	,, ,, ten	,,

Measurements of temperature remain yet to be discussed. All our readers are aware that the accepted scale of this country calls the freezing point 32° and the boiling point 212°, while the French or centigrade scale gives 0 and 100 respectively to these points. For a very rough estimate, Fahrenheit degrees may readily be translated to centigrade by subtracting 32 and doubling the remainder. Complete exactitude will be found if this result be diminished by subtracting its tenth part. This rule will in practice be more readily performed mentally than the common one of subtracting 32, then multiplying the remainder by 18, and dividing by 10. This rule was communicated by a correspondent, but it is so simple that it may likely enough be found elsewhere.

We may conclude by giving another equally simple, rough rule (which also we have never seen in print, though it is equally probable it may be so found) that we employ where French prices have to be converted into English. It is simply to multiply the price of francs by four, and then take off the two right-hand figures. Those remaining represent English pounds sterling.

The subject we have thus dwelt upon represents a considerable array of figures; but, in view of the importance of being able to readily translate English to French quantities, we think their greatly increased simplicity will commend them to our readers.

Mr. J. P. Mayall, of Park-lane studio, has had the honour of photographing Mr. Gladstone, in his sitting-room at Hawarden, for the series of "Artists' Homes" now in preparation by Messrs. Sampson Low, Marston, and Co. The right honourable gentleman, we presume, finds his way into the series by virtue of his Professorship of Ancient History to the Royal Academy.

The engravings in the folio edition (Venice, 1488) of *I Triomphi*, of Petrarch, recently purchased by the British Museum from the Sunderland collection, have been reproduced by photogravure, together with three others, forming the illustrations to *Il libro del Monto Sancto de Dio*, by Bettini, 1477, the engravings being by Botticelli, and also the nineteen illustrations of the *Divina Commedi*. The plates are now ready for delivery to the subscribers.

The French Institute has also published a photographic *facsimile* of the Leonardo da Vinci manuscripts in the library of the Institute, the work being edited by M. Charles Ravaisson-Mollien.

When distilled water is not available it is often recommended to use rain water, and for certain purposes it is an efficient substitute; but for many operations it is inapplicable on account of the ammonia it usually contains, which would be quite fatal to some experiments, and as the amount present is not a constant quantity no standard allowance can be made for it to neutralise its effects. According to Herr Hozeau the principal agents which increase or diminish its amount are light and heat. In July he was not able to detect even a trace of it in rain water, and he also noticed that water exposed to the action of sunlight for a long time lost a large part of its ammonia. The amount of rainfall also influenced the quantity present, which, as might be inferred, was in inverse proportion to the amount of rainfall.

M. Becquerel, whose researches in the spectrum by the aid of phosphorescent tablets we alluded to last week, has noted that the infra-red spectrum can, with an ordinary sprectroscope, be examined down to about wave-length 8,000 if the light be concentrated upon the slit, and the more luminous rays filtered out by a solution of iodine in bisulphide of carbon.

In addition to our remarks in a recent number upon the separation of the haloids, we may here note still another process lately published in the *Chemiker Zeitung*, by A. Cavazzi, for the separation of iodine, which is as simple as useful. Ferric chloride, it is known, will liberate iodine and bromine when present in a mixture of the three haloids, and Herr Cavazzi finds that ferric sulphate will separate the iodine alone. It must be free from acid for the purpose, and to make it so he heats the salt to redness. It is then rather insoluble; but by adding from five to ten per cent. of ferrous sulphate the solubility is so increased as to enable water to take up a twelfth of its weight. When a mixture of iodine, bromine, and chlorine is boiled in this solution the iodine is driven out. It can be absorbed by potash, and the iodate thus formed reduced to iodide, which he is enabled to do by the hydrogen evolved by adding aluminium. Precipitation by silver nitrate in the usual way enables the amount to be estimated with exactitude.

It is not often that a photographer requires to use a thermometer with such attention to accurate reading as to note tenths of a degree, though our own experience in pyroxyline enables us to say that a very marked difference in the properties of the cotton is produced by a variation in the temperature of the mixed acids of a single degree. Still it is worth noting that an error amounting to several tenths of a degree may take place within half-an-hour when the stem of the thermometer is heated to 250°.

It is not generally known that any one possessing a thermometer of good quality which he desires to have tested can, for a very small fee, get a thoroughly complete examination of its powers, together with a written character detailing its defects, by sending it to Kew. There are few thermometers which are perfect in their readings at all temperatures. The makers of those of the best class, intended for experimental research, take great pains with each instrument; but there is generally some residual error left, and of this the authorities at Kew will make note. There are many interesting points about the performance of thermometers, under certain conditions, that cannot well be treated in a short note, but with which we may, if we have space, deal more fully on another occasion.

As an example of the power of the emulsion filter, described some few months back by Mr. C. Beckett Lloyd, a recent experience may be quoted, which will also serve as a warning to others. A thick solution of pigmented gelatine was being filtered through a plug of tow, the cork at all the "joints" having been "luted" with a little of the gelatine to make the whole perfectly air-tight and to secure the full advantage of the exhaust. All went well, though slowly, for a short time, until the tow became clogged with the thick, viscid gelatine, when, under the increasing pressure from without as the filter cooled, the stout glass flask collapsed with a loud report. Moral: for very viscous solutions employ stronger vessels.

Glass is generally looked upon as a most inert and repellent body to the action of almost all chemicals; but, as we have before shown, it is capable of being dissolved on its surface by pure water even, while anyone who keeps a store of chemicals in his laboratory knows too well, by the fastening of stoppers, not to speak of the staining or visible corrosion of their interiors, that many liquids interfere with the integrity of their vitreous receptacles. Professor R. Bunsen has lately been investigating the condensations of carbonic acid on the smooth surface of glass, which he states goes on for years notwithstanding continued changes of density and pressure. He asserts that in three years' time each square centimetre absorbs, at standard pressure and temperature, 5·135 cubic centimetres of the gas, about two-thirds of this amount being absorbed the first year. No wonder that photographers at times experience irregularities in the adhesion of their coatings of collodion and of emulsion when it is shown how porous glass usually is even to a gas.

DARK-ROOM ILLUMINATION.

The many letters of inquiry that I have received on the subject of the particular method of lighting photographic dark rooms, to which I have recently called attention, and the fact that even those who have written in the photographic journals upon the matter have, evidently, not had in their minds some of the points which I mentioned when exhibiting the results of my experiments at meetings of the Photographic Society of Great Britain and at the London and Provincial Photographic Association, induce me to think that a few collected remarks will not, at the present time, be out of place.

The proposition of the proper light for the dark room has often been put in this way—"*Get a safe light and use plenty of it.*" But what is a safe light? Presumably the expression means a light that is without chemical action upon a sensitive film. I have yet to learn that any such light exists. The proper way of putting the problem appears to me to be this:—*What is that light which, when of a certain intensity judged sufficient for working by, has the least effect upon the sensitive plate?*

In the early days of photography certain different appearances upon bromide and iodide of silver when submitted to the spectrum were thought to indicate great relative differences of sensibility in these salts to light coming from objects of various colours compared with their sensibility to white light, and a theory was in consequence formed that bromide of silver was sensitive especially to yellow and green light. Sir John W. Herschel was one of those who first promulgated this theory, and his authority has been used in support of it; but I am happy to find that he afterwards saw reason to alter his views.

The theory has, however, been kept up and insisted upon so long that photographers have accepted it as a matter of course, and when bromide of silver first came into general use in the form of collodion emulsion it was found that the plates, although slower in the camera than the iodide bath plates, yet fogged in the yellow light of the dark room. This fact was thought to be accounted for by the superior sensibility to yellow light inherent in bromide of silver, and the use of ruby glass, admitting very little light to the eye, was insisted upon.

Another explanation may be found in the fact of the much longer exposure to the light, whatever it may be, of the dark room, to which bromide emulsion plates were subjected. With the iodide plate the only exposure up to the moment of developing was in the passage from the bath to the dark slide. With the bromide emulsion, on the other hand, there were the operations of preparing the emulsion, washing it, coating the plate (and each time a plate was coated some emulsion was poured back after having been exposed to the light), drying, and storing. The development of the bromide plate, too, sometimes required minutes when the iodide had seconds, and there was the fact that the bath plate became less sensitive as development went on—a condition which does not appear to exist with bromide emulsion plates. All this exposure to the light of the dark room is quite sufficient (especially now that bromide plates are made so much more sensitive altogether) to account for the different intensity or quantity of light permissible, when working gelatino-bromide plates as compared with iodide bath ones.

Another instance of the effect which the persistent re-assertion of this idea of the greatly different colour-sensitiveness of iodide and bromide of silver had upon the photographic mind, may be found in the literature of photography at the time when rapid gelatine plates first came into ordinary studio use. This was in the winter of 1878, and it was then supposed by some writers that the superior sensitiveness of gelatine plates was due to their special sensibility to the yellowish light of winter, and that, when the more powerful light of spring and summer came round again, there would be found no difference, or but a very slight one between the speed of gelatino-bromide and collodio-iodide plates. Experience, however, showed that the relationship of sensitiveness was not altered to any extent that could be proved. The sheet of ribbons of various colours shown by Mr. J. R. Sawyer at the last May meeting of the Photographic Society of Great Britain, and the photographs from them, in which it was seen that the ordinary collodion and gelatine plates gave the whole set of colours in identically the same relationship, should either set the question at rest or lay upon those who still assert that the great difference of colour-sensitiveness exists in the two processes the onus of proving the truth of their assertions.

Ruby glass will certainly cut off more of the chemical action of light than yellow glass; but, then, it will cut off at the same time *very* much more of the luminosity to the eye by means of which we perform the operations of the dark room. To make the comparison usefully we should, either by repeated screens of yellow, by lowering the source of light, or by some means at all events, reduce the intensity and the quantity of the yellow light until it reaches the same amount of brightness of illumination to the eye that we have with the ruby light, and then see which has the most chemical effect upon the plate.

I am pleased to see, by an article in a recent issue of The British Journal of Photography, that Mr. W. H. Harrison has—although from a former article he appeared not favourably disposed to the green and yellow combination—come by the test of direct experiment to speak very decidedly in its favour. I may say that I arrived at my results originally in a similar manner to that in which Mr. Harrison tested them; that is, by the exposure of a plate to openings covered by different combinations of coloured glass and paper, forming what he describes as a polychromatic negative. Mr. Harrison has, however, overlooked the fact that, at the meetings of the societies where I showed my lantern, one side was glazed with ruby flashed upon orange pot metal, and another side with ruby glass and one thickness of the same paper that was used with the green glass. With the green glass there were two thicknesses of yellow paper, because the green allowed so much more visual light to pass than the ruby that even with the extra thickness of paper that side of the lantern was considered to afford the best light by which to work. The remaining side only was glazed with the two thicknesses of red glass. He says:—"Had Mr. Debenham used two kinds of red, or ruby glass superimposed on orange, it is probable that the actinic rays would be more powerfully cut off than by his greyish-green, although the latter is more valuable for ordinary practical purposes."

It will be seen that what I am assumed not to have done is exactly what I did, and I showed the plates which had been exposed to these ruby-orange and ruby-yellow lights, which plates were described as showing an image of intermediate strength between the trace obtained on the green-yellow side and the strong image of the plate exposed to the light through the two ruby glasses. From being thought not to have tried these combinations, Mr. Harrison, although approving strongly of the light I advocate, calls my "comparative experiment an unfair and inconclusive one." The expressions "ruby-orange," "ruby-yellow," &c., are of course used, not to describe the apparent colour of the light, but to indicate the colours of the media through which it has passed.

The coloured tissue papers mentioned by Mr. Harrison may, indeed evidently have, in his case answered very well for lanterns when the source of light is not a powerful one; but I cannot approve of a single thickness of any medium which has holes or interstices. So far as that medium is concerned there are places in which light passes unaltered. The same remark applies with greater force to a single thickness of any textile fabric, such as twill or tammy.

The number of thicknesses of glass and paper required must depend upon the strength of the light and the sensitiveness of the plate. For daylight I use a fixed frame, containing one thickness of a pale green glass and two thicknesses in winter or three in summer of the deep yellow paper, kept in place and free from splashes by a sheet of ordinary glass. In front of this is a movable screen similarly covered. For lanterns a single thickness of glass and two of paper suffice, although for the coating room I use an extra thickness of the paper. One friend uses a deeper glass, and then one thickness suffices him with two of paper. To any readers who wish to be relieved from the fiery glare, and who would like to see patterns of the glass and paper that have been successful with me, I shall, on receipt of directed envelope, be happy to post small samples. A letter addressed to my name, Haverstock Hill, London, will find me.

It is sometimes said that it does not follow that, because a certain light is best for developing, it is also the best for preparing and coating the plates. It seems to me that if with a certain colour of light there is less chemical action for a given amount of luminosity to the eye, that colour is best for all purposes—preparing and coating more especially; and I am writing particularly with the desire of inducing a change in the workrooms of the dry-plate makers, where amongst the many employed there can be no reasonable doubt that the eyesight of some is being ruined. And what a prospect for the worker when that takes place! For my own part, I certainly think that my plates are clearer since I have abandoned the ruby glass and orange paper that I formerly used in the coating-room as elsewhere.

There is one other point to mention. I am at a loss to know what colour to call the light. The colour to the eye of the combination of glass and paper that I use is not at all green. Yellow glasses or papers when superimposed in several layers appear orange, and sometimes almost red. The green glass seems to have the effect of cutting off some of the actinic rays and of doing away with the hot orange colour of the light, and making it more pleasant without much lowering its illuminating power.

W. E. Debenham.

INTENSIFICATION OF GELATINE NEGATIVES WITH SILVER.

That not a few of the votaries of the art would forsake mercurial intensification for silver and iron or other permanent re-development, were they assured of the absence of abnormal or other stains, may be taken for granted. With the permission of the Editors I shall lay before the readers of the Journal a method of intensifying gelatine negatives with silver and iron which has rendered good service since the summer of 1880. I mention the date simply to show that it has stood the test of experience.

The chemicals necessary are identical with those used with wet collodion, with the exception of the chloro-iodo bath, which apparently decomposes the active principle or constituent in the gelatine that causes the well-known pink fog. Neither iodine nor chloride of sodium by itself will prevent the pink stain, but a combination of both as prescribed. The image is, probably, converted into iodide of silver, which in turn gives place, to some extent, to the excess of chloride, forming both iodide and chloride of silver in the film, and during the decomposition the fog-producer is destroyed or rendered harmless. At all events, the negative is very readily and successfully intensified after its immersion in the bath.

The following are the requisite solutions:—A, saturated solution of common salt; B, ruby solution of iodine in iodide of potassium; C, ten-grain solution of protosulphate of iron; D, fifteen-grain solution of nitrate of silver; E, a very weak solution of cyanide of potassium.

When the crystals in solution D are dissolved a few drops of a saturated solution of carbonate of soda should be added, and the bottle placed in the light until clear. The silver should then be filtered and acidified with acetic acid (eschew nitric) enough to turn litmus paper red. To solution C half-an-ounce of glacial acetic acid must be added to every fifteen ounces of water.

Test a mixture of C and D thus:—Pour into a developing cup half an ounce of C and add (say) half-a-drachm of D. If the combination turn muddy in less than five minutes, add more acetic acid to the stock bottle C until it remains clear when mixed with the silver solution for the specified time.

To intensify the negative:—It is premised that the negative has been "alumed" and washed thoroughly to free it from the fixing agent. If the film be tender it is best, in the first place, to dry it. Now pour into a clean measure sufficient of A to cover the plate; then add a few drops of B until the colour of amber be attained. Immediately place the negative in a clean tray and pour over it the chloro-iodo solution. Leave the plate in this bath for four or five minutes—the thicker the film the longer it should remain—then well wash it under the tap. As vegetable and other extraneous substances from the washing water often adhere tenaciously to the surface of the film, thereby causing irregular markings, at this stage any such should be gently removed by a tuft of cotton wool dipped in water.

The next operation must be done in the dark room—one in which wet collodion can be worked—or by candle or gaslight. To proceed: into a developing cup shake a few drops of D, and add (say) for a half-plate almost half-an-ounce of C. Flow this on the negative and let it remain for three or four minutes—not longer—gently rocking the plate the while; then quickly place it under the tap until all greasy lines have disappeared. It will now be seen that a considerable increase of density is the result. One operation generally suffices; but if the image be still too thin clean out the cup and repeat the dose. The plate will be thin, indeed, if it require a third application. After a good wash place the negative in solution E for one or two minutes, when it may be examined in daylight. Well wash again, then dry, and varnish.

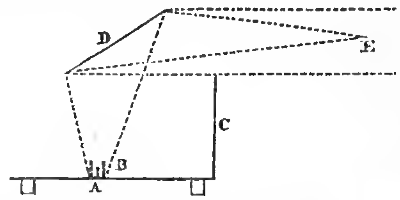
If ordinary precautions be taken with the above method there will be little fear of red fog; but if, from inadvertence or other cause, it should appear, immediately immerse the negative in a fresh solution of A and B. It has the valuable property to a great degree of clearing off the stain. Should the fog be deep and obstinate, place *out of doors* the plate in a solution of potassium sulphide, when it (the stain) will gradually vanish. This treatment intensifies the negative. It simply requires to be well washed in running water, dried, and varnished. A. DONALD.

AN IMPROVED DARK-ROOM LAMP.

IN Mr. G. D. Macdougald's description of his method of dark-room illumination, in your issue of the 4th instant, he states that it involves exactly the same principles as that of the lamp I described in the previous number. He evidently quite misunderstands the theory on which my lamp is based. We know that every opaque surface reflects more or less white light (even a surface such as velvet at certain angles will reflect almost pure white light); but if over this opaque surface we can paint a transparent colour (or, as artists call it, a "glazing" colour) the light when reflected from the opaque surface will have to *pass twice through the transparent colour*, and the colour of the reflected light will consist of a combination of that of the light and of the opaque and transparent mediums.

I therefore painted the interior of my lamp white to reflect as much light as possible. Over this I painted a non-actinic transparent colour, for this reason: as the light would have to pass twice through the colour, I thought the latter would absorb the actinic power of the light in its passage in the same way as ruby glass does by transmitted light, and the result showed that the supposition was correct. I wish I had explained this more fully in my article, but I thought it was hardly necessary.

In Mr. Macdougald's arrangement, from the top of the tube surrounding his gaslight or candle to the ceiling there is a beam of *white light* passing upwards through the room. He does not say the distance from the light to the ceiling, and this is a most important point. If the candle were placed on a table and the ceiling were five or six feet above, the amount of light reflected on to the table from a *dark* orange matt surface on the ceiling must be nearly or quite *nil;* and I think he would find it so if he were to arrange his light in this way:—



A, Table. B, Candle in tube. C, Shield to cut off white light. D Reflector—a dark orange matt surface. E, Point where the plate is developed.

Five feet to be allowed from the candle to the centre of the reflector, and the same distance from the reflector to the point E.

I have no doubt that the light Mr. Macdougald works by is the weakened white light reflected from the particles of dust, &c., in the air as the light passes from the candle to the ceiling, and not the orange light reflected from the ceiling. If this candle were close to the ceiling, of course the reflected light would be more powerful. I note that Mr. Macdougald does not say how he examines his plates by transmitted light to see the density.

The reason I made my lamp square was to absorb every particle of white light possible. In the first place, the whole of the white light is contained within the lamp, and none is allowed to pass into the room; then the light from the sides and top is reflected within the lamp, and the white light is thus rendered more non-actinic by the reflected coloured light mixed with it, which would give a colour to any particles of dust, &c., that might have reflected white light into the room.

I quite agree with Mr. Macdougald that the more extended the reflecting surface is—that is, the further from the light, and in consequence the less light it would have to reflect—the safer it would be for photographic purposes, provided the white light is shaded from the plate in its passage to the reflecting surface. The reason I made my lamp so small was to have as little white light within it as possible.

While on the subject of my lamp I may give the result of further experiments made by Mr. A. L. Henderson and myself. The light from a paraffine lamp covered with deep ruby glass, then passing through a bath containing a solution of bichromate of potassium, then through a bath of solution of quinine, will fog a very rapid plate in two or three seconds; whereas with a plate three and a-quarter inches wide put close to my lamp (painted with raw sienna, as I described) for thirty seconds, the part nearest to the lamp gave a slight deposit, but the film on the part farthest off did not show the slightest trace. The reason of this is that in the case of transmitted light the bulk of the actinic power comes from the one point—namely, the flame—direct to the plate, whereas with my lamp the actinic power is first dispersed all over the interior of the lamp. In the one case we have a weak light concentrated on one spot, and all around is perfect darkness; in the other a flood of light (in comparison) of a very light yellow tint. As Mr. Henderson described it, "the light was grand!"

I tried the effect of Mr. Debenham's proposal of painting the interior of the lamp chrome yellow (matt surface) and putting a piece of green cathedral glass in front of the lamp. I found that it gave a very luminous light; but I could not try the photometric value of the lights, as I had painted the yellow over the raw sienna. In each case I was very much struck with the rapid falling-off of the actinic power of the light the farther the plate was placed from the lamp compared to the loss of luminous power. For instance: at fifteen inches from the light (with yellow and green glass) on a plate of about fifty times rapidity we got a faint deposit in one minute, but at twenty-seven inches we could get no deposit in fifteen minutes. As we got no deposit in half-a-minute about five inches from the lamp (painted raw sienna, without any glass) I have no doubt that it would be equally safe, if not safer, at the same distance. As there is ample light to coat plates at two or three yards' distance from the lamp, it must be quite safe for all practical purposes both for coating and developing plates. I tried the effect of putting orange instead of green glass in front of the lamp, the plate being put twenty-seven inches from the light and the orange and green glass together, with the plate fifteen inches off, the exposure in each case being fifteen minutes. In neither case could I get a deposit.

As I stated in the postscript to my article, the plate that I exposed for an hour and a-half close to the lamp was much slower than I thought. Mr. Henderson found that they only gave 9 on

Warnecke's sensitometer. I also developed it with the same amount of bromide as I used for ordinary development. When Mr. Henderson tried the lamp he got a greater deposit on his plates than I did, after allowing for the relative rapidity of the different plates; but in one case he had intensified the plate to such an extent that he got a greater deposit on it in ten minutes than he did on another plate of about sixty times the rapidity in two minutes. Of course intensification was very useful in proving that the light had really acted on the film, but had not much bearing on ordinary development.

On the subject of reflection from matt surfaces Mr. Macdougald will note that I only proposed to use double reflection for daylight. I am quite aware that a very great deal depends on the nature of the surface employed; indeed, it was in consequence of noticing the great difference of the same colours on different surfaces that led me to take up the question at first. In the autumn of 1881 I tried my first experiments on the subject. I got some buttons covered with different-coloured dress material, the roughness, &c., of the surface being, as near as I could tell, the same, and on photographing them I was very much surprised at the results, as the effect on the film was so very different to what I expected. I spoke to several practical photographers on the subject, and pointed out to them how important the knowledge of these tone equivalents of different colours would be to them in obtaining a proper balance of light and shade in their pictures, and the necessity of making the tint given on the film from the sitter's dress the starting-point for the arrangement of suitable accessories and background. They thought it was very interesting to those who cared about such things, but they preferred to go on their old rule-of-thumb method. In last year's *Year Book* I raised the question in its bearings in relation to "the addition of iodide to a gelatine bromide film;" but, with that exception, until I took up the subject of the lamp I had not thought anything further of the matter.

I wish to say that in my experiments with the lamp I took for granted that the power of light reflected from a blue-painted surface would have the same relative power on a sensitive film compared with a yellow-painted surface as the blue-covered button did to the yellow; and if two surfaces—one rough and one smooth—were painted with the same colour (say blue), when photographed the *relative difference* in the deposit on the film in the two cases would be the same as if the two surfaces were painted yellow or any other colour, so that I did not try with a painted surface anything I had already tried with the covered buttons.

Mr. Macdougald proposes that I should try experiments as to the photometric values of the different colours. Now this was quite a secondary question to settle in connection with my lamp. It would have been useful in comparing a raw sienna transparent surface with Mr. Debenham's proposal of an opaque yellow surface and green glass. What I wanted to find out was from what surface has reflected light the least power on a sensitive film *placed close to the lamp*, and which would give at the same time the most pleasant light to the sight. After finding that out—by putting some transmitting medium in front of the lamp, such as coloured glass—I could easily reduce the actinic power of the light; but I wanted to do away with transmitted light altogether.

And, now, as to the real or absolute photometric value of the light reflected from different coloured surfaces: of course when the spectrum is thrown on a sensitive film and thus photographed the photometric value of the different colours are not equal, and the density on the film does not at all correspond to the intensity of the light. By-the-bye, has anyone thrown the spectrum on a white surface and then photographed it by reflected light in the camera? This would be a most interesting experiment, and would have a most important bearing on the subject of reflected light.

As near as I can remember the colours of the various buttons which I used were about the same as a painted representation of the spectrum. I did not try the whole of the colours of the spectrum, but I tried some of the colours of the secondary and tertiary scales. If Mr. Macdougald will repeat my experiment with the buttons or with pieces of coloured ribbon, and have among others pieces of blue, yellow, orange, and red, as near the colours of the spectrum as possible, I have no doubt he will find that what I stated in my article was correct. I remember I thought at the time that the reason of the orange giving nearly as dense a deposit as the blue was on account of its being more luminous; but I could not understand why the yellow, which was even more luminous than the orange, acted so differently.

About a month ago I commenced the collection of different materials of the same colours and tints, the only difference being the roughness, &c., in the nature of the materials. I have already obtained from a friend several hundred examples, and by the time the days get long enough to allow me to get my camera out for experimental work after business hours, I hope to have a large collection, photographs of which I think will be very interesting.

I have just seen Mr. W. H. Harrison's remarks on my lamp, in a recent issue. He seems, too, not to have noticed the difference between light reflected from an opaque surface and light twice transmitted through a transparent medium. There is another point he raises in connection with the subject, namely, the action of actinic force with regard to colour; but this article is already so long that I must leave that subject for another communication.

HERBERT S. STARNES.

LANDSCAPE BACKGROUNDS IN FIGURE SUBJECTS.

THE reference recently made by Mr. Edward Dunmore, at a meeting of the Photographic Club, to a now nearly-forgotten but ever-excellent method of printing landscape backgrounds in portraits induces me to add to what has already been said concerning it, with a view to keeping it prominently before your readers.

This process, as originally described, consists in printing the portrait to the full depth required, the background being presumed to be sufficiently light to enable other subjects to be photographed thereon, but in, of course, a more subdued tone. When it is removed from the printing-frame a camel's-hair brush charged with gamboge mixed up with water is passed over the portrait, care being taken that, on the one hand, the whites of the figure are covered, and, on the other, that the entire background is left untouched. The print thus masked is now exposed to light under a landscape negative, after which the gamboge is removed by placing the print in a vessel of water, the toning and fixing then being effected in the usual manner.

Recollecting that I had heard complaints concerning the ill effects experienced by wetting certain parts of the print, I set to work to discover in what manner this might be obviated. It appeared evident that a thin, transparent pellicle—if superposed upon the print, and the figure then carefully stopped out upon *it*, instead of upon the print itself—would answer every purpose, without being liable to the objection used against the system of working with aqueous colour upon the silvered paper.

In carrying out the idea here indicated I tried various thin pellicles, the first to be pressed into this service being gelatine as supplied by artists' colourmen and stationers who supply the requirements of confectioners. A thin sheet of this gelatine, when superposed on the portrait, lies in such close adherence that it is quite easy to make the most delicate traceries round the figure. As the readiest means of doing so I adopted a pigment formed by rubbing down of China ink in common writing ink, and applied it round the margins by means of an ordinary steel pen having a turned-back point like those designated "Waverley." After the marginal outline was formed the body of the mask was filled in by means of a brush.

This method answers so well that I can very strongly recommend it. All that is necessary, when about to print a background, is to lay the mask down upon the previously-printed portrait, adjust it to the margin of the figure, and take precautions to ensure its not being removed when placed in the printing-frame which contains the landscape negative. By adopting this method the one mask answers for every print that may be required from the same negative, saving both the trouble of having to work upon each print with the gamboge and the difficulty and annoyance arising from the application of wet pigment upon an untoned print. A solution of india-rubber applied to the margin of the mask forms a very good cement which, while keeping it attached to the negative, still permits it to be readily moved should the adjustment not have been perfect.

I have also, with an equal degree of success, made use of ordinary tracing-paper in the formation of the mask. This possesses the advantage of being rather more easily worked upon than gelatine by the pen or brush with which the mask is made. At first sight an objection would be urged against this medium on the ground of its lacking perfect transparence; but neither is this nor any further objection arising from its thickness of any validity. It should be borne in mind that, as the background must be in subordination to the figure, it is not only unnecessary, but it is undesirable, that the landscape should be as sharp as it is capable of being rendered by the negative; hence the interposition of a thin sheet of translucent paper proves rather advantageous than otherwise. Indeed, to such an extent may the negative be separated from the print, that I have made the mask upon a thick sheet of wove paper rendered translucent by an alcoholic solution of castor oil, and the softness conferred on the background by this imparted quite a charm to the finished picture. OMEGA.

THE PAMPHENGOS.

As regards the desirability of having even an approach to a substitute for the lime light, possessing a degree of strength or intensity sufficient for a second-rate lantern exhibition, no person will express a doubt; but as respects a hope or expectation of oil illumination being ever brought to such a state of perfection as to supersede oxyhydrogen for any purpose whatever for which it is now being employed, experts will probably shake their heads.

When we read of that skilful and experienced lantern exhibitor, Mr. B. J. Malden, giving his endorsement to an allegation as to a certain quadruplex oil burner equalling many exhibitions with the oxyhydrogen lime light which he had seen, we did not attach to the statement the importance we should have done, knowing that some lime-light exhibitions were not unfrequently poor enough; but when this was still further confirmed by Mr. Lewis Wright, the author of a meritorious treatise on *Light*, who stated that not only had he seen a well-lighted twelve-foot disc produced, but that the lamp possessed sufficient power, as tested by himself, for projecting polariscope objects in a manner sufficiently brilliant for class demonstration, on a disc five feet in diameter, we felt that an inquiry might fittingly be instituted into this matter, because, as everyone familiar with the phenomena of polarisation by the lantern is well aware, much less than half of the emitted ray only reaches the screen.

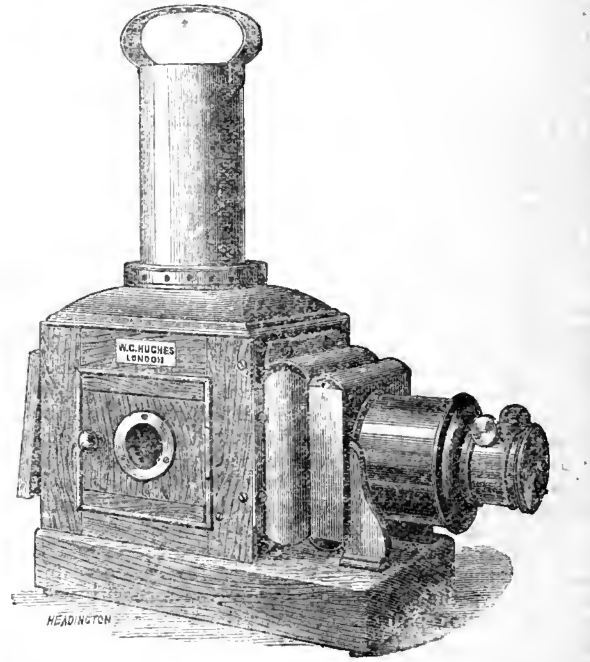
The light by which such good things are effected rejoices in a north-eastern origin and a Greek designation, namely, the "Pamphengos," of Mr. W. C. Hughes, Hackney and Kingsland-road, and by it is purported to be solved the difficulty of securing a higher class of combustion than heretofore obtained. Believing that the best way to test the performance of any special mode of illumination is to do so when the demonstration is made by its maker, we accordingly called at the factory (Brewster House, Mortimer-road, N.) and requested permission to witness the capabilities of the Pamphengos—a request with which Mr. Hughes promptly and courteously complied.

While an assistant was being despatched upstairs to the exhibition room to "light up," we took occasion to cast a glance round the lantern department. A specialist in these instruments, Mr. Hughes keeps here nothing but lanterns and their appliances. The show-cases were amply supplied with condensers of every size and degree of curvature, both mounted and unmounted. Here, too, were displayed innumerable achromatic objectives, which differed from the ordinary French portrait lens in some respects—such as the greater diameter of the lenses for a given focus; the more substantial workmanship, especially in the racking; and the double end to the pinion, by which milled heads projected at both sides for facilitating focussing from either side of the lantern, which is a source of great convenience. Polariscopes, lantern microscopes, lime-light burners of the various sorts now in use, dissolving taps, and other lantern appliances were also here in rich profusion. These several items of brasswork were finished in a most excellent and substantial style—much better, indeed, than one usually expects to find in lantern fittings. Arranged on shelves we saw quite a variety of lanterns in every style, and at prices ranging from £50 downwards. But a lantern of this character is a work of engineering art, having a triple optical system controlled by dissolving taps so perfectly as to enable the very refinement of dissolving views and mechanical effects being indulged in. As we looked over the great display we concluded that the powers of the lantern are at length recognised, and that it has now taken its position as an important social teacher and demonstrator in the arts and sciences, as well as fulfilling its original *rôle* as the ever-popular amuser of the domestic circle.

We had only time to take a hurried glance round the well-decorated walls of a large show-room adjoining, in which were displayed many hundreds of choice slides of recent outcome—all of them prettily coloured, some of them elaborately so—when the word was passed for us to proceed upstairs to the demonstrating hall, in which the Pamphengos, now lighted up, was in waiting to receive us.

There was no doubt at all of its success. "Seeing," in such a case, "was believing;" and there before us on a disc, which measured eleven feet six inches in diameter, was projected a photograph from nature, beautifully lighted and sharp all over. The conclusion at which we arrived, after having seen upwards of a dozen slides passed in review upon the screen, was that undoubtedly it was the best light from oil that we had ever seen, and that in innumerable cases it might be made most fittingly to do duty for the lime light. A few subsequent experiments satisfied us of the capability of the light for showing microscopic objects of the low-power class, prepared for exhibition by the oxyhydrogen light, while with the polariscope it far surpassed our expectations.

With respect to the instrument itself the annexed diagram affords an accurate idea of its external form, which is certainly



very elegant. The burner is composed of four wicks placed parallel with each other and axially in the lantern. They are controlled by pinions projecting behind. The air supply is adjusted in such a manner as to cause the flames from these to be deflected towards the centre, thus forming a rather small flame of exceeding great intensity. The chimney is of metal and somewhat tall, so as to ensure perfect combustion; while the portion immediately surrounding the flame is formed of metal, having a large aperture, both in front and behind, to permit the passage of the light to the condensers on the one hand, and the reflector on the other. These apertures are protected by small curved panes of glass, annealed so as not to be liable to breakage by heat.

One of the important conditions of success lies in the lighting of the lamp in the proper manner. Mr. Hughes recommends that it be done so slowly as to occupy about five minutes before the full effect is obtained. This care at the preliminary stage is the key to success in securing intensity and purity of light. The lamp is evidently constructed with thoughtful attention and with a due regard to the admission not only of air in the requisite quantity, but also, as respects its direction, so as to impinge properly upon the flame. The result of such care is a light both pure and intense, and one well adapted for showing colours and photographs on an enlarged scale.

The condensers are formed of two plano-convex lenses four inches in diameter, with perforations in the mount to prevent the condensation of moisture on the inside surfaces. The objective is, as previously hinted, of rather larger diameter than the French lenses commonly employed, and it defines well to the margin. Altogether we are justified in saying that the Pamphengos is decidedly a step in advance in the applied science of optical projection.

PRINTING.*

I STRONGLY advocate the adoption of ammonia fuming by all those engaged in printing from gelatine dry plates, being convinced that it only requires a fair trial to render its use general. Purchase liq. ammonia fortis s.g. ·880, in capsuled bottles or Winchester quarts. The present price is not more than sixpence per pound. Use a measured quantity, say two ounces, in a saucer placed at the bottom of an air-tight box; lay the sheet to be fumed on netting stretched an inch or two below the lid; the distance between the liquid and the surface of the paper should be fifteen inches at least. To ascertain the

* Concluded from page 42.

proper time to fume any given sample of paper—for the different makes vary enormously—it is better to start by exposing the paper in the box for one minute; cut off a corner and expose it to daylight. If the colour be red as it darkens in the light, the action has been insufficient, and it will be quite safe to return the paper for at least another minute; at the end of this time another small piece may be cut off and exposed as before. This time it may print grey, afterwards becoming purple; this is an indication that the paper is sufficiently fumed for all ordinary purposes. The sample of paper we have been using for the last few months requires thirty minutes' fuming, and a few years ago we were using paper which required an hour and a-half. When there is much moisture in the atmosphere, and a weak silver bath is employed, a peculiar mottled appearance is sometimes seen, although the purple colour has been attained. This indicates the necessity for a longer period of floating on the silver solution, followed by a prolonged fuming until the blue stage has been reached. As a rule, paper should be floated until it is seen to lie perfectly flat on the solution, whether it requires three minutes or ten to obtain that result. When paper has been acted upon too long by the ammonia, also when not quite dry, a grey metallic lustre and generally flat appearance is obtained. Such prints will not tone well; neither will burnishing improve them very much.

On the subject of preserved sensitive paper I can say but little. Like others, I have made many experiments, ranging between citric acid of at least fifteen years ago, and carbonate of soda leaves of a later period. Although I have preserved paper perfectly white for more than a year, I cannot say the results are preferable to those obtained on paper freshly silvered every day. The formula used for preserving the paper I have just alluded to is as follows. After sensitising in the ordinary way, and while the sheet is wet, the back of the paper should be floated, for the space of five minutes, on the following solution:—

Picked gum-arabic	3 ounces.
Water	100 ,,

When dissolved, add—

Citric acid	2 ounces.
Tartaric acid	2 ,,
Strong hydrochloric acid	2 ,,

The paper should be dried, and packed in a close metallic case.

Vignetting is a troublesome operation unless one is constantly practising; and amateurs, as a rule, would rather print their pictures plain than be bothered with cutting out and adjusting masks, without any very certain knowledge as to the results they are likely to obtain. Probably the shape is suitable enough if it were looked after; but the system of placing it in position, and leaving it to the glorious uncertainty of chance, is not a system favourable to good work. Who among us has not occasionally forgotten or neglected a vignette, and upon removing the print from the pressure-frame discovered too much this side or too little that—a sort of one-sided effect.

I won't ask your permission to let me wade through the dozen and one different ways of obtaining a vignette, since a recent description of every practical method has been made familiar to us in the *News;* but will merely mention that any suitably shaped opening in an opaque substance would give all the blending that can be desired, if placed in a diffused light at sufficient distance from the negative, to produce a well-softened outline. An arrangement similar to the one I now show you answers very well for ordinary negatives.

Example 5.—In a case of very thin or under-exposed negatives the opening may be covered with tissue paper, ground glass, or a plate coated with purple dye dissolved in collodion and spirit varnish. When the picture is half printed, should there appear to be any deficiency in blending, the smaller mask may be replaced by a larger one, and for some subjects a brief exposure may be given, removing the vignetting mask entirely. Some negatives will not give such good results printed out to the extreme limit of their dimensions; and it is not desirable to vignette them, neither is it convenient to print only so much as is really good, thus reducing the size materially. Under these circumstances a mask of the required size and shape, with plenty of margin, is secured to the faulty negative. Prints from this masked negative will have white margins. In everyday practice this white margin is given a tint somewhat lighter than the general depth of the subject. This is done in the following manner:—

Example 6.—The zinc shapes now being passed round will be found to exactly fit the paper masks, any number of which may be easily cut with a sharp penknife.

Two blocks of zinc are cut to the size of every shape used, one being a little smaller than the other. A mask is cut from sensitised paper from the larger zinc block, and the counterpart or inner portion is cut from the smaller block; the difference in the size of the two blocks being sufficient to enable the smaller one, attached to a glass plate, to block the picture entirely, and thus enable the margin to be printed deep enough to produce a pleasing effect without the necessity of a white line.

Cloud effects are produced in a variety of ways, the most practical being to obtain a series of good cloud negatives, selecting the most suitable for the subject. Without wishing to dictate in any way as to which is the best method of printing-in clouds from a negative, I will tell you which I think is the easiest.

Negatives having good density in the sky portion rarely require stopping out beyond ordinary shading. When the subject will allow it, a duster, or strip of thin sheet lead suitably arranged outside the pressure-frame, will stop most of the light from passing through that portion of the negative. Some landscape and architectural subjects would be difficult to vignette in this way; nothing short of obscuring the whole of the sky by means of an opaque substance will be found to answer. The best medium I know of is black varnish. Care must be taken not to use it too thin, and allow it to spread beyond the parts to be covered.

Example 7.—Having a print, such as I now show you, it only requires to be exposed under a sky negative for a short time in diffused daylight, covering up the picture as much as can conveniently be done. The sky negative should overlap the subject a little, unless there are special reasons for not doing so.

Heavy shadows may be softened very effectually by means of dabbing an old brush slightly charged with black varnish on the negative. To facilitate working in foliage when insufficiently indicated several retouching pencils may be bound together, thus multiplying the number of strokes with considerably less labour to the operator, and better effects are obtained than by using an ordinary stump and powdered graphite. Some photographer grind the back surface of their negatives to facilitate retouching; others attach tracing paper with the same object in view. Combining portions of one negative with portions from another requires both patience and skill. It is easy enough to print the head from one negative and the shoulders from another; but it does not always look well, either a white or dark line, caused by overlapping or the reverse, being very often too evident. Vignetting does not produce any better result, and sometimes grave errors are made in the lighting. I have always succeeded better by cutting out accurately the portions required from untoned prints of the various negatives, using a sharp penknife for the purpose. If a line of any kind be perceptible when the parts are combined it is better to let it be a white line, for this can easily be removed by the finishing.

There are a great many matters connected with this subject which might occupy the attention of our Society for several evenings. It is manifestly impossible for me to deal with more than a tithe of them just now. Before closing, however, I wish to call your attention to a method of testing the quantity of silver contained in any given solution—preferably an acid solution. In this tube is placed some pure solution of nitrate of silver, and in this one silver solution *plus* nitrate of potash.

Example 8.—This mercury bulb, termed an argentometer, is so indexed that floating in distilled water at 60° F. it stands at zero. If 100 grains of silver nitrate be added to each ounce of distilled water the bulb should register 100°; if I were to add barium or ammonium nitrate instead, I should get a very different result. The solution I am now operating with contains ten grains of silver nitrate to each fluid ounce of distilled water. We shall find upon testing it with the argentometer that it does not register nine grains. If this be so in the case of a pure solution, what degree of certainty can there be when operating with an old bath containing nitrates and albumen? I have also another solution composed of ammonium thio-cyanate seventy-eight grains in seventeen ounces of distilled water; this is the equivalent proportion to react volume for volume on a ten-grain silver solution. These burettes are graduated in cubic centimetres. I will run off five cubic centimetres of silver into this beaker; to it I will add a few drops of dilute nitric acid and a colour indicator, such as ammonia ferric alum. I will now run into this mixture exactly five cubic centimetres of the re-agent, and you will see the reaction is complete the moment the colour remains. Having a stock of the re-agent made at any convenient strength, preferably normal or decinormal, the greatest accuracy is obtained in testing any given solution containing silver. Those who employ the French system of measurement will find it more convenient to use decinormal solution, viz., seventeen grammes of silver nitrate per litre of water, and 7·6 grammes of ammonium thio-cyanate per litre. The silver solution is merely used as a standard test for the re-agent. Each cubic centimetre of the re-agent is equal to ·017 grammes of silver nitrate, or ·0108 of pure metallic silver; thus, in testing, we multiply the number of c.c. employed to act on each c.c. of the silver solution by that number of times, ·017. An easy way to ascertain how many grains per fluid ounce are contained in a definite number of grammes per litre, is to multiply by 70, and divided by 160; thus the decinormal solution of seventeen grammes of silver multiplied by 70 and divided by 160 equals 7 and $\frac{7}{16}$ grains per ounce—practically, $7\frac{1}{2}$ grains per ounce.

I thank you, gentlemen, for your kind attention. I should like to have illustrated my remarks more fully, but have not been able to devote much time to the subject. On going carefully over it, I find I have not touched at all on some important matters. No doubt the gentlemen who follow me on this subject will not be so remiss.

W. M. Ashman.

ON THINGS IN GENERAL.

I can imagine I see a grim smile pass over the features of a gentleman (personally unknown and, possibly, utterly unlike the mental image I have formed) with whom I lately crossed swords, as he read a communication in the December issue of the "non-commercial" *Journal* of the Parent Society—the one I mean suggesting or recommending the institution of a "school of art-photography." And has it come to this? After the conscientous endeavours of the Editors of this Journal and of other writers to show the universality of art—which is for all time, and knows neither creed nor people—that at this time, when photography as a science is advancing with rapid strides, and thus showing, with no questionable voice, that so many of its votaries have the true artistic spirit, to find any one advancing a plea for teaching "photographic art," and accorded a prominent position in a representative journal is, to say the least of it, disheartening in the highest degree. True it is that art is not mathematics, and the accepted of yesterday may be the laughing-stock of today. Put up at Christie's dry work by a certain former President of the Royal Academy, and would it fetch as many pence as it was purchased for pounds? Yet never, I doubt, would "photographic art" come to the front. I feel positively degraded at the suggestion.

Such reflections lead me to think of the recent complaint that has been made of pictures being exhibited in the names of persons who did but turn the handle, as it were—who only uncapped the lens while others went through the labour and the toil of developing. I do think the whole of the operations of taking photographs are better performed by one man; but, if they be not, surely it cannot be denied that when a man produces a number of good things—and not merely a simple picture, which may be a fluke—whatever art feeling may be indicated in the picture, or canons of art followed and their application shown, should be held worthy of recognition, whoever may have developed the plate and flashed into existence the proof of the value of his selection or arrangement.

A somewhat similar theme is touched in a letter I lately saw in these columns relative to the Bristol exhibition, where whatever enlargement is exhibited it is required to have been done by the exhibitor himself. If this rule were universal more than one exhibitor would be deprived of his spoils. This point, however, is fairly open to discussion; but when, as I am credibly informed happened a year or two ago at Pall Mall, a medallist exhibits as his own (and not as an enlargement) a picture the original negative of which he had no hand in taking, and, as is commonly believed, also did not make the enlargement—I refrain from giving my opinion of such shameless effrontery.

To leave such subjects aside, I pass to the Glasgow *conversazione*, which seems to have been a thoroughly successful affair. I trust the harmony of the evening was not disturbed by the exhibition of the Grimeo-Kistocope. What a terrible instrument it must be if its proportions are at all in keeping with its name!

By-the-bye, the coincidence that I noticed last month is rendered still further remarkable. Not only is the light screen and the bicycle-saddle illustrated in this Journal, from Mr. Crooke's paper, identical with that used by Mr. Marshall Wane, but even the camera shade also appears identical with it. Cannot one of the two gentlemen give some explanation of these parallel thoughts? I should like to know also if the plate-varnishing convenience illustrated has been actually brought into practice by its inventor, as the somewhat guarded context suggests? or is it merely an idea, and nothing more? for, as represented in the drawing and described in the text, I should say it would be worthless.

Mr. McKean's lantern carrier, illustrated in the preceding pages, possesses just the opposite characteristics, and exhibitors will be under a debt of gratitude to him, in the first place, for devising, and, secondly, for publishing, such a useful contrivance.

I want to know is "useful" the correct word to employ? for I find a large advertisement brought before my eyes every week describing a certain process as being the "most intrinsic" of photographic processes. Now, I should like to give a nice, full-flowing, rounded adjectival expressiveness to my praise of Mr. McKean's inventions; but I don't like to call it an "intrinsic." I am afraid he would not take it kindly.

Mr. W. E. Debenham's invention has, as I predicted, aroused quite an excitement, and the old "canary medium" and orange pea-green controversy bids fair to be reopened in full intensity. Experiments are being made by everybody. I have heard no one condemn the suggestion on practical grounds—and theories are like statistics, they can prove anything—yet such is the perverseness of photographic human nature that with every inducement before them people will not get out of the rut. As to my own case I candidly confess, though I use ruby light, I use it freely, so that the smallest of small prints can, at any rate in summer, be read in any corner of the room with the greatest ease; hence there is no inducement to me to change. Further: I must say that personally I cannot accurately judge of the density of a negative nor as to whether the features are "sharp" when there is a sheet or two of paper between the negative and the light. This reason would prevent me taking up the idea of Mr. Herbert Starnes's lamp if I were not prejudiced against it on theoretical grounds. As far as I can judge it only reduces the intensity of the light to a most marked extent, so that if the reflected light were intensified by a lens photographic action would proceed apace. If this view be correct, the same effect could be produced by turning down the gas or by putting an extra sheet of paper on the window when daylight is used. I cannot help feeling that the general verdict will be, like that narrated in the veracious ballad of "St. Anthony and the Fishes," which explicitly explains how—

> "St. Anthony at church
> Was left in the lurch;
> So he went to the ditches,
> And preached to the fishes,"

and after expounding all kinds of valuable truths suited to their piscine natures and erratic modes of living, despondingly adds—

> "Much delighted were they,
> But preferred the old way."

FREE LANCE.

CAMERA LUCIDA.—PALETTA OBSCURA. A STUDY IN LIGHT AND SHADOW.*

To consider the first of our united art aims, namely, the exact imitation of Nature as she appears to us and as she appears to others, the eye is the organ to which we all appeal, and I do not know a more fickle umpire, except perhaps the ear.

I had a friend once in Auckland, New Zealand, who had weak eyes and used blue spectacles for the glaring. He never was satisfied with my colouring; the yellows always had such a green appearance. "Why won't you stick to pure chrome?" he used to ask, seriously transfixing me with two blank window panes of deep indigo.

Many people are colour-blind, yet not entirely so, and more is the pity, but just on one point, *like the sunstroke of Sir Roger Tichborne;* and the worst is they are not aware of that particular point, and feel quite put out if it is explained to them. They will think the man an ass who tries to prove them wrong, for if they are strong upon any point it is on that particular one. I have proved it dozens of times in cases of partial sunstroke and colour-blindness. I mean, just a slight wipe out of the mental slate—a blurring, or, as it were, a Dutch effect in the case of sunstroke; or a delicacy of perception awanting in the colour-blindness, a gauze veil dropped over, not nearly so apparent as the blue glasses, or the lack of distinction between red and green, for Daltonism like this ought to be palpable both to the sufferer and his suffering friends.

There is also a distortion of vision apart from nearness or longness of sight which is a very troublesome agent to fight against for the producer—a little nerve gone "agee" through partial paralysis or an accident before birth—and everything is different than to any one else; or it may be that it is spasmodic and occasional in its effects, and then woe to the picture that comes under his lash (if a critic) at a moment the twisted fit is on him.

Ten artists sit down to one landscape and make ten different pictures, and the camera drops in and makes the eleventh, like none of the ten, but wonderfully like the original, as those ten different pairs of eyes will testify, in spite of their varied distortions. Ten different critics look at a picture and find out different faults, each praising as virtues the faults of the nine others. Ten women will look upon one man and ten chances to one they will all find different uglinesses about him, with the exception of the tenth, *whom he may have chosen,* and yet they will all unite in agreeing that she wasn't worthy of him; which clearly proves, I think, that this form-distortion of vision is only partial.

Realism is the passion of the day, both in writers and painters; and this passion photography is only too well qualified to gratify. To note down a scene, or describe an emotion by the aid of its most minute outer symbolism, as faithfully and as free from complexity as possible, seems to be the greatest virtue and highest aim of the modern school.

The names which I would select as samples of this style of work will be those names which, by engravings and etchings, are best known to us, and so likely to be of most use in our search after excellent examples. Amongst the old masters I would quote Albert Durer for stern realism, combining a symbolism and spirituality so refined that it is no wonder his qualities have been so long unseen by critics such as Pilkington, who says of him—"He was a man of extreme ingenuity, without being a genius. In composition copious without taste, anxiously precise in parts, but unmindful of the whole, he has rather shown us what to avoid than what to follow." Rembrandt I would take next, as we all know about him and his powers; also because he seems to be the model chosen, but in few cases followed out correctly, by photographers who desire to produce striking effects. David Teniers I would point out next, as a type of naturalism without much straining after force or effect, no elevating force or symbolic influence.

I take those three great names as samples because their manners are distinctly separate, because their systems and tricks for reaching effect are easily penetrated, and because, while I am describing characteristic works by them, and explaining as well as I can how they may be followed out with original force by photographers, you will also call to mind those specimens of their brush-work exhibited in Edinburgh during this last summer, and so follow me more easily.

All good original work is got from copying and following those who have gone before. I could quote scores of painters since the days of Durer, Rembrandt, and Teniers, down to the present hour, who gain fame only through being Durerites, Rembrandtists, or Tenierians, with

* Continued from page 41.

a little of their own personalities thrown in, as those old masters did. Durer flung in and mixed up a part of himself (which he could not keep out) along with the training of Michael Wolgemuth. Rembrandt hashed up Zwanenburg, Lastman, Pinas, with a host of others, along with the son of his own mother, to produce the mightiest giant of the art race, which we all try to copy whenever we want to feel free from the feeding bottle. It is the fate of all great men to copy. Blake says—"The difference between a bad artist and a good is that the bad artist *seems* to copy a great deal, and the good one *does* copy a great deal."

Spending lots of time drawing after the antique and winning gold medals and South Kensington certificates; fiddling over false niceties, trying to *finish*, when there is no such thing as finish in creation, far less in art; being so careful that they lose all freedom of action, freedom of thought, and produce *nothing*. That is the rubbish they are turning out of the government schools nowadays—students who labour five years at freehand outline, ten years at antique casts, and niggle the rest of their useful years amongst nude models in life schools, while the real, active copyists are vaulting over their silly heads, and digging out niches to enshrine themselves down Time.

William Hunt, the Yankee, in his *Talks about Art*, tells us about Durer and copying in his own terse way thus:—"Albert Durer with an outline knew how to make an outline look like a firm, full figure. He began with firmness, and finished with delicacy.... But he did'nt get it in a day. Hercules may have strangled a serpent when he was a baby, but there was a time when he couldn't. 'Durer worked in his own way!' No! nor did anybody else at first. They all worked in the manner of someone else, in the way they were shown. Raphael after Perugino, Vandyke after Rubens. If Albert Durer had lived in Venice he would have been a Venetian painter. As it was he worked as the old German artists had worked."

I turn from Durer to Rembrandt, as from a nature refined and gentle to a nature rugged and strong, as from a woman to a man, whose firm hand I like to grasp even better than the tender clasp of the other.

Rembrandt, the master of painting—even more than Rubens—of etching and photography, who, when better understood, will do us all more benefit than any one of the others with one exception, which I shall name presently.

The secret of Rembrandt lies exposed if we only read him aright. It is not the mass of shadow and isolated light which stamps the power and individuality of the man. These are only his tricks of trade, repeated when he saw how well they took with the public. It is the vigour and command of the man that strikes us as we probe the breadth and extreme simplicity of accessories. He is content with a bunch of carrots when they serve his purpose. The copper gigantic stew-pan would have been enough if he could have hidden a part of the exact circle; but he wanted the woman to stand out alone. The other objects were put in to support a blankness, as a little by-play, an incident by the way; but the working woman is the aim of his setting up that large canvas. He got it all in of an afternoon—the time she was plucking the fowl—that is, the master touches; the rest might be done by any one.

To imitate Rembrandt properly get hold of the first High-street, Cowgate, or Leith basket woman that you chance to meet—a herring or orange vendor will do. Take her as she sits without arranging a single fold, adding to or removing one iota about her; take her on the street or in the close, or as she squats down inside the half-darkened doorway of her own little shop. She can neither have too little or too much about her if she struck you distinctly while you passed as being picturesque. Never mind the lighting, or think to be original. As she stands, or sits, or squats, she is the woman for your camera; out with it and secure her before she can wink or know what you are up to, and you have caught the whole secret of Rembrandt's power and realistic talent. HUME NISBET.

(To be concluded in our next.)

DISTRIBUTION OF MEDALS AND CERTIFICATES AT THE POLYTECHNIC YOUNG MEN'S CHRISTIAN INSTITUTE IN CONNECTION WITH THE CITY GUILDS.

ON Thursday evening, the 17th instant, the medals and certificates gained by students in photography at the Polytechnic Young Men's Christian Institute, at the annual examination in connection with the City Guilds, were awarded to the successful candidates,—Mr. W. Fowler, M.P., occupying the chair. The large hall was crowded with the students and visitors.

Mr. Quintin Hogg, the founder and hon. secretary of the Institute, in his report for the past year, stated that the Polytechnic headed the list above all other schools in the country at the City Guilds' examination—eighty per cent. of the candidates who presented themselves from the Polytechnic obtaining certificates, while from all other educational centres the average passes were fifty per cent.

The prizes were distributed to the successful competitors by the Right Hon. the Lord Chancellor (Earl Selborne), who, in a capital speech, expressed his pleasure at being present and the interest he took in the matter of technical education, being himself officially connected with the City Guilds. His Lordship (and also subsequent speakers) dwelt at some length on the importance to the country at large of advancing technical education in the various arts and trades, alluding to the efforts now being made in this direction in foreign countries, and said that if England was to hold her own in competing with other nations still more attention must be given to technical teaching.

Classes in photography are now held twice a week at this school, under the direction of Mr. E. Howard Farmer.

RECENT PATENTS.

PATENTS APPLIED FOR.

No. 934.—"Apparatus for Changing Dissolving Views." W. H. DUNCAN.—*Dated January* 8, 1884.

No. 1,497.—"Increasing the Focal Length or Range of an Ordinary Photographic Camera by Means of a Collapsible Extension Joint." D. H. CUSSONS and W. T. TURNER.—*Dated January* 16, 1884.

No. 1,622.—"Photographic Cameras." A. C. LAMB.—*Dated January* 17, 1884.

No. 1,794.—"Photographic Shutters." R. B. GARDE.—*Dated January* 21, 1884.

No. 1,814.—"Portable Folding Tripod Stands." F. W. HART.—*Dated January* 21, 1884.

No. 1,898.—"Construction of Photographic Cameras." C. SANDS and J. J. HUNTER.—*Dated January* 22, 1884.

APPARATUS FOR CHANGING AND STORING PHOTOGRAPHERS' BACKGROUNDS AND OTHER MOVABLE SCENERY.

THE following is the specification of an invention communicated by WILLIAM EVANS LINDOP, of St. Thomas, Ontario, Canada:—

This invention consists of a gate or switch-like frame provided with rails at top and bottom, together with a series of stalls, each having rails at corresponding heights to those of the gate to receive a background, the gate or switch being so pivoted that it may be brought opposite to any one of these stalls, so that the background therein may be readily run on to the gate for use from any one of the stalls, and *vice versâ*.

The backgrounds have rollers at back which run on the rails of the gate and sustain the background in position, and the gate is pivoted or hinged to any suitable support at one end, or at some intermediate point, and its hinge rod made double-jointed or cranked in order to enable the gate to be shifted about for altering the position of the background.

The stile of the swinging end of the gate is provided with one or more spring catches, to engage with the posts of the stalls to hold the gate while changing the background.

A spring holds the other end of the gate at the same time, said spring being attached to the floor to receive the bottom part or crank of the hinge rod, and fastened at one end only in order that the other end may slide along the floor and be depressed by the crank, which passes into a notch in the spring, whereby the hinge rod is held in the required line with the stall.

Where space will allow of it the stalls will be extended in a straight line, and backgrounds of said construction employed; but, to provide for storing the backgrounds in less space they may be made flexible by means of narrow strips or slats properly jointed together, the stalls being curved so as to turn corners or run in circles, or nearly so, if desired.

The rollers on the backgrounds are grooved for running on the rails, but grooved rails may be employed with rollers to run in them if desired, and other modifications of the details may be made.

The gate is provided with a caster wheel on its free end to prevent it from sagging, and, by preference, the lower guide rolls on the backgrounds (when used) will be located under the lower rails of the gate, to have better effect in bending the flexible backgrounds to the rails.

The invention is applicable to other scenery as well as to the backgrounds of photographers' rooms.

Our Editorial Table.

BACTERIA.—By DR. ANTOINE MAGNIN and GEO. M. STERNBERG, U.S.A., F.R.M.S.—Second Edition, with Plates, pp. 487.
New York: W. WOOD AND CO.

IN a series of articles devoted to *Photomicrography*, an attempt is being made to show its conditional applicability to meet some of the difficulties in delineating the images of minute microscopic objects, and we are now enabled to cite the above work as an example of its utility. This second edition of *Bacteria*—a work originally from the pen of Dr. Magnin and translated by Dr. Sternberg, the author of *Photomicrographs and How to Make Them*—has been very largely supplemented by a *résumé* of the latest works and opinions of some of the most eminent experimentalists and observers in this conflicting and laborious field; also by valuable original contributions of the translator.

Under the joint authorship we have now an excellent work on the *Bacteria*, with the statement of the experiments that have led to the more or less general opinion that some of the schizophytes are the cause of, at least, a few of the devastating infectious diseases, especially among cattle and poultry, if not also in man. We have, likewise, the details of the curious fact of the virulence of the author's saliva, being that of a healthy person, and of others, when injected under the skin of healthy rabbits, both before and after pure cultures of the peculiar infective micrococcus have been procured.

Very recently we have seen it stated that Dr. Friere, of Brazil, has obtained and cultivated the micrococcus of yellow fever, *Cryptococcus Xanthogenicus*. Acting upon the courage of his experiments, and advice of a medical commission, he has already inoculated five persons, under the conviction of securing to them immunity from the virulent form of the fever.

The methods which have been found successful in obtaining purity in the cultures, without which all results would be open to doubt, are especially noted. Good photomicrographs are given in heliotype plates, and in the preface Dr. Sternberg acknowledges "the technical difficulties attending an attempt to photograph the minute organisms represented." Figures from various sources are also given of many of the *bacilli*, *bacteria*, and *micrococci*. The 487 pages may be briefly divided into the classification (Cohn's), embracing the morphology and physiology of the organisms, while the additional portions, due to the translator, are given in the technology (cultivation, staining, photographing, collecting, attenuation, &c.); germicides and antiseptics (some 60); bacteria in infectious diseases (34), and in surgical lesions. Twelve plates and sundry woodcuts adorn the work, which is completed by a most copious bibliography.

The value of the book is very largely dependent upon, and increased by, the conscientious manner in which it has been accomplished; hence, it is the more to be appreciated in a subject of such momentous question and widespread interest.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
January 29	Bolton Club....................	The Studio, Chancery-lane.
,, 30	Photographic Club	Anderton's Hotel, Fleet-street.
,, 31	London and Provincial	Mason's Hall, Basinghall-street.
,, 31	Liverpool Amateur	Free Library and Museum.
,, 31	Oldham........................	Hare and Hounds, Yorkshire-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

At the technical meeting of this Society, held on Tuesday last, the 22nd instant, the chair was taken by Captain W. de W. Abney, F.R.S.

Mr. A. Cowan said that a question had been asked at a previous meeting as to the advantage which had been claimed for the addition of iodide of mercury to the developer (in this case, the soda developer) as an accelerator with gelatino-bromide plates. He produced six plates, the first four of which had been exposed for a similar length of time, and had been developed in the following manner:—No. 1 with the usual pyro. and ammonia; No. 2 with the soda developer; No. 3 with the soda developer and the mercury added after a time, as recommended; and No. 4 with the mercury added to the soda solution at the commencement of development. Plates 5 and 6 were developed like plate No. 3, but had had less exposure. He could find no gain at all from the use of the mercury. He considered that it only acted as an intensifier in the same manner as it would do after fixing. When mixed, either with pyro. alone or with soda alone, the mercuric solution produced no effect, but when mixed all together the solution became muddy at once. There was, he thought, no advantage in the use of the soda developer, and none from the addition of mercury in the developer.

Mr. W. M. Ashman had experimented in the same direction, and his opinion was in accordance with that of Mr. Cowan.

The Chairman inquired whether the intensifying action of the mercury when mixed with the developer gave a permanent negative.

Mr. Cowan thought that it gave a result neither more nor less permanent than the use of mercury and hypo. generally.

Mr. W. E. Debenham considered that the use of Schlippe's salt after that of mercury was favourable to permanency.

Mr. T. Sebastian Davis remarked that the discussion showed the benefit of the technical meetings. The experiments which had been made would, doubtless, prevent many others from wasting their time on the process.

Mr. Payne Jennings observed that it was satisfactory that both experimenters had come to the same conclusion.

Mr. Debenham said that on a previous occasion he had shown a lantern to exhibit the comparative illuminating effects of a light through four varieties of medium, namely:—No. 1 side fitted with green glass and yellow paper, No. 2 with two ruby glasses, No. 3 with ruby flashed upon orange pot glass, and No. 4 with ruby glass and yellow paper. The result had shown the greatest luminosity to come through the side with the least chemical action, namely, that one fitted with the green glass and yellow paper. He now exhibited the lantern fitted for comparing other media. The same green and yellow combination was on No. 1 side; on No. 2 were cherry fabric and tissue paper, and on No. 3 were orange glass, ground glass, and white paper. The paper had been added to the last-mentioned combination because without it the light was so powerful that a fair comparison with the other lights could not be instituted. The gas having been turned down, some drawings on the wall were illuminated by each side of the lantern in turn, and the general opinion was that decidedly less could be seen by the light through the cherry fabric than by either of the other lights. Plates were shown which had been exposed simultaneously for twelve minutes at a distance of eight inches from each side of the lantern. The plate opposite the green glass and yellow paper showed less action of light upon it than either of the others, which were about equal.

The Chairman said that, bearing on the same subject, he would show some plates prepared for experimental light-testing purposes—some with chromate and some with bichromate of lead; also, some orange paper and some paper which had been given him as canary medium. He had exposed plates at a distance of four feet from an eight-candle gas jet behind each of these mediums. Canary paper was unsafe in itself, but the addition of orange paper to it made it quite safe.

Mr. H. H. Cunningham said that the paper handed round by the Chairman as canary medium was not at all like what he had seen as that material, and was much thinner.

Mr. Debenham confirmed Mr. Cunningham's observation, and added that he had found canary medium safer, produce less effect on the sensitive plate, than a ruby light of the same luminosity to the eye.

Mr. T. Bolas said that the great point was not to use too much light.

The Chairman remarked that a plate might be developed with white light kept down in quantity.

Mr. Bolas inquired whether the Chairman considered that it would be safe as a working method to use white light.

The Chairman said it would be perfectly safe if care were taken to use only reflected light and keep the plate shaded.

Mr. Davis thought orange glass and yellow glass together formed a good combination.

The Chairman said there was nothing to compare with a glass known as "stained red;" it was of deep orange colour.

Mr. Davis observed that when development was long he turned his back to the light and shaded the plate.

Mr. J. Cadett said that he had been trying yellow paper in comparison with a ruby globe, working at a distance of four feet from the light. He found the light from the yellow paper decidedly preferable for working by, and the effect on the sensitive plate was less than with the ruby globe.

The Chairman said that yellow light might do for plates containing iodide, but with pure bromide plates it was necessary to use red.

Mr. Debenham said that anticipating that objection he had, as he stated at the meeting when he first introduced the subject, exposed to the four different coloured sides of the lantern pure bromide plates as well as those containing iodide, but could find no difference in the results.

Mr. Jennings thought the best light he had used was that obtained through ruby glass and orange paper.

Mr. Cadett said he had found with that combination that a plate had fogged in ten seconds at a distance of eighteen inches.

Mr. Bolas remarked that with some persons the sensitiveness of the eyes to rays of certain colour was different from that of other persons comparing the luminosity of light of various colours.

Mr. Cowan said that some considerable interest had been excited by Mr. Debenham's method of lighting the dark room, and quite lately by a method of using reflected light only. He had combined these methods in his dark room, and had a large sheet of the green glass with four thicknesses of yellow paper in contact with it. At a distance of four inches from this glass was a gas flame, but a tin shade was arranged so as to prevent any light from the flame from striking directly upon the glass and paper. The light from the flame fell upon a sheet of the same kind of yellow paper, which was curved so as to reflect its light through the glass and paper. He had exposed three sections of a plate at a distance of six inches from the glass for periods of five, ten, and fifteen minutes. A fourth part of the plate had been kept covered. On development no trace of an image appeared on any part of the plate, which was handed round for inspection. There was ample light for working by.

In answer to a question, Mr. W. Ackland said the injury to the eyes from working in a red light that had come under his observation was a weakness of the ciliary muscle.

Mr. W. England thought it was very evident that green-yellow light might be used with safety.

The Chairman said that green and red light combined would make a yellow which was absolutely unsafe.

A question was read from the box, and the Chairman suggested that answers should be given at the next technical meeting. The question was—Which of three courses is it best to pursue in developing a gelatine plate—1. To wet the plate before developing.—2. To mix the developer completely at first.—3. To add the constituents of the solution by degrees?

Mr. G. L. Addenbrooke said that a plate wetted first, developed more slowly, and more on the surface, than one on which the developer was poured direct. In the latter case the image showed more at the back of the plate.

The Chairman remarked that much depended upon the state of the plate at the time of development. If it were very dry from the effects of climate, it might appear as if it had only had half the proper exposure. Such a plate would register three numbers lower on the sensitometer than one which was in the ordinary state. If kept for two or three months in his laboratory (which was rather humid) before development, the plate returned to its normal state.

It was mentioned that at the next technical meeting there would be the Society's two-wick sciopticon lantern in use, and comparisons of slides of various makes and of other forms of lanterns were invited.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society held on Thursday the 19th inst., the chair was taken by Mr. A. Haddon.

Mr. W. E. Debenham showed a dipper of wood, pegged together, for use in a hypo. bath for large plates. He said that some time before he had seen a dipper in use by Mr. A. L. Henderson in which there was a slot along the upright part, with a glass stud sliding in this slot. This stud caught the top of the plate and prevented it from slipping off. The present dipper had such a slot, with the addition that, at the top, the slot or groove was continued for a short distance in a horizontal direction. This allowed the stud, which was an ordinary ivory collar stud, to remain without slipping down, whilst the plate was put in place. The bottom of the dipper was a piece of wood, about ten inches long, by one inch wide, and had two deep semicircular grooves running along it. Two plates could, if necessary, be placed on the dipper, one in each groove. This was an advantage, as although, for ordinary sizes, he preferred to have several baths in use so that each plate might have time to fix properly, it would be inconvenient to have several such large baths as that to which this dipper belonged, one taking plates up to twenty inches by sixteen.

Mr. W. M. Ashman thought it very desirable to have plenty of accommodation for thorough fixation. He kept four hypo. baths in use.

Mr. A. Cowan showed a camera, understood to be of French manufacture, with a novel means of altering the position from vertical to horizontal, or *vice versâ*. The front of the bellows was attached to a circular plate which worked in a recess in the camera front. The back was attached to the base-board by a screw which could not be quite drawn out, so that it could not be lost, and on turning this screw the back was disengaged, and might be revolved and refixed by a similar screw in the desired position. There was also great length of movement, focussing from two and three-quarters to seventeen and a-half inches.

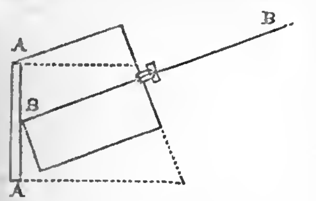
Mr. H. S. Starnes showed a variation of the lamp which he had previously exhibited, and which was contrived for portability in travelling. A base and top of semicircular shape were made of blackened tin with a vertical rim. In these rims was placed a sheet either of cardboard lined with green or brown paper, or a sheet of ordinary brown paper merely. The semicylindrical form of the card or paper gave it sufficient rigidity to support the tin top. In the base was a socket for a candle, and a rim for holding a piece of card to keep any light from passing except that which was reflected from the paper forming the inside of the lantern.

A Member inquired whether there was any difference in principle between the use of a tilted camera with a swing back and a camera with a swing front and rising arrangement.

The Chairman said that perhaps Mr. Debenham would answer the question.

The Member (continuing) said that the case was one where the lens would only cover the plate of the size wanted, so that it was not admissible to raise the front without tilting either camera or front. He thought that there was an advantage in the use of a swing front, as the lens could be raised a little and so do part of what was wanted, and that the front would not have to be swung to so great an angle to get the image central as the angle that would occur when the camera was tilted and the back swung into the vertical position.

Mr. Debenham said that there was no difference in the angle in the two cases, and put the annexed diagram on the black-board in illustration of the position. Let A A be the camera back, and B B a line from some point in the building which must come in the centre of the field. Now the lens must occupy the position in which it is drawn, whether the camera be tilted and the back swing vertically, or the front be swung and the lens raised as in the other case. It could, therefore, make no difference optically whether the filling-in of the camera took the ordinary form indicated by the continuous lines or that with the swing front indicated by the dotted lines. For his own part he preferred, as being better on principle, to use in such a case a lens with very wide angle, a rigid camera, and high rising front.



Mr. R. E. Wilkinson was elected a member of the Association.

MANCHESTER PHOTOGRAPHIC SOCIETY.

The ordinary monthly meeting of this Society was held at the Manchester Technical Schools on Tuesday, the 10th inst.,—Mr. John Pollitt, President, in the chair.

The minutes of the previous meeting were read and confirmed. The following gentlemen were elected members of the Society, and afterwards formally introduced to the President:—Messrs. John H. Baird, Jas. H. Prestwich, and T. C. Rayner.

The Hon. Secretary then read a paper which was particularly of interest to the members of the Society, calling upon them for assistance in making the monthly meetings as interesting as possible. He (the Hon. Secretary) said he was quite aware of the difficulty to many of the members in finding original matter for papers, but thought there were plenty of subjects of sufficient interest that might be taken up by them. Say, for instance, a few practical demonstrations in the development of gelatino-bromide plates; for all knew how much more they could learn by seeing a thing done under their own eyes than by any amount of book reading. He did not advocate *every* amateur making his own plates, as the general convenience and limited consumption was not sufficient to enable them to prepare plates better, or even as good, as could be purchased from many of the more commercial firms, any more than they could prepare albumenised paper for printing. In the days of collodion dry plates things were very different; but, even then, few amateurs made their own collodion, so that it is the development of plates to which he would advise them to turn their attention for the present. There were now various methods for developing gelatino-bromide plates, with particular merits claimed for each, and a few practical demonstrations carried out in a scientific manner would, he was sure, be of interest to all. Take, for instance, the ordinary pyrogallic developer, the ferrous-oxalate, the sal-soda, the sulpho-pyrogallol, the developers in which citrates are added, the hydrokinone developers, and a new one spoken of in last week's Journal, from Mr. Newton's studio in America. Perhaps the best way to test these developers at the meeting would be to expose a number of plates of one batch, behind a negative in a printing-frame, to the light of a lamp (which could be made dark for developing). Developing trays and chemicals were, he thought, better brought by the demonstrator. After the plates had been exposed consecutively for a given time, at a measured distance from the lamp (thus ensuring the same exposure to each plate), they might each be developed by a separate developer, and the result could be judged afterwards. The developing of plates, as here suggested, could be varied in other ways, and a night might be spent in testing the rapidity of various plates by a standard developer, using one of Warnerke's sensitometers. The intensification of gelatine plates by the various methods might occupy another evening, and he (the Hon. Secretary) instanced many failures through imperfect knowledge in the use of chemicals. An evening might profitably be spent in the making of lantern transparencies, and perhaps by other methods than gelatine: for, although there has been some good work shown on gelatino-albumen plates, he did not consider gelatine transparencies compared favourably with those by many other processes he could name. In turn, the carbon process might easily be demonstrated, and he did not think the manipulation of a wet collodion plate or two would be out of place. Another subject might be *Enlarging* by the various methods, comparing argentic gelatino-bromide paper enlargements with those by other processes from the same negative. An evening could be well filled up with testing the use and value of swing-backs and swing-fronts. There was plenty to say about lenses for one or two evenings; and if they could induce some of our artist friends to contribute a paper or two for their guidance in the artistic arrangements and composition of their photographs no subject would be more acceptable or so highly appreciated. He (the Hon. Secretary) concluded by expressing his willingness to assist in whatever way his services could be made useful, assuring the members he would not shirk his share of the work when his time arrived.

The President said he hoped Mr. Chadwick's communication would be followed with practical results, and was of opinion the subjects set forth by him would prove very valuable instruction to most of the members.

The Hon. Secretary then exhibited several view lenses, and described (by use of the black-board) the diaphragms and their respective value, promising on some future occasion to read a paper on elementary photographic optics.

Mr. Lewis Morgan said he had paid great attention to Mr. Chadwick's remarks, and proposed a special vote of thanks.

Mr. E. Openshaw said he was much pleased with the information Mr. Chadwick had given about lenses and diaphragms; and although it was simple enough when explained, he was sure many of the members, like himself, were wiser after the explanation. He seconded the vote of thanks.

Mr. Rishton promised to read a paper on swing-backs at an early date.

Mr. A. Brothers said he should be glad to give a demonstration of the Daguerreotype process.

Mr. Chilton exhibited several plates showing insensitive marks round the edges. He had prepared the plates himself, and was unable to account for the cause of the markings.

Mr. Schofield said he had had similar markings on his own plates, and had, he thought, discovered the cause to be imperfect drying; in fact, he had satisfied himself that he could cause or prevent it at will.

Mr. Smith thought, with Mr. Schofield, that imperfect drying was the cause.

Mr. W. B. Wood said he also had experienced the markings, and after an alteration in his drying-box they had disappeared.

Mr. Allen Garnett had frequently developed plates with similar markings and by various commercial makers.

Mr. Edwards and several others all expressed similar opinions.

Mr. Allen Garnett showed a negative in which was clearly seen a double image on part of the plate only.

Mr. McKellen said he had had several similar.

Mr. W. B. Wood believed the cause was from the stop in the lens not being put in its proper place, and allowing light to get under the stop.

Mr. Chas. Harris observed that he had a photograph which he purchased in Malta, a short time ago, showing two ships, whereas there was only one in the actual view. He promised to bring it to the next meeting.

Mr. John Warburton presented to the library of the Society Thomson's translation of Gaston Tissandier's *History and Handbook of Photography*, and a vote of thanks was passed.

Two questions were from the question-box, respecting lenses, were replied to by the President.

The albums and folios of the Society were brought out, and it was suggested that as they were so full of pictures new ones be provided. Mr. S. D. McKellen promised to present six landscape prints as soon as the new folios were ready.

After a very interesting and pleasant evening, the meeting was adjourned till February.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

The sixth general meeting of the Association was held in the Religious Institution Rooms, on Thursday, the 10th instant,—Councillor Robertson in the chair.

The minutes of last meeting and of the *conversazione* were read and approved.

The Chairman then invited the members to inspect a number of platinotype prints lent by the Platinotype Company. These were very much admired, and several gentlemen testified to the simplicity and suitability of the process.

Mr. J. Paton said it was the simplest process he had ever tried. He had no trouble from the very first, and exhibited some excellent specimens of work in proof of his statements. He also showed some portraits, printed both on albumenised and platinotype paper for comparison, but the general feeling of the meeting was that the gloss of the albumen print imparted an advantage over the platinotype for portraits. He (Mr. Paton) said that he had twice tried to enamel platinotypes, but had not been successful. He thought the paper supplied by the company was not suitable. The prints had always a greasy appearance after enamelling.

The question was then asked whether solar enlargements could be done on platinotype paper.

Mr. T. McLellan said it would be quite possible to do it, but that a very long exposure would be required.

Mr. Philson showed some enamelled silver prints in accordance with his promise at the meeting on the 22nd November. A discussion arose as to the best method of mounting enamelled photographs. Some of the prints exhibited (Mr. Philson explained) were mounted with starch before being stripped from the glass. The others were mounted with gelatine along the edges. The surface of these, however, were slightly dulled where the gelatine touched the back.

Mr. Paton also showed some enamelled prints mounted with gelatine. These showed no mark of the mountant, owing to his having used a thick paper to back-up the print when enamelling.

Some discussion then took place concerning the permanency of enamelled photographs, and the general opinion of the meeting was that enamelling very much increased the permanency of silver prints.

The Chairman said he had noticed a camera advertised by the Scovill Manufacturing Company, in the New York *Photographic Times*, the principal feature of which was the revolving back, which enables the operator to make either an upright or oblong picture after he has the plate in the slide. This was advertised as Flamming's patent—a truly novel instrument. He said this statement was hardly correct, and exhibited one on exactly the same principle made for him fully twenty years ago, which had also the advantage of moving so as to take eight pictures on one plate without changing the position of the lenses.

Mr. Blackley said he had never heard of either Councillor Robertson's or the Scovill Company's cameras, but he had one made quite recently on the same principle which he would exhibit at the next meeting. Votes of thanks were then awarded to the Platinotype Company, to Messrs. Paton and Philson, and to the Chairman. The meeting then terminated.

BERLIN ASSOCIATION FOR THE CULTIVATION OF PHOTOGRAPHY.

A general meeting of this Society took place on the 7th December, 1883, when the chair was taken by the President, Professor H. W. Vogel.

Herr Schapiro, of St. Petersburg, was admitted a member, and the Chairman mentioned that Herr Schapiro had kindly promised that the series of pictures taken by him and shown at the previous meeting, under the title of *The Memoirs of a Madman*, should be reproduced as a supplement to the *Mittheilungen*.

Herr Goltzsch showed a stereoscopic camera of peculiar construction intended for the use of amateurs, which he had himself made, using a pair of opera-glasses for lenses. He also exhibited some of the pictures taken with it.

The camera was examined with interest, but the general opinion seemed to be that, in order to make it really a useful article, some radical changes would require to be made in its arrangement.

Herr Suter, of Basle, who was present as a guest, showed one of his small wide-angled aplanatics.

The Chairman spoke well of this lens, and showed an architectural view he had taken with it. He, however, remarked that the term "wide-angled," as applied to this lens, was hardly correct, as its angle was rather under 90°.

Herr Suter said it would not be difficult to make a lens of such an angle. He thought the principle fault of this lens was that its focus was rather too long. The focus of the next higher number was *relatively* shorter.

Herr Haberlandt, who had tried one of Herr Suter's larger lenses, reported favourably of it.

Herr Schwier presented to the Society a copy of his *Photographen-Kalander*, for 1884.

On the motion of the Chairman, it was resolved on this occasion and for the future to have no second meeting of the Society in December, because the second meeting of that month was usually thinly attended.

In order not to clash with the Physical Society (of which many members of the Association were also members) it was resolved to meet every second Friday, so as to alternate with the meetings of the Physical Society, instead of meeting, as hitherto, on the first and third Friday of each month.

The Chairman showed some specimen results of a new process of photo-engraving, recently discovered by Herr Obernetter. The correctness of the gradation of the lights in the specimens shown was said to be remarkable. The process is stated to be based on the use of Obernetter gelatine plates, which are transferred to copper, and then serve as a basis for a peculiar process of etching. The plates so obtained are multiplied galvanoplastically. The pictures exhibited excited an extraordinary sensation.

Herr Haberlandt recommended that the pad put at the back of the albumenised paper in the printing-frame should be of cloth instead of paper, as the sensitive paper would then keep longer white and lie flatter upon the plate. He also spoke of the use of a trace of hyposulphite of soda in the development of under-exposed gelatine plates. He complained that plates so treated went back a great deal in the fixing bath, and was recommended to use that addition to the developer with great care and only to add it to the developer at the end of the development.

The Chairman again showed some of the portraits he had collected in the course of his journey through America. Amongst them the work of Rocher, of Chicago; Cramer, of St. Louis; and other well-known names were represented.

The question-box was then opened, and its contents having been disposed of, the meeting was adjourned.

Correspondence.

GELATINO-CHLORIDE FOR TRANSPARENCIES.

To the Editors.

Gentlemen,—I note in your issue of January 18th some questions put by a gentleman signing himself "Demarr," and relating to my remarks previously made in your columns on contact printing with gelatino-chloride emulsion. I think the questions about the printing are not difficult to answer, and I gladly assert that if no greater difficulties present themselves to "Demarr" than those he suggests, he will, in a very short time, completely master the process I was trying to popularise.

To retain my gelatino-chloride plate in contact with the negative to be copied, I simply put them face to face in a well-made printing-frame. A proper printing-frame—for all purposes—has a plate-glass front, a good, thick pad, and *good* springs, sufficiently strong to keep the plates in contact even if one be slightly curved, but not strong enough to break any ordinary plate. I have a great many 10 × 8 transparencies produced in this manner, and I never had a smash. I do not think "Demarr" need apprehend any great mortality among his negatives from this cause if he use or buy decent plates; still, I admit the force of his objection so far as it goes.

As to an unvarnished collodion negative: well, I should like to back myself to produce a contact positive even from that; but if I felt myself diffident, or fearful of scratching, I should probably varnish it or pour thin gum solution over it. Again I admit the force of "Demarr's" objection; for of a truth I should not make a practice of contact printing from collodion negatives before giving them at least a very thin coating of something.

Lastly: "Demarr" argues that if a photographer sell glass positives others may copy them. He has me on the hip this time, just as he would have those pirates if his negatives were copyright. I am not a lawyer, nor even a professional photographer, but I calculate silver prints can as easily be copied without infringing the law as glass positives.—I am, yours, &c.,

Craigcleugh, Langholm, N.B., January 19, 1884. Andrew Pringle.

FUMING SENSITIVE PAPER.

To the Editors.

Gentlemen,—At the commencement of your article on *Fuming Sensitised Paper*, page 34 of the present volume, you refer to my experience in the ammoniacal treatment of paper, and appear to be in doubt as to whether the experience was gained in America or this country.

Now, although I have every respect for Americans and American institutions, I think it is due to the photographers of this country for me to say that I took my first lesson in fuming paper from Mr. A. L. Henderson, of London-bridge, as far back as 1863—three years before the publication of the *Silver Sunbeam*. During my travels in America, soon afterwards, I met a great many photographers who had not the most vague idea of ammonia fuming, many of whom might, if they chose, say when and who gave them their first instructions. Before fuming became so general many photographers used a ninety-grain solution who would not care to admit it now.—I am, yours, &c., Wm. M. Ashman.

3, *Amersham-road, New Cross, January* 23, 1884.

"A TRADE QUESTION."

To the Editors.

Gentlemen,—It is a very great pity that, assuming the facts as stated by "X. Y. Z." in the Journal of last week to be correct, he did not give us the *name* of the firm who are doing their best to injure professional photographers. It is most sincerely to be hoped that if the name be made public all photographers will make it a matter of duty to have nothing whatever to do with such a firm.

I can draw my own conclusions as to the firm in question, and will take care that neither directly or indirectly will I have anything to do with them so long as they are doing their best to injure professionals.—I am, yours, &c., Z. Y. X.

January 22, 1884.

"PHOTOGRAPHIC EXHIBITIONS."

To the Editors.

Gentlemen,—I am glad to see that some of your readers are drawing attention—not before time—to the treatment of pictures at photographic exhibitions, and I beg that you will allow me a little space to enlarge on the ideas so admirably expressed in Mr. Lyddell Sawyer's letter of last week.

I, too, was an exhibitor at the Newcastle Exhibition and I can truthfully say that I spent many months in preparing negatives for it. I appeal to you whether, after a man has studied art in all shapes and forms, burning the midnight oil and rising with the lark; after endeavouring to breathe art into inanimate photography; after educing from the inmost recesses of his soul noble aspirations and delicate subtleties which might elevate photography to a higher and a prouder position than it has ever yet occupied;—I ask you, gentlemen, whether it is right that these splendid results should be liable, at the whim of any member of a hanging committee, to be wantonly wasted in the dim obscurity of some dark corner? and whether the continuity of an epic series should be broken by pictures being distributed over all the nooks and corners of an exhibition room?

This is what happened to me. I may say, with all modesty, that I have done my best to get a thorough knowledge of art; and I think, with Mr. Sawyer, that our talents, such as they are, should not meet with a return like this. I, like Mr. Sawyer, drew the attention of the Hanging Committee to my pictures; but, as I had not the honour of previously exhibiting them at Pall Mall, I suppose I did not get even the attention which Mr. Sawyer got, for mine were hung in odd corners, on the floor, and in the worst lights. Mr. Sawyer says he got four of his hung together, but *no two* of mine were.

It is, as Mr. Sawyer cleverly puts it, highly improper that a committee, appointed simply because they have leisure, and quite without reference to their powers of discrimination, should be able to shatter the chances of competitors.

I think that though Mr. Sawyer, with a politeness which does him credit, says he will refrain from commenting on the discourtesy shown him, it is a matter which should be brought before photographers; and I, for one, am not prepared to keep my opinion to myself.—I am, yours, &c.,
January 21, 1884. E. G. O.

To the EDITORS.

GENTLEMEN,—There was a somewhat noticeable letter in the Journal last week on the above subject. An exhibitor at Newcastle-on-Tyne complains that his pictures were not hung as he wished, although he took the trouble of telling the Hanging Committee exactly what he wanted. This does seem too bad.

It is generally understood that hanging for an exhibition of any kind is an invidious, a laborious, a difficult, and an utterly thankless task; but if each exhibitor would kindly attend with his pictures and explain exactly how and where he wished to have them placed, the work of the hangers would evidently be much lightened. As there could not possibly be any difficulty in fulfilling the wishes of all the exhibitors, and in giving to each one of them the best light and the best position, the exhibition would *probably* be a great success.

To turn this probability into a certainty it would only be necessary to provide a medal for each exhibitor, or, preferably, for each exhibit.—I am, yours, &c., K. ALNWYKE BROWNE.
January 22, 1884.

Notes and Queries.

J. C. BROWNE, D.D., asks:—"Is it possible to get the platinotype tone with the ordinary albumenised paper? Will chloride of platinum do it? If so, could you give me the formula?"

I AM about building a new studio. Being naturally desirous of constructing it on the most approved principles, I ask your kind help and information.—W. J. BYRNE, Richmond, Surrey.

KINDLY let me know if it be necessary, in the matter of copyright photographs, to brand them as such in the case of their being published, or if they can be sent out simply with the name of the subject on them.—C. A. M.——In reply: Such "branding" is unnecessary.

IS a gentleman whose portrait has been placed in a showcase as a specimen legally entitled to smash the glass and destroy the portrait, merely because we omitted to remove it immediately or soon after receiving a request from him to do so? The opinion of brother photographers will be esteemed.—BROKEN FRAME.

I AM about to build a studio. Can you kindly give me any information on the subject? or if there be a book published on the construction of studios say where it may be had, and you will greatly oblige,—JOSHUA MADEN.——In reply: There are several valuable articles on this subject scattered through back volumes of this Journal, but there is no book devoted to it.

H. HOLDEN says:—"Would you kindly let me know, through the medium of your valuable Journal, what lens you consider best—whether landscape or portrait—and whose make would be best suited to all kinds of direct enlarging from the *carte-de-visite* negative, from $6\frac{1}{2} \times 4\frac{1}{4}$ up to 24×20?"——In reply: Any good *carte* lens will answer the desired purpose. Let the lens be made of moderately long focus, and when employing it for this purpose let the back lens be placed next the negative.

Now that gelatino-chloride seems to be coming to the front, would you allow me to suggest that some enterprising firm should supply gelatino-chloride paper? If I remember rightly, Captain Abney demonstrated the beauty of this process in his lectures before the Society of Arts two years back. I have several times since tried to get paper prepared in this way, but have failed. I am sure there would be a demand for the paper—perhaps greater even than for the gelatino-bromide paper—owing to the variety of tones obtainable.—H. G. M. CONYBEARE.

J. INGHAM inquires:—1. Would a plain bromide emulsion act as well as chloride or bromo-iodide for coating canvas for enlargements?—2. What is a *good* intensifier that also acts as a brightener of negatives?—3. For general purposes, for an amateur, what kind of lens may be recommended?—4. Who was the inventor of the gelatine dry plates? and who first sold them or advertised them in the Journal?—5. A good runner runs (say) one hundred yards in ten seconds; that is, one inch in $\frac{1}{360}$ secs., and a quarter of an inch in $\frac{1}{1440}$ secs. My shutter only works to $\frac{1}{250}$ secs.; how far ought I to stand from the runner to take a sharp picture?

LENS asks:—"Will any reader inform me what is the shortest distance required by law to enable me to build a wooden shed near any other building?"——To a second question put by this correspondent we reply: Any oil lamp will do to retouch by, if you use a fine piece of ground glass behind the negative, or reflect the light on to a piece of white paper.

G. B. R. says:—"I am greatly pleased at the idea of your starting a *Notes and Queries* department, because (if you will pardon my saying so) your 'Answers to Correspondents' column is of no use whatever except to individual querists, owing to the suppression of the question. The answer, 'Yes, certainly,' may be all important to the 'A. B.' or 'X. Y. Z.' to whom it is addressed, and who, perhaps, may have put a question which is amply answered by it; but how much is the general reader benefited thereby? My idea of a proper 'answer' is one that affords the reader an idea of the question that has been asked."

F. P. wants help. He uses 165 ounces of silver nitrate for sensitising paper. The cuttings—that is, paper ash—give him twenty-five ounces of silver; the residues only eight ounces. What is wrong with his mode of treatment of the latter? The first two washing waters are saved, and thrown down with common salt about two handfuls a day, and the clear water drawn off about twice a week. The prints are given a third washing in acetic acid and water, which is thrown away. No attempt is made to save hypo.——In reply: "F. P." has quite overlooked a fertile source of recovering silver, viz., precipitating the precious metal from the hyposulphite fixing bath by the addition of sulphide of potassium. After trying this let him report again.

IN reply to the query of "A. B.," who inquires the best way to utilise sensitive plates that have been accidentally exposed to light, I would advise that the films so exposed be scraped off the glass and thrown among the waste to await recovery of the silver.—C. D.

GENTLEMEN,—I beg to tell "A. B.," who appears to have had his plate-boxes opened by the custom-house officers, that neither by chlorine water nor by acid nitrate of silver solution of any strength will he be able to get them restored to their primitive state. This information is of a decidedly negative character, you will probably say. Well, some day—perhaps soon—I may ventilate my ideas with reference to this, and describe some experiments I have now in hand.—BOZ.

I note the query of Geo. S. King (whom I recognise as a fellow collegian) with respect to the publication of Newton's method of preparing extra sensitive collodion emulsion. When I was in New York, in the autumn of 1882, I made special inquiries concerning this process, the results of which I had seen; but upon being referred to a publication of the same in a local journal, I found it so vague and so full of generalisms as to lead me to conclude that the author of the article wrote it, to some slight extent, in the interests of secrecy?—that is to say, he did not seem to "make a clean breast of it," although, from the very construction of his sentences, I felt morally certain that he knew all about it. These observations of mine will possibly fall under the eye of the writer in question, and I hope they will have the effect of "drawing him out;" for a sensitive collodion emulsion is a thing devoutly to be wished for.—THOS. HOLLAND SEDLEY.

If "Teacher" will make use of a citrate in his dark room, he will have no great trouble in developing over-exposed plates. I should recommend him to keep by him always a solution of citric acid, and one of citrate of soda—say ten per cent. in strength. When he begins to develope he should use the full quantity of pyro., with only half the amount of ammonia and bromide he would use for a properly-exposed plate. The image will then come up much less quickly, and enable him the more speedily to counteract over-exposure, and yet not lose any great amount of time. If the image come up with such rapidity as to show a very considerable over-exposure, let him raise the plate from the developing solution as soon as possible, and instantly flow over it some of the acid solution. This checks all development, and after the plate is washed for a short time it can be proceeded with almost as though it were an undeveloped plate known to be greatly over-exposed. The addition of a solution of citrate of soda in such quantity that about four or five grains is given to each drop of ammonia will then cause the action of the developer to be so modified that seven or eight times the ordinary exposure would have to be given before it would bring out a proper image. Citrate of ammonia has still greater retarding action, a few grains to each drop of ammonia allowing twenty or thirty times a correct exposure to be given without spoiling the negative.—G. WATMOUGH WEBSTER.

Exchange Column.

I will exchange an oxygen generator and gas holder, Marion's strong cameo press, and cabinet rolling machine, for movable comic lantern slides and chromotropes.—Address, 2, Hall-street, Colne, Lancashire.

We will exchange a 12×10 Kinnear camera, with two single and three double backs, for a 10×8 Dallmeyer's rapid rectilinear, thirteen-inch focus.—Address, YORK AND SON, 87, Lancaster-road, Notting-hill, W.

We will exchange lantern slides, by Joseph, Scarboro', and moving comic ditto. Wanted, symmetrical or rectilinear lens, copying camera, interior backgrounds, accessories, &c.—Address, SMALLEY BROTHERS, Fleetwood.

I will exchange a twelve-inch square studio camera, swing- and repeating back, screw focussing, studio camera stand, Emmerson's head-rest, cabinet rolling-press, two show-cases, and a variety of other articles. Wanted, portrait and view lenses by good makers.—Address, G., 157, Victoria-road, Aldershot.

I will exchange a Waterlow's automatic litho. press, sixteen-inch bed, stones, and ink slab, for condenser or photo. lens.—Address, D. 10, Spencer-road, Holloway, N.

I will exchange a two and a-half-inch portrait lens, in good condition, for full-plate lens or a camera, 8½ × 6½, in good condition; difference adjusted.—Address, J. Warwick, Sheffield-street, Carlisle.

Wanted, ferrotype material, folding tripod, or what offers in exchange for a large lamp, 30 × 25, for taking portraits by magnesium light, and a small quantity of magnesium ribbon?—Address, Photographer, 53, Clifton-street, Exeter.

Wanted, to exchange, patent "Eclipse" light apparatus for taking portraits by night or in dull weather; also, mahogany enlarging camera for portrait or group lenses or magic lantern, or offers.—Address, Beta, 61, Chapeltown-road, Leeds.

Wanted, a cabinet burnisher or camera, half- or whole-plate sliding-body, in exchange for French accordion by Bussoon, 10 keys, with row of semi-tones and three basses, in good order.—Address, N. S. Brown, 38, Balfour-street, Leith-walk, Edinburgh.

What offers in exchange for set of books (list sent on application) on Chemistry and Physical Science, landscape camera, 12 × 10, two slides, Marion. Wanted lens, Ross or Dallmeyer wide angle, 24 × 18.—Address, Alfred Cox, 30, Park-row, Nottingham.

I will exchange a good rolling-press, with glass bed and seven-inch roller, also a large dark slide for plates up to 26 × 26, for lantern transparencies, landscape quarter-plate camera (bellows-body), or anything useful in lanterns or photography.—Address, J. K. Townsend, Woodbine Villas, Carrington, Nottingham.

I will exchange three superior gem lenses, quarter-plate camera, lens, and tripod, powerful steel cabinet embossing-press, without dies, and The British Journal of Photography for the years 1882-83 complete, and half-a-year of 1881. Wanted, background, studio accessories, or open to offers.—Address, F. Rubbra, Stony Stratford, Bucks.

I will exchange a Seavey's background, interior, a large number of lantern slides, a Dallmeyer's 12 × 10 wide-angle view lens, six chromotype printing frames, for anything useful for the studio; furniture preferred. Also two backgrounds, interior and exterior, two chromotype, *carte*, and two cabinet printing and tinting frames, to print three at a time, for anything useful for the studio.—Address, Graham Glen, 1, Cary-parade, Torquay.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

Photograph Registered—

Charles Johnson, photographer, 43, Nethergate, Dundee.—*Photograph of the Tay Whale Suspended from Crane in Dundee Docks, January 12th, 1884.*

Walter Reeves.—See answer to J. Berryman. Your failure appears to be due to the same cause.

B. Bentley.—A quarter-plate portrait combination will answer quite as well as a lantern objective.

Pyro.—The same formula as for the ferrous-oxalate solution used for developing will be the best for the purpose.

H. G. Baliol.—The manufacturers do not supply the masks retail. You will have to procure them through some of the dealers.

Mask.—That portion of the subject will be dealt with next week. You will have to wait till then for the necessary information.

V. (Dublin).—In reply to your query: we believe artists emigrating to the colonies would find themselves in no better position than in this country.

Lantern.—An ordinary magic lantern, fitted with a portrait lens, will answer the purpose; or you can employ an ordinary camera and lens if you choose.

J. F. C. (Troy, N. Y.).—There has been no English translation. Apply direct to Dr. Liesegang, Dusseldorf. We are unaware of the publishing price of the work.

James Ring (Greymouth, N. Z.).—Your letter received. As you have not given us the address of your brother (W. S. Ring) we are unable to communicate with him.

S. E.—Perhaps your developer is not acid enough, or you do not use sufficient bromide in it. See to these matters, and if you find no improvement write again.

W. S. Watson.—You will be able to procure aurine from Messrs. Hopkin and Williams, Cross-street, Hatton Garden. They will also supply the other materials you require.

J. H. N.—Copy of advertisement received, but you omitted to enclose your address where replies are to be forwarded. Send address and some stamps for postage of replies.

A. Beddoe.—So far as we are aware the plates are not sold in this country, and you will, therefore, have to procure them direct from Paris. We do not know the address of the manufacturers.

Experimentalist.—Nothing more has been published on the process than was contained in Major Waterhouse's paper. Some amount of experience is, of course, necessary to work this, as every other process, successfully.

Novice.—The reason of the want of detail in the shadows is that the shutter works too rapidly for the plates. The remedy is either to adjust the shutter so that it shall act more slowly, or to procure more sensitive plates.

Bradshaw and Son.—The machine named is not an article of commerce. You can procure the specification at the Patent Office, and make one for yourselves as the patent has expired. No similar apparatus is in the market.

S. A. J.—Whatman's drawing-paper may be procured from any artists' colourman. The manufacturers will not supply so small a quantity as two or three quires; possibly they might supply you with a ream or two, but we cannot say positively.

Homo.—The best plan of drying gelatine negatives quickly, without fear of their running, is to immerse them in strong methylated spirit for a few minutes. If two changes of spirit be used they will dry very quickly, indeed, if put into a warm place.

Hertfordshire.—The company formed to work the process has ceased to exist for many years. The pictures, for which greater permanency was claimed, proved to be as fugitive as those produced in the ordinary way. The process is now never worked.

A. Woodford.—The specimen transparency is much too dense for enlarging from. It is not to be wondered at that you can only get hard and crude enlarged negatives from it. It is also under-exposed. Try again with a new transparency that is more fully exposed and much thinner.

C. A. Cartwright.—There are several reasons why collodion negatives sometimes split off the glass as they dry. Dirty glass is a very fertile source of this trouble. A too acid bath has a similar effect. If the collodion be of too heavy a character it will frequently split from the glass as the negative dries.

Albumen.—As the stains do not rub off with the cotton wool it is clear that you continued the development too long after they made their appearance. In future, so soon as any staining is apparent, put the plate under the tap and rub it off, well rinse, and recommence the development; with a fresh solution all will go well.

J. Berryman.—The fault appears to be that you have used too much heat in the muffle, or you have kept the picture in too long. Try less heat, and a shorter duration. If this do not overcome the difficulty write again, and give us full particulars of your method of working. We presume the picture was sufficiently toned in the first instance.

M. A.—Good pictures can certainly be taken in a studio such as shown in your sketches. On the whole, we should prefer to have the sloping glass roof continued, a foot or so lower—say to three feet—six or four feet from the floor. This will make the skylight steeper, which will prove an advantage. Your plan shows four feet. It will also be better to have only five feet six inches, or six feet, opaque at each end, instead of seven feet and nine feet, as you propose.

Received.—A. F. Genlain. In our next.

Photographic Club.—At the forthcoming meeting of this Club, at Anderton's Hotel, Fleet-street, on Wednesday next, the 30th inst., the subject for discussion will be on *The Preparation of Lantern Slides.* This being an evening devoted to the exhibition of slides in the lantern, members and visitors are invited to bring interesting subjects to be shown.

Employés' Dinner.—On the 17th instant, by the kind consideration of Mr. Norman May, photographer, Malvern, his *employés*, with a few of their friends, were enabled to spend together a few very pleasant hours of social recreation. The party numbered in all about twenty-five. They assembled in the new, handsome, and spacious rooms of the Beauchamp Hotel, where a bountiful and elegantly-served repast was provided. The time that remained after dinner was filled up with mutual congratulations, song, and merry chat—all enjoying themselves heartily.—*Malvern Advertiser.*

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician,
For the Week ending January 23, 1884.
These Observations are Taken at 8.30 a.m.

Jan.	Barometer.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max Shade Temp.	Min. Tem.	Remarks.
17	30·64	W	42	41	—	46	39	Overcast.
18	30·62	W	44	42	—	48	41	Overcast.
19	30·62	W	46	43	—	49	42	Overcast.
21	30·47	W	46	45	—	53	43	Cloudy.
22	30·30	W	50	46	—	54	44	Cloudy.
23	29·79	SW	53	52	—	53	48	Raining.

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GELATINE PELLICLE.

At this period of the year it is the practice of many photographers, both amateur and professional, to devote a portion of the time which the dull season leaves on their hands to the preparation of a stock of plates to be used when brighter weather arrives. Others, again, content themselves by preparing a stock of emulsion to be bottled off and preserved by means of alcohol or other convenient antiseptic; while still a few others prefer to dry the emulsion and store it in the form of "pellicle." But, though the latter form is in all respects the more convenient in which to store the sensitive material, the trouble involved in its preparation is sufficient to deter a very large number from utilising its advantages.

The chief trouble lies in the difficulty of drying the "pellicle," or emulsion, after it has been freed from soluble matter by washing. It is true that a certain amount of heat may be employed to hasten the operation; but the danger of causing decomposition of the gelatine limits this power within certain bounds, and, at the best, the operation is a tedious and troublesome one. Alcohol, too, may be employed to displace a great portion of the water contained in the solidified emulsion; but here, again, an objection is raised by many on the score that alcohol exercises an unfavourable action upon the sensitiveness and other qualities of the emulsion. Certain it is that alcohol does modify in some respects the character of an emulsion; but we are not prepared to say that such action is an injurious one.

As the question presents itself, then, the difficulty in pellicle-making rests in getting rid of a certain quantity of water in as effectual and rapid a manner as possible without setting up decomposition of the gelatine. The first and most natural step towards improving matters that will offer itself is to reduce the quantity of water originally employed—in other words, to make a more concentrated emulsion. But, unfortunately, this is seldom possible; for, in the majority of processes of emulsification, the quantity of water employed forms an element of equal importance with the quantity of any of the other ingredients, while in many instances it is difficult to keep the bulk of emulsion within necessary bounds in consequence of the proneness of the gelatine to absorb water during washing.

But by adopting the principle of Mr. W. K. Burton's precipitation process we get rid of this difficulty entirely, and it becomes possible to make an emulsion of almost any degree of concentration without the slightest interference with its sensitiveness or its physical qualities. The preliminary stages of emulsification are performed in any of the ordinary ways, sensitiveness being gained either by prolonged boiling or by the addition of ammonia, and the silver bromide is subsequently allowed to subside. The precipitate is then washed in two or three changes of distilled water, and allowed to subside completely after each change. The quantity of gelatine to be added is soaked well in water, and, when, swelled, added to the precipitated bromide with no more water than it has already absorbed, and, when liquified by heat, thoroughly incorporated with the sensitive bromide. This thick emulsion, when spread out in thin layers, dries with considerable rapidity, and presents no special features of difficulty to deter any one from making pellicle.

We may append the particulars of a batch of pellicle made in this manner:—One ounce of silver nitrate, thirty grains of gelatine, and three minims of nitric acid were dissolved in ten ounces of water. 300 grains of ammonium bromide were then dissolved in another quantity of ten ounces of water, and the two solutions carefully mixed at a temperature approaching boiling point. The mixture was boiled for one hour, allowed to cool, and then rendered very slightly alkaline and set aside for the bromide to settle. This occupied three or four days, in consequence of the large excess of soluble bromide. Once settled, however, the precipitate on subsequent washing subsided more rapidly, the operation being repeated three times, and, finally, the bromide was closely drained. One ounce of gelatine, having been previously swelled in water, was now added, and the beaker immersed in hot water, the contents being energetically stirred during liquefaction. This being complete the bulk was found to be about four ounces. This quantity was poured on to a 12×10 glass plate previously polished with talc, and formed into a dish by pasting strips of paper round the edges. When set the plate was placed in the drying-box and dried in the usual way, which operation occupied, without special heat, between two and three days. If cut into strips the emulsion may be peeled from the glass while still moist, and hung upon strings in the drying cupboard, when its desiccation takes place much more rapidly. Or it may be spread upon collodionised glass and stripped in a single sheet either before or after drying. Upon re-solution, the collodion film will, of course, remain undissolved and be removed by filtration.

COMBINATION PRINTING.

In our former articles on this subject we have dealt with the methods usually followed, both in silver and carbon printing, when the combination is made in the print itself. Now, as double printing with each impression is of necessity a troublesome operation, it is, therefore, more convenient, when large numbers are required, to combine two or more pictures into one negative, so that the prints may be obtained at a single operation. The usual plan of accomplishing this is, first, to make a combination transparency, and from that to produce the negative, either by camera or contact printing.

In our volume for 1882 (see pages 15 and 27) we described a means of making combination transparencies, containing the best portraits from two group negatives which had been taken in duplicate on purpose to ensure the best results attainable. In those articles will be found practical details which are applicable to the production of combination transparencies generally, and to these the reader is referred for further information.

At one of the recent meetings of the Photographic Club—when the subject of combination printing was under discussion—Mr. B. J. Edwards explained a plan he had once successfully employed to make a combination negative. It may be well, in the first instance, to explain what had to be accomplished. One figure, out of a group of several taken out of doors, was required on a larger scale for publication as a separate portrait, and it was also desired that it should appear as if taken in the studio. As a very large number of copies had to be issued, double-printing each impression was quite out of the question.

It was managed in the following manner:—In the first place, all the figures in the original negative, with the exception of the one required, were stopped out, as was also the background. Then a transparency of the figure—of course with a white background—was made on a sheet of talc. Next, some accessories with a background were arranged in the studio, and a negative taken of them on a scale suited to the figure. When finished, the space in this second negative where the figure had to be introduced was stopped out—the transparency, already made, serving as a guide for doing this. From this negative a transparency was also made on talc. Then the two transparencies were adjusted in position, one on the other, and secured together. Next, from this compound transparency a negative was made in the enlarging camera. The plan employed by Mr. Edwards on this occasion answers very well, as the thickness of talc intervening between the two images does not perceptibly interfere with the sharpness in the reproduction. But, unfortunately, as Mr. Edwards explained, this plan is only applicable when the original is of small dimensions, as there is a difficulty in obtaining perfect sheets of talc larger than four or five inches square.

This difficulty may, however, be overcome, if we take the transparencies on glass plates—previously waxed, or treated with French chalk—and then transfer the film of one or both of them to a thin sheet of gelatine or other transparent medium. Or the figure transparency may be allowed to remain on the glass, provided that of the background be on a very thin plate, and a lens of long focus—well stopped down—employed in making the reproduced negative. The trifling distance between the two images will not materially interfere with the sharpness of the reproduction; but, even if it did, the background being slightly out of focus would be advantageous rather than otherwise.

As the plan of making transparencies and then transferring the films may be utilised in so many ways in the production of combination negatives, it will here be desirable to describe how the films may be transferred. There are two methods of accomplishing this with gelatine, both of which entail but little trouble. One is that originally described many years ago in these pages by Mr. Wenderoth, namely, to immerse a sheet of thin gelatine—such as is employed for *bon-bons*—in a mixture of alcohol and water until it is softened, and then to squeegee it down upon the negative or transparency film. When it is dry it is stripped off, bringing the picture with it. The other plan is to place the transparency on a levelling-stand, and to pour upon it a warm solution of gelatine, which should contain a very small proportion of glycerine in order to avoid brittleness when the film is desiccated. When the gelatine has set it is put into a warm situation to dry. When dry the film is removed as in the former case. If sheet gelatine be used it had better be procured from some of the dealers in lithographic materials, as they supply a kind which is superior to that employed for confectionery, which, it frequently happens, is covered with the well-known "pits." Whichever plan be adopted, the edges of the plates and the gelatine should be bound together with gum paper to prevent any part of the film leaving the plate before all is perfectly dry; otherwise it will become cockled, and thereby render the transparency useless for our present purpose.

Here is another plan by which the films bearing the image may be transferred, and which possesses certain advantages over the gelatine methods:—After the transparency (or negative, for that matter) is dry, it is placed on a levelling-stand and a solution of india-rubber in benzole, about the consistency of castor oil, is poured upon it. This is allowed to dry. Then the plate is again put upon the levelling-stand and some (a good quantity) enamelling collodion is poured on, which is also allowed to dry. When perfectly dry, and not before, a penknife is run round the edges and the film removed. This compound film of collodion and india-rubber possesses several advantages over gelatine—amongst which it may be mentioned that a much thinner film may be employed, as it is very strong, yet flexible, and, unlike gelatine, is not affected by hygroscopic conditions. The pellicle transparency may even be slightly moistened, if necessary, to cement it to the other picture; whereas gelatine, if allowed to become moist, even by absorption, may so expand as to give rise to difficulty. It is almost needless to mention that when a film has to be transferred the glass should always be treated with wax or powdered talc.

Film transparencies may be employed for combining a number of negatives as a panorama, as we described in our volume for 1880 (see page 422). In this case, the transparencies are made from the small negatives, and then stripped by either of the plans described. Now a plate of glass, large enough for the combined negative, is taken and on it one of the transparencies is secured, at the top and bottom edges, with gum paper. Then the next one is adjusted in position and secured in the same manner, and so on with the remainder. Each of the small negatives, it may be mentioned, should contain a small portion of the subject of the next, and when it does it will be seen that when these portions are exactly superimposed extreme accuracy must be assured. When the transparencies are secured in position on the glass, all that remains is to cut, with a sharp penknife, through the two films in some place where they overlap, and remove the loose pieces. By this means accurately-fitting "butt" joins are secured. In cutting the films it is advisable not to make the cut in a formal straight line, but to take it through some of the deepest shadows of the picture when possible, as then the junction is the more completely hidden. From this combined transparency a negative can be made either by contact printing on a dry plate or in the camera.

Next week we shall bring this series of articles to a conclusion.

SOLIDIFYING GELATINE IN A WARM TEMPERATURE.

A TRIVIAL incident which occurred at Mr. T. Bolas's lecture at the Society of Arts, on Monday evening, involves in it a great principle. When a transparency on glass had been printed by the Woodbury process, it was found that the gelatinous ink would not set to such an extent as to permit of its being placed in the lantern for projection on the screen, in order that a certain effect might be thus illustrated. This was owing to the warmth of the hall in which the lecture was delivered.

Without staying to inquire into the degree of temperature which proves detrimental to the effective manipulation of this ingenious and admirable process, we believe, from experiments made in a different, although somewhat analogous, direction, that if once this source of annoyance is recognised as something which might possibly intrude itself, the means of effectually overcoming it may always be at hand and in readiness to be brought into requisition at a moment's notice.

Passing once the fact that the real preventive for such an occurrence is to employ a gelatinous ink that sets readily at a somewhat high temperature, the question for practical consideration at present is—By what means can an intense degree of cold be most effectively employed so as to cause a gelatine film to set quickly in order to bring it under the operation of drying agents? It is on record in a previous volume of this Journal that one of the causes by which the Woodbury process was prevented from achieving its deserved success in America was the impossibility of getting the ink to set during a season in which the thermometer stood between 95° and 100° Fahr.

We imagine that there are few who have much to do with the working of gelatine films, either as a fundamental element in the Woodbury and carbon processes or many others connected with engraving, collotypy, or even emulsion processes, who are not aware that when once a film is set the water may easily be driven out by means of alcohol, after which all danger of the film becoming again dissolved by heat ceases. But what is required during a season of warm weather or in a high temperature is a means of getting the gelatine solidified to such an extent as to preserve its moulded or pellicular form in contradistinction to its fluid state. Cold is, perhaps, not the only means of effecting this congealation; but in the present state of our knowledge it is believed to be so, and, fortunately, it is not difficult to subject fluid gelatine to its action. In regions where ice is easily procurable it is only requisite that a space of any required dimensions capable of containing the plate, the paper, or even the printing-press that has to be cooled, be brought to a sufficiently low temperature by having a tray of ice kept standing inside. This, however, cannot, in the very nature of things, cool the surrounding air below freezing point; but by the addition of half as much common salt as there is crushed ice an extreme degree of cold is produced. But it is not necessary to have recourse to this unless in exceptional cases.

We have cooled and dried a gelatine cast upon glass with great rapidity and in a very perfect manner by means of the following treatment:—Premising that the temperature of the room in which we operated was about 90° Fahr., and that no ice was procurable, we placed the coated gelatine plate in a 5 × 4 inch zinc tray, which, in turn, was set inside of a much larger and deeper porcelain tray, on the bottom of which had been placed a liberal sprinkling of ammonium nitrate, crushed by being roughly pounded in an iron mortar. A little water was then poured into the porcelain tray, care being taken that it should not stand more than three-fourths of the height of the inner zinc tray. It was immediately covered up by a thickly-felted, non-conducting cover, similar in character to the "cosy" employed by prudent housewives to cover up the teapot during the infusion of the fragrant "souchong," although of dissimilar form, and employed for a purpose quite antithetical to the other. After standing for a few minutes, the intense cold produced by the solution was found to have caused the gelatine to set much more firmly than had even been hoped for. A little alcohol was now poured in, to a depth sufficient to cover the gelatine surface of the glass. This alcohol contained a small proportion of chrome alum in solution. After allowing a few minutes for the alcohol to displace the water which remained in the gelatine, the plate was removed from the vessel and quickly became dry.

The means here described may not be the best in a mechanical sense that are suitable for effecting the rapid drying of a gelatine film in a very warm atmosphere; but the principle is unexceptionable, namely, congealing the gelatine by means of cold artificially produced, and then abstracting the water by the agency of alcohol.

PHOTOMICROGRAPHY.

Stereo-Photomicrography.—Early in the practice of this branch of photography it was proposed by Professor Wheatstone (*Trans. Microscopical Society*), 1852, that the microscope should be capable of rotation for about 15° round an imaginary axis prolonged through the object, the motion in reference to the stand being made in any direction; or that the object be made to rotate from 7° to 15° round an imaginary axis within itself, while the illumination remained equal, to avoid interfering shadows and pseudoscopic results. Mr. Wenham, in 1855 (see *Trans. Microscopical Society*, January, 1855, page 56), made the necessary difference in the images by stopping off alternately, on opposite sides, one-half of the effective aperture of the objective, and in those with large angular apertures about one-third of the aperture, by using a sliding stop with sharp edges behind the back lens. With high power objectives, as $\frac{1}{12}$, he found that, after obtaining a picture in one position, a slight alteration of the object, and the illumination, sufficed to furnish the necessary difference in the other picture to give stereoscopic effects when combined. It was on this plan that Dr. Maddox obtained his stereo. pictures at 3,000 diameters.

For opaque objects low powers are the most suitable, and may be used with the proper Lieberkuhn reflector, which sometimes may have nearly half of its reflecting surface stopped off by a screen of black paper for the first picture, and then rotated for the second picture; or light may be thrown across the object by a side reflector, a small condenser, or an achromatised prism. Depressions appear to be best illuminated by the Lieberkuhn. If the shadows appear too heavy the object may be slightly lighted in the opposite direction by light reflected from a white card or mirror. It is always well to screen the objective from extraneous light.

Professor Riddell, of New Orleans, suggested the use of a small equilateral prism behind the objective, which, by being slightly inclined as regards the axis of the microscope, is made to furnish one picture. The position is then to be altered and the object moved so as to bring the same part again under the objective, thus giving it a slightly varied appearance, the required inclination of the prism being from 4° to 7°, the combination of the images furnishing a stereo. picture.

Professor Rood adopted the plan of depressing the slide on either side alternately to procure the angular displacement. (See *Trans. Microscopical Society*, 1862, page 268.)

Mr. Heisch, in 1862, by an ingenious plan, adapted the half stop to the back of the objective, so that he could shut off the alternate halves, as required, by the use of a lever moved from the outside. It could take the place of an adapter to any ordinary microscope. In use, the stop is moved in the tube nearer or farther from the back lens, until the image "is equally illuminated in whatsoever position the stop may be turned." (See this Journal, October 15, 1862.)

Dr. Moitessier describes the method of making the cap to fit over the front of the objective, and points out the necessity of having the position of the stop, relatively to the image on the screen, carefully observed, so that the edge of the stop shall coincide with the vertical axis of the images. He also remarks that this method can be used effectually when the apparatus is arranged for an ordinary small photographic lens behind the prism when photographing rather large objects. He prefers to place the half stop either close before or behind the front lens of the objective, as furnishing better results. Sometimes it is advantageous to use subdued solar light from a ground glass placed near the solar focus of a long-focus achromatic condenser, when taking transparent objects. For these Dr. Moitessier also advises some form of additional stage of sufficient elevation to allow of the slide being depressed sufficiently on either side alternately, some 8° or 10°, the illumination remaining fixed. It is necessary that the points of suspension of this slide-holder, when raised or lowered, shall be in the same plane as the objects when mounted upon slides of different thickness. An explanatory figure is given. The plan Dr. Maddox adopted is stated in Dr. Beale's *How to Work*, &c. Slips of cork cut to the necessary angle have been suggested to be placed under the slide at alternate ends—rather a rough and troublesome method. Possibly the inexpensive form of protective stage, lately suggested by Mr. Stewart at the Royal Microscopical Society, for preventing damage to the slide by inexperienced hands, may answer very well. A thin strip of mahogany $1\frac{3}{4}$ in. wide and $3\frac{1}{2}$ to 4 in. long, with a central aperture of about 1 in., has fastened to it, on the upper surface, two strips of wood about $\frac{3}{8}$ in. thick and $1\frac{1}{2}$ in. long, the top of these strips being each covered by a thin strip of brass which projects beyond the wooden strip. Over the end of the brass strips at equal points are stretched two thin india-rubber bands, the slide being passed between and clasped by each of the bands. By attaching with a pivot a strip of brass with a slot to the end of the upper right hand brass strip, and a similar one to the lower left hand end, each having a rather coarse screen with milled head working through the free end of the strip, after centering the object, one could be swung over the slide, the blunt screen point brought, by means of the slot, to a line through the centre of the slide, and the depression made by turning the screw. One image being taken, the screw should be released, the small strip turned aside, and the same plan pursued with the opposite side, care being taken to equalise the turns of the screw. We believe this addition, with care, would meet the difficulty, when the object is far from the centre of the slide. The strips can be turned aside when not needed. The above methods refer to the monocular form of microscope, and are very useful when the stereo. plate-holder is fitted to a strong microscope used in the vertical position, for moderate enlargements. Care is required in mounting the prints, otherwise a pseudoscopic effect will be given to the combined images.

The binocular stereoscopic, or the pseudo-binocular form of microscope, can be used for producing stereo. pictures; but in the ordinary form of the former, where the body tubes are set at an angle, there is a difficulty in attaching the double camera. As Nachet's pseudo-instrument is not used in this country, Stephenson's binocular microscope can be conveniently used with the double camera. In all cases where prisms are used to divide, or secure, two images they should be set near the back lens of the objective, and it should be remembered that there is a considerable diminution in the actinic power of the light.

In this Journal, Feb. 10, 1871, the then Editor, Mr. J. T. Taylor, pointed out a method by which enlarged stereo. images of minute objects could be produced by retaining the lens and object in an immovable position during the whole operation, and, after focussing, shifting only the direction of the light. A photograph of the head of a crane fly was taken by a two inches objective for one picture, and the concave mirror then slightly moved so as to illuminate the object "from a different point in the horizontal line." This must be attended to, the amount of relief in the combined pictures exceeding that furnished by the binocular microscope. Higher powers, as a quarter objective of wide angular aperture, stopped down to furnish sufficient penetration, were used successfully upon *Navicula angulatum*, and Mr. Taylor (see this Journal, page 411, 1877) also found that the images first reflected by proper mirrors, and again reflected at the right distance by total reflection along the two body tubes, set at the necessary position, enabled him to successfully obtain binocular pictures with a one-twelfth objective. This mode of working involves rather more trouble than when producing single pictures, and we fear is not likely to be generally adopted. The stereographs of some of the *diatomaceæ* have a peculiar charm, in their delicacy and crystalline transparency, entirely their own. Dr. Maddox obtained stereo. photographs of some of the *coscinodisci* that when combined resembled crystal inverted saucers; but with portions of *Pleurosigma formosum* and *angulatum* at 3,000 diameters there was always a difficulty to exactly centre the pictures at their necessary displacement. Spicules of *synapta* and the wheel plates of *cheirodota* are excellent objects for the purpose. Some of the *diatomaceæ* form most difficult objects; those of *heliopelta* and *aulacodiscus* were seldom satisfactory, being more or less confused.

For giving objects stereoscopic relief Mr. Furze recommended a plano-convex lens, ¾-in. inch diameter, with central and external stops, each revolving on a separate axis, and an adjustable cap on the top of the lens, with a crystal of herapathite mounted between thin glass, and also a plate of selenite on thin glass to be used when objects were of rather too great density for transmitted light, as thus illuminated they appear as if in relief. (*Trans. Microscopical Society*, 1855.)

Although this applies rather to micrography than to photomicrography, yet with such objects it may be useful, though the time of exposure would be much increased.

The original intention was to complete this series of articles in our last volume, but it was found impossible without condensing detail too much. Some points which have been only incidentally alluded to now remain to be briefly touched on, and a full table furnished of useful references.

Is engraving to become a lost art? Such would appear to be the prospect if there be any foundation for the wail of the *Daily Telegraph*. According to that journal engravers proper are rapidly dying out—done to death by *photogravure* and other photo. "processes." Whether this be so or not, the matter is, after all, one of supply and demand. So long as the productions of the engraver retain their superiority over photographic productions so long will engraving continue to exist; but as soon as photo-engraving is able to compete on equal terms, as regards quality, with the older and more expensive style, so soon will the latter cease to have a *raison d'être*. It would be as reasonable to attempt to shut up railways and return to the old mail-coach system as to expect photo-engravers to study the special interest of the artist of the graver and etching needle.

Our readers will very likely remember Mr. F. Galton—an enthusiast upon the subject of obtaining and tabulating all kinds of data respecting the human frame. Some year or two ago a paper by him was read before the Photographic Society of Great Britain, in which he explained a method he had devised for obtaining an average type of face from superposing a number of images of faces taken to scale, and thus obtaining a single face—a plan which, as our New York contemporary, the *Photographic Times*, aptly observed, was as likely to be successful—may we add useful?—as an attempt to picture a house of average size by printing a poor man's cottage and a Fifth Avenue mansion upon one another on one sheet of paper. Mr. Galton has lately given another stimulus to the production of photographic portraits in the offering of prizes to the amount of five hundred pounds in connection with a plan entailing the production of a number of photographs.

The prizes are given to the one who most successfully fills up his book, the *Record of Family Faculties. The Life-History Album* is a companion volume, "being a Personal Note-book combining the chief advantages of a Diary, Photographic Album, a Register of Height, Weight, and other Anthropometrical Observations and Records of Illnesses." In the former book, not only is every possible detail respecting the competitor's father and mother, grandfather and grandmother, required, but also his father's father's father, father's father's mother, &c., &c.; in the latter his own history only, among which numerous details, including every ailment from teething to toothlessness, he is to place every five years a photograph of himself. The editor has not left even a blank page after the age of seventy-five, so that nonogenarians and centenarians can leave no records for admiring and wondering posterity.

Our contemporary, the *English Mechanic*, lately had some observations to make upon the subject of Dr. Huggins' photographs of the solar corona, taken from the sun while an eclipse was occurring. We described these interesting pictures and the ingenious mode by which they were produced shortly after Dr. Huggins brought them forward. Our contemporary's remarks were based upon the probability of the "rifts" seen in Dr. Huggins' photograph being due to reflection from the backing; and, as they are based upon entire error, thus naturally giving rise to a feeling of annoyance, if not even injury, on that gentleman's part, it may be well here to give the erroneous part of them in the words of the original:—"It is now suspected that the pseudo-coronal structure visible in his negatives may have its origin in reflection from the dark backing of his photographic plates, such backing being painted on in streaks with a brush."

Now, two errors are to be noted here. If our memory serve us right the backing was asphaltum, presumably dissolved. It would, therefore, be quite indifferent how the black varnish was laid on—whether with brush or spatula, or were poured on—the result would be identical. If the whole surface were covered, the backing would be in optical contact, and there would only be a plane surface to reflect from. Secondly: the backing is placed, as most practical photographers know, to prevent reflection, or at least either to reduce it to a minimum or to alter its character so that it should possess no actinic power. Dr. Huggins, it is stated, speaks of laying the varnish on with a spatula, and in view of the great intensity of the light the image would possess this may be a wise precaution. As asphaltum is to a certain extent transparent, reflection might occur from its back surface; still we should almost imagine that in the case in question a pouring on of the varnish would have been simpler, seeing it was not the actual image of the sun itself that was thrown on the plate. But it must be observed that, by adopting the plan he did, the learned astronomer took every possible precaution to avoid that very evil which his photographs are now said to be suspected of displaying.

The fifty-eighth annual exhibition of the Royal Scottish Academy will be opened on Saturday, the 16th instant. Many of the more distinguished members of the R.S.A. and contributors to its annual displays utilise photography in their artistic labours, and are not afraid to avow their indebtedness to our art-science.

Apropos of the subject of the hygrometric condition of the atmosphere lately discussed by us, an account is to hand of a most wonderful instrument, a supply of which it will be well for the meteorological instrument makers to procure. Baron Maclay lately read a paper before an antipodeal society upon the *Barometio araucano*, which had been shown to him by Captain C. de Amezega, of the Italian corvette *Curaciolo*, who informed him that the natives of the Chiloe Islands used it as a kind of barometer to foretell the approach of dry or wet weather. Some continental writers have strange ideas about crustaceans, a celebrated Frenchman once terming a lobster "the cardinal of the deep." The crustacean in this case is a crab—the *Barometio araucano*—and the Baron was informed that its shell, which under normal atmospheric conditions is white, possesses the wonderful property of becoming dotted with red spots upon the approach of moisture, increasing in number and size with the increase of humidity, until during the wet season it becomes completely red ! That the Baron believed his informant is evident.

A new thermometer, of singular properties, has been devised by M. Latschinoff. Ordinary mercurial thermometers, as our readers are aware, act by the dilatation of the mercury exceeding that of the glass, and so upon heat being applied the mercury rises in the tube as its bulk is increased, that being the only available exit. The new thermometer has an ebonite bulb which expands so largely by heat that the mercury cannot keep pace with it. The consequence is that, when heat is applied, instead of the mercurial column rising it falls; hence, with M. Latschinoff's thermometer, when we say the thermometer is very low we mean it is warm, and when we see the mercury rising we know the temperature is falling. To say the least of it, this would be very confusing; but we do not think it very likely that, with so uncertain a substance as ebonite, these new instruments are likely to come into use.

According to *La Nature*, for some years a large number of articles, such as *porte-monnaies*, travelling bags, &c., have been made of crocodile and serpent skins, or those of other more or less rare animals, and it has been difficult to procure genuine skins in sufficient quantity to meet the consumption. Accordingly they have been replaced by imitations. Our contemporary quotes the *Scientific American* as follows to show how photography has assisted in the matter:—"An alligator, or boa, or seal skin is photographed in such a way as to give an exact reproduction of the chequering and mottling that characterise each kind of skin. This photograph is used to produce, by means of a galvanoplastic process for example, a metallic plate which, passed between the cylinders of a rolling-press with any ordinary leather whatever, gives it the exact appearance of the leather it is desired to imitate." *La Nature* goes on to say that it reproduces the text of the American journal, but it does not well understand the intervention of photography—at least that the photoglyptic processes should not be used. According to its editor it appears that the operation could be performed directly by the aid of galvanoplastic moulding.

The same journal contains an account of a small portable electric light arrangement, worked by a battery of four elements, modelled on the Poggendorff pile, the whole being the invention of M. Radiguet. The elements are so constructed as to be easily withdrawn, and are acted on respectively by bisulphate of potash and acid bichromate of potash. Many similar *apparata* are made in this country, but this particular one seems to be especially compact and handy. We have no details as to its cost.

It is very reprehensible that the historical portrait department of the photographs exhibited in the Patent Museum at South Kensington does not receive a little more attention from those in authority. One looks upon the facial lineaments of really great men, many of whom have long since passed away, with profound interest. It is not by any means pleasant to find that these museum portraits show strong indications of fading; and, seeing that a photographer of the eminence of Colonel Stuart Wortley is curator of this national collection, it would be extremely desirable if Colonel Wortley would exert his influence—first, in having the already existing portraits reproduced in an imperishable material, such as carbon ; and, secondly, in greatly adding to their number.

Referring to the comet Pons-Brooks, the Rev. T. E. Espin, B.A., F.R.A.S., Observer to the Liverpool Astronomical Society, writes as follows:—The comet was detected by Brooks, in America, on September 1st of last year, and for a long time remained an insignificant object. The path it was travelling speedily showed that it was identical with the comet of Pons, observed in 1812. Up to the end of November it appeared as a bright nucleus with a circular haze, and on December 5th it showed a short tail from the circular haze. During the following evenings it swept across the Milky Way, and on December 24th was close to, but a little inferior in brightness to, the second magnitude star Epsilon Sygni. On this evening I succeeded in photographing it with an exposure of fifty-three minutes. On the negation it appeared as a circular haze with no tail. I did not catch sight of it again till the moonlight night of January 5th, when it was observed by me and two other members of the Liverpool Astronomical Society with the five-inch refractor seven feet long. At this time the tail had increased, and the brightness of the comet was above a second magnitude star. The tail could be traced some five degrees, in spite of the moonlight. When the moon had passed out of the way the comet was much fainter, and on January 19th and 20th was comparatively an insignificant object. Two other points must be noticed. The spectrum of the comet in December corresponded with the spectrum of alcohol, and there can be little doubt that the path is identical with that of a stream of meteors which radiate from Draco in December.

PHOTOGRAPHY AND PHILOLOGY.

It might be thought that these two subjects had little in common ; but we promise our readers that if they will spend an hour or two in looking through the first part of the *New English Dictionary*, just published under the auspices of the Philological Society, they will find in its pages a fund of interest, if not of instruction, in connection with matters photographic alone. We all know the story of the old lady who found a dictionary very entertaining reading, though she disliked the frequent change of subject ; but even that standard joke could not be passed upon the present publication, some words taking a full share of a page to elucidate their meaning, and many upwards of a column.

We are sanguine that any photographer who takes up the work will agree with Théophile Gaultier in looking upon the perusal of a dictionary as a pleasant mode of whiling away time. A large folio volume of three hundred and fifty pages—to which upwards of thirteen hundred persons have contributed, together with a whole army of sub-editors and the aid of numerous specialists, technical, artistic, and otherwise—ought to be very complete. And complete this wonderful tome is, with a total of 8,365 words treated, as against 4,162 and 4,198 respectively in Webster's or Ogilvie's lexicons, hitherto looked upon as the most comprehensive published in our language.

One remarkable feature in the present work is the great scope of the authorities referred to, embracing references to writers in the fourteenth century down to the daily newspapers of the present period. Thus, we turn to the word "Albumenizer," and we find, after the derivation, the meaning, "One who albumenises," with a reference, "1879, *Daily Telegraph*, 25th Oct (advertisement) 'Albumenizers —The Imperial Company have vacancies for several first-class hands.'" Now, we take it that a firm of photographic albumenisers never had their names put in the text of a dictionary before, nor did the *Daily Telegraph* ever get quoted in one previously.

We find "Albumen" (also spelt in a cross reference with "i" for "e") fully described, and "Albumenize" also, the latter word being referred to photography; while under "Albumenized" we have a reference to the *Quarterly Review* of 1868, which speaks of the number of eggs consumed in the production of albumenised paper. What, we wonder, would the reviewer have to say to the consumption of the present day for photographic use alone?

We need not go further than the same page to find "Album," the gradual change in the meaning of the word being shown through a series of words, till at the last we reach—"A book for reception of photographic *cartes* and views, or of postage stamps, crests, or other things which are collected and preserved." This our readers will hold with us to be a rather restricted view. The plan of this *Dictionary* was first devised in 1857, and, possibly, the meaning was given to it at an early period, when the *carte* reigned lord paramount in photography, and when the "cabinet," which now bids fair to overthrow its sovereignty, was not. There is an amusing excerpt from Charles Lamb, who writes in 1829 of fleeing to escape the "albumean" persecution. We can imagine his feelings if he had lived late in the Victorian era, and been pestered for his *carte*. At a still later period he might have borne the nuisance with equanimity, as he would then, no doubt, have been asked to "sit," and offered a premium for doing so.

Our readers may remember some months ago our noting the editor's request for references for the word "Ambrotype," and our suggesting the perusal of photographic literature, where it once abounded. We note that the word occurs with references to *Notes and Queries* (1855), *The Autocrat of the Breakfast Table* (1858), and the *Century Magazine* of 1882. We think far better suggestive extracts might have been supplied from the source we indicated. The word is described as "the name given in the United States to a photograph on glass, in which the lights are produced by the silver, and the shades by a dark background showing through." The derivation is given from a Greek word signifying "immortal," or, perhaps, "Amber + Type." We fail to find a photographic reference to the photographic term "alabastrine," its nearest relative, and, perhaps, it is as well that all reference to so fugitive and almost forgotten a style of photography should be avoided.

The editor, however, has not left out "Actinium;" but he shrewdly terms it a "supposed" chemical element, "* * * so called because of the action of light upon its salts." The date of its discovery is given as 1881; yet no one but its discoverer appears to have seen the substance, and, as some years have now elapsed, we have little hope of the old photographic *répertoire* being increased by the addition of another light-sensitive element.

"Actinism" is neatly treated; but the references are not new, and refer rather to the older conception of the functions of solar radiations, the extracts given being behind the time. Thus, in 1844, Mr. Hunt speaks of the "relative quantity of the active chemical principle" in a prismatic analysis of the sun's rays, while the latest reference is 1862—Mr. Patterson's.

It must not, however, be thought that we are, in thus speaking, finding fault. The *Dictionary* is not a cyclopœdia, and words rather than things are described. The change of the former is slow, and it is a positive advantage to have them registered. The theories of yesterday go in the waste-paper basket of today, and their symbols only do we wish to preserve in a dictionary.

We will finish our excursion into the realms of science and philology by referring to the word "Alcohol," which teems with interesting data about the present and past meaning of the word. Few who speak so freely of alcohol in the present day have any idea that it is a contraction for "alcohol of wine," so formed from the original meaning by a process of extension. Primarily used to indicate the fine powder employed by Eastern beauties to stain their eyelids with, it gradually was employed to signify any fine powder produced by trituration or (and more especially) sublimation. Even so late as 1812 we have Sir Humphrey Davy speaking of the "alcohol of sulphur," alcohol and essence then being evidently convertible terms. The alcohol of wine is an easy transition.

We could wish to follow the editor in his interesting remarks upon many other photographic words ("Aberration," "Achromatic," "Alum," "Acid," and many others), but space forbids; and we can only recommend our readers to dip for themselves into this interesting "well of English [defiled and] undefiled."

ACTINIC FORCE *VERSUS* COLOUR.

Mr. W. H. Harrison stated, in his remarks on my dark room lamp, that he thought I had made a mistake in using white as a substratum. There is no doubt that if I had used orange the light would have been safer, but it would have been at the cost of decreased luminous power. He further speaks of the blue rays only requiring to be absorbed; but this way of putting it often leads to mistakes, because a gelatino-bromide film is sensitive to all the colours of the spectrum. What is actinic force? Capt. Abney and others have been photographing the ultra-red rays beyond visible light and have found it there; and I wish to suggest whether it would not be better to leave off calling the rays at the violet end of the spectrum "actinic rays" and those at the red end "heat rays," because in both cases the names are misapplied.

I purpose proving that actinic force is a power quite distinct from colour—indeed, it is evidently a counterforce to it. (By colour I mean the different wave-lengths into which white light is divided by the prism.) If we throw the spectrum on to a gelatino-bromide film we find that *the prism has not analysed actinic force.* True it passes most readily with the blue and violet rays, but it does not pass solely with them. In the yellow (which does not contain any of the so-called "actinic rays"), and even in the red, we find actinic force passing through the prism. Again: if we place a piece of ruby glass (which has been proved by the spectroscope not to transmit any green or blue rays) before a gelatino-bromide plate, and expose them to candle light, we shall find that we have not stopped actinic force from passing to the plate. Indeed, with plates sensitive to the ultra red rays we shall not (theoretically) be able to have a lamp really safe for dark-room illumination, because the plates are sensitive to a point beyond visible light. This proves that actinic force must be a power in light quite distinct from the luminous rays, which are white light divided by the prism into colours of different wave-lengths, and which we know as the colours of the spectrum.

And now comes the question—If actinic force be distinct from luminous light, why will it pass more readily through blue than red glass? I believe the reason is that it is governed by the power of the different wave-lengths of the various colours of the spectrum. The shorter the wave-length the greater the amount of actinic force; increase the length of the wave and we have a corresponding decrease of actinic power. We know that those at the red end of the spectrum are the longest, and of course the longer the wave-length *the greater must be the force which makes it so;* so that we have here a counter force to actinic power. This will explain why light has more power on a sensitive plate when passed through blue than when passed through red glass. In the latter case we have put the strongest single force that there is in the luminous rays between the actinic force and the plate. The red glass has brought the various wave-lengths of the white light all to one long length—I ought rather to say nearly to one length, because the spectroscope would probably show that the red glass was not a pure colour, and that it contained a trace of orange, &c. In coloured glass we have an equally-distributed force throughout the substance which acts as a sort of buffer stop to actinic force, the strength of the buffer depending on the wave-length of the colour of the glass used.

Mr. W. E. Debenham showed some time since that by putting two mediums—one green and one yellow—he got a safer light than with red alone; in other words, he had put a stronger power between the actinic force and the film. With the yellow medium he had the greatest luminous power, the wave-length of which was comparatively long; with the green he had a colour the least injurious to the eyesight, though of less wave-length. The combined wave-lengths of the two, however, would be more than that of the red alone, and in consequence the light was safer.

We thus see that light consists of two distinct forces; whether the one or the other is the stronger depends on the substance which reflects or the medium that transmits light. If we have a substance which either reflects or transmits a colour of a short wave-length (such as blue or violet) we get great actinic force; but, if the colour reflected or transmitted have a long wave-length, the increased strength of it will act as a stronger force than the actinic, and the latter will only be able to affect the silver haloid to a small extent.

There is one more point which requires to be referred to, namely, that some colours when reflected have a less restraining power on actinic force than when transmitted. My attention has been called to Mr. Sawyer's experiments on reflected light, and also to his paper on the subject read at the meeting of the Photographic Society of Great Britain in May last. I am pleased to see that his experiments quite corroborate what I stated in my article describing my reflecting lamp, viz., that orange by reflected light gives nearly as dense a deposit on a film as the blue, &c. Since I found that Mr. Macdougald thought I must have made some mistake I have again gone into the matter, and the only explanation I can give for it is this: some substances reflect the complementary colour, or nearly so, to what they transmit. For instance: gold leaf is almost yellow by reflected, but is green by transmitted, light. Aniline dyes have also this peculiarity. The colour known as "violet of methylaniline" is yellow by reflected, but violet by transmitted, light; and the red aniline dye is yellowish-green by reflected, but red by transmitted, light. I do not know how the orange colour is obtained in woollen materials; but if it were an aniline dye the complementary colour to the orange would be blue. As a portion of the light would be transmitted through a portion of the substance and partially reflected the apparent orange colour would be of a compound nature, part of which would probably be blue; and as this colour has a short wave-length, it would account for the increase of actinic power when reflected from an orange surface compared to transmitted light of the same colour.

There is another point that has an important bearing on the subject, which is that white light is made by compounding together all the colours of the spectrum; but it may also be produced by two colours only, and the eye is not able to distinguish whether the white is a compound of the whole spectrum or whether it consists (as proved by prismatic analysis) of only two colours. Neither will it tell the difference between a compound blue, containing nearly one-half the colours of the whole spectrum, and the pure spectrum blue of the same apparent shade. Now it is most probable that the effect on a sensitive film would be different in these cases, because the combined wave-lengths would be different. But the subject of reflected light and its action on a sensitive film requires to be examined thoroughly. It is a matter that has hardly yet been raised, and is one which I believe will lead to most important results in its bearings on practical photography.

There is another important point about "actinic force" *versus* "wave force" (or, as it is usually and, I think, wrongly described, "actinic rays" *versus* "heat rays"), and that is that if we heat a metal to a red heat we get red light—the longest wave force and the least actinic force; but if we heat it more—say, to a white heat—the additional wave-lengths are shorter and there is a corresponding increase of actinic force. So we see *that heat generates actinic force*—and not only that, but the increased heat has expanded the metal; thus actinic force and expansion go together, but if the heat act on the metal for any length of time we get a decomposition of the metal, which would be a chemical action. And this is another link in proof of my theory that the action of light or, rather, actinic force on a silver haloid is first an expansive force, or, in other words, it expands the particles of silver bromide which burst the thin cells of the gelatine or collodion that surround them, and thereby allows the developer to act on the particles; but, where the light has not acted, the gelatine film surrounding the particles protects them from the developer. If the action of light be continued we get the decomposition of the silver haloid; that is, the chemical action or reduction to a sub-haloid. This, I believe, is what we know as the reversed action of light, which is identical with the action of the light on a daguerreotype before development by mercury vapour, and the reduction to a sub-chloride of silver chloride in silver printing. If it be not so, how can we explain why light can act on a particle of silver bromide tightly enclosed in a casing of gelatine with as much effect in a minute part of a second as it does on a similar particle atttached to a daguerreotype plate (where it is quite unenclosed) with several minutes' exposure?

We know that the wave-lengths of the violet are shorter than the blue; we would, therefore, expect to obtain greater actinic force from a violet than a blue surface. But the glasses of which our lenses are made absorb an amount of actinic force; if we use quartz lenses the violet rays are less powerful to withstand actinic force. But there is another reason: violet surfaces are generally a compound of blue and red, and the long waves of the red would decrease the actinic power reflected from the surface.

We know that a gelatine plate giving a red or orange colour by transmitted light is much slower than one giving blue. This would be certain, because the actinic force passing through the gelatine to the various particles of silver bromide meets with less opposing force from the short wave-lengths of the blue than it does with the long wave-lengths of the red or orange. The question has just struck me:—Would not the pocket spectroscope help us immensely when preparing an emulsion, by telling us (by the spectrum given by the emulsion by transmitted light) exactly the point when it has reached a certain point of sensitiveness? At present we either trust to boiling a certain length of time under circumstances perhaps never twice exactly alike, or we trust to the eye to tell us by the change in the colour; but in this case we have no certain guide, because we have no fixed colour with which to compare it. In the preparation of Bessemer steel, by the employment of the spectroscope the exact moment of the completion of the process is determined; and I think the instrument will be equally useful in the preparation of emulsion.

But the fact of the blue emulsion being the more rapid is also caused by the gelatine being more decomposed by boiling or by the addition of ammonia; so that prolonged emulsification has a double action—it weakens the gelatine, and allows the particles of the silver haloid in expanding to more readily burst the gelatine cells. It also alters the nature of the gelatine, and causes it to transmit blue instead of red light. That it is so, and that boiling does not cause a chemical action between the silver bromide and the gelatine, is proved by boiling—

Gelatine	200 grains,
Ammonia	1 ounce,
Water	9 ounces,

for one hour; then, if we add the silver bromide, we at once obtain an emulsion giving the blue-grey colour by transmitted light. I am quite convinced that this is the best way of preparing an emulsion, both from a theoretical and practical point of view, and one which will give the most certain results when successive batches of emulsion have to be made of the same rapidity.

HERBERT S. STARNES.

STANNOTYPE.

No. I.

MOST of our readers have, no doubt, some sort of idea of the principles, at least, of the stannotype process which has received mention in many ways recently; but there are probably few who are at all intimately acquainted with its details. As the process is one which is likely to prove of great utility in certain branches of photography, we propose in the course of a few articles to give a description of its practical working.

Stannotype is, briefly, a simplified method of producing the actual printing surface from which the well-known "Woodburytype" prints are made; for the process which bears the name is confined to the production of the "mould," the subsequent printing being in every respect identical with Woodburytype. But the modification in the preparation of the "mould" is of sufficient importance to remove this style of printing from its hitherto existing state, as a method of purely commercial practice on a large scale, and to bring it within the reach of any photographer who may wish to produce more than a very few copies from his negatives. The process is not one that recommends itself—nor is it so intended—as a substitute for silver printing, or for work on an extremely small scale; for the simple reason that the various operations involved in the production of the printing mould are scarcely recompensed by the return brought by a dozen or so of prints. But, on the other hand, the printing mould once secured the prints are obtained by the dozen, the score, the hundred, or the thousand at a merely nominal cost, and with a rapidity that cannot be excelled by any process, photographic or photo-mechanical, while the results are indistinguishable from the best silver prints.

There may be some of our readers who are entirely ignorant of the nature of stannotype; for their benefit, therefore, we may give a brief outline of the Woodburytype process and the subsequent modifications which have been made upon it. Like the majority of the photo-mechanical methods of printing it is based upon the employment of a surface of bichromated gelatine. This is prepared in the same manner as for ordinary "carbon tissue;" but the layer of gelatine is many times thicker, and contains a much smaller quantity of colouring matter. The first stage in the process consists in the exposure under an ordinary negative of a piece of this special tissue. Upon development in the ordinary manner of a carbon print—though the operation is much more prolonged—a relief is produced in insoluble gelatine, from which, when dried, a counter-relief is made by heavy pressure in contact with a plate of soft metal under the hydraulic press, this latter relief being the actual printing mould.

The printing is performed by means of a gelatine ink which, when poured upon the mould and overlaid with paper, is submitted to equable pressure. The surplus ink is forced away to the edges of the mould, leaving the hollows filled, and thus a cast in coloured gelatine is left adherent to the paper, which, as soon as the ink has set, is detached from the mould, and forms when dried the finished print.

The necessity for the hydraulic press limited the utility of the Woodbury process, and for many years past attempts have been made to dispense with its services, but for a long time without practical success. Mr. Woodbury himself, however, some three or four years ago, devised a plan by which the gelatine relief, instead of being pressed into a plate of metal under the hydraulic press, was "faced" with tinfoil, and upon the latter an electro deposit of copper was made, while this, again, was backed up with resinous matter to give it solidity. The triple layer of tinfoil, copper, and resin being detached from the original gelatine surface formed the printing mould.

Here, however, though the hydraulic press was dispensed with, the introduction of the electrotyping proved an obstacle, and this modification of the process scarcely advanced it much in popularity. Very shortly, however, Mr. Woodbury further simplified the method of producing the printing surface, and his process of stannotype has secured for him several recognitions, including the progress medal of the Photographic Society of Great Britain, as well as a medal at the last exhibition of the same society.

In this process the gelatine relief is made in the same manner as before, except that a *positive* is employed instead of a negative in its production. A relief in reverse is thus obtained, and this is faced with tinfoil and employed as the actual printing surface. The tinfoil merely serves the purpose of preventing the warm gelatinous ink from acting upon the surface of the relief, which, though insoluble, is capable of absorbing moisture, and thus losing its sharpness as well as being liable to damage. The mould thus produced is printed from in the same manner as the ordinary Woodburytype.

In succeeding articles we shall describe minutely the different steps in the production of the stannotype mould, and its subsequent use as a printing-block.

A THERMOMETER FOR THE DARK ROOM.

AT various periods since the invention of the thermometer endeavours have been made to have its variations registered by means of an index which, like the dial and hands of a clock, could be seen at a glance. In more recent years several ingenious devices have been brought to bear upon the problem with a view to its effective solution. So much had been done in this direction with regard to the barometer, as evidenced by the "wheel" and "aneroid" instruments, why could not some similar means be discovered by which the indications of the thermometer also might be shown by means of a finger?

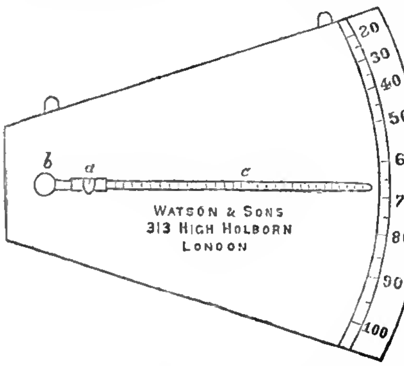
This is a question in which photographers are much interested. For, whereas in a room lighted by the full blaze of daylight in midsummer one can only note the indications of an ordinary thermometer by peering somewhat closely into it, in a subdued light this is effected with increasing difficulty; while in the dark room it becomes quite impossible to note the temperature at all by means of a thermometer of the usual class.

Among the patents obtained this year one has been granted for an invention which supplies this desideratum in an excellent manner—so excellent, indeed, as to enable the thermometric indications to be seen with the greatest plainness at a distance of several yards. Previous to giving details of Messrs. Watson and Sons' new indicating thermometer, it may be useful and interesting to briefly describe the means hitherto employed for a similar purpose.

If a strip of sheet brass be soldered or riveted to a similar strip of steel in such a manner as to form a compound laminated band, one side of which is steel and the other brass, such a band will never remain straight during changing temperature, but will curve itself either to one side or the other. The ratio of expansion of brass being greater than that of steel, the former metal on the application of heat would expand and become slightly elongated; but, as it cannot do this in consequence of its attachment to the steel, in its endeavours to obey the law of nature it forces the steel round into the inner side of a curve, the opposite condition taking place when the cold is in the ascendant. It is in consequence of this law that chronometers are compensated for heat and cold; and it is not difficult to understand in what way the same principle may be applied to actuate a hand or pointer by which thermometric changes can be indicated. There are certain inherent difficulties connected with this system which, in addition to the expense of carrying it into practical form, have militated against its popular or even successful introduction.

In Messrs. Watson and Sons' thermometer the ordinary mercurial bulb and capillary tube system is the one adopted. This tube is, like the thermometers of the better class, graduated upon itself by being etched with fluoric acid, so that to that extent the tube is a graduated thermometer complete in itself, and to read it off correctly necessitates the close introspection to which we have already alluded. Here, now, comes in the improvement:—Grasped by a short tubular brass collar capable of sliding tightly upon the thermometric tube for purposes of adjustment, and which brass collar is pivoted, the thermometer is poised or swung like a long lever with a short counterpoise. By the rising and falling of the mercury in the tube, the centre of gravity changes its place and disturbs the equipoise of the tube, the upper end of which thus sweeps round a radius, of which the pivot in the brass collar is the centre.

The annexed diagram explains the whole arrangement better than any verbal description. The tube is shown balanced at *a*, near the bulb *b*, the upper end of the tube *c* acting as the indicator.



As the tube is white, owing to the enamelled glass of which one side is formed, and as the background over which it moves is black, it is evident that the indications can be seen with great ease. Those who are prone to jocularity will not fail to observe that *this* thermometer, unlike others, rises with cold and falls with heat. The name by which it is intended to be known is the "Patent Balance Thermometer.'

When for scientific purposes a more accurate reading of the temperature is required than that afforded by the index, it can immediately be obtained by reference to the graduated tube itself. This thermometer cannot fail to prove of great utility for many purposes in addition to its use in the photographer's dark room.

SOCIETY OF ARTS.

On Monday evening last, the 28th inst., the first of a series of Cantor lectures was given by Mr. T. Bolas, F.C.S., at the Society of Arts, John-street, Adelphi, the subject being *Recent Improvements in Photo-Mechanical Printing Methods.*

This is the second course of lectures which Mr. Bolas has given on the same subject, the first having been delivered some five years ago. The lecture was well attended, the large hall of the Society of Arts being quite full. Mr. B. F. Cobb, Vice-President of the Society of Arts, was in the chair, and briefly introduced the lecturer.

Recent Improvements in Photo-Mechanical Printing Methods.

Mr. Bolas commenced his remarks by saying that the present condition of the various institutions which went to make up society was greatly due to the influence of the printing-press, and that in the work of the printing-press the camera was coming to take a larger and larger share. Various methods by which a photograph could be printed mechanically had been described by him some years ago; but since that period great progress had been made. He pointed out that almost all the methods of printing which were mechanical involved the use of an ink of somewhat the same nature as that used for letterpress printing—that is to say, one in which carbon is the basis—and that, therefore, they had the enormous advantage of giving prints which were permanent—a thing which no process giving a silver image did.

All mechanical printing processes, previous to the present date, depended for their working on the fact that, if gelatine were treated with a solution of bichromate of potassium, it retained its solubility only so long as light was not allowed to act upon it, whereas when it was effected by light it became insoluble. Lately, however, Dr. Eder had made a discovery which might lead to an entirely new direction of working. This was that if gelatine be treated with ferricyanide of potassium an insoluble compound results, which, however, becomes soluble when light acts upon it. [A complete demonstration of the various modifications of the Woodbury process followed these remarks.]

A portion of slightly pigmented, bichromated gelatine tissue was exposed under a negative. This was then squeegeed into a piece of glass, and was developed by pouring hot water on it, the image of the plate being meantime thrown on a screen by a lantern, so that all might see the operation. By this means a gelatine relief was gained.

A similar relief, which had been previously prepared and dried, was now taken, and being placed in contact with a block of type metal in the hydraulic press of Mr. George Smith, a mould was obtained. Into this mould there was poured some liquid pigmented gelatine, a sheet of paper was placed against it, and the excess being squeezed out in a press, a reverse mould was obtained by the time the gelatine had set. This was the final print, requiring only to be dried first —in practice being, as a rule, treated with alum to harden the gelatine.

The only objection to this process lay in the necessity of using a hydraulic press, which is a somewhat cumbersome piece of apparatus. To overcome this Mr. Woodbury invented an improved process, which was demonstrated. The gelatine relief is prepared exactly as before, but instead of a metal block being impressed with it, there is brought into contact with the relief a sheet of tinfoil. The two are pressed together through a rolling-press, some elastic material being placed behind the tinfoil. By this means the tinfoil took precisely the form of the relief. Copper was now deposited by electricity on the tinfoil to impart to it somewhat more strength, and on to this was poured some resinous composition, whereby the tinfoil and copper mould became attached to a flat glass or metal plate. This mould was used precisely as the type metal one was. This was the first stannotype process.

Both the original Woodbury and the first stannotype processes had worked excellently, and yet the development of the process had not been so great as the lecturer had five years since supposed it would be. The necessity in the first process for a hydraulic press, and in the second for an electrotyping apparatus, had prevented its being adopted as generally as might have been anticipated.

Mr. Woodbury's latest stannotype process appeared likely to popularise the method of printing by pigments to a very great extent, as by it no special apparatus was required. This process was so contrived that the gelatine relief itself was used in the mould, the relief being in this case obtained from a positive, not a negative. After it was dry tinfoil was pressed into it as before, and this mould was used at once, the only object of the tinfoil being, in fact, to prevent the liquid gelatine solution used in forming the prints from acting on the relief. The tinfoil might be nickel or steel-faced. If the tinfoil showed signs of wearing out, it could be stripped off and new tinfoil might be applied.

An application of Woodburytype to the water-marking of paper was described and demonstrated.

To show the influence which pressure has in rendering paper transparent a half-crown was pressed against a piece of paper folded in eight, fifteen tons' pressure being applied. On each of the eight pieces of paper there was a distinct mark of the coin. It was evident that if a Woodbury relief took the place of the coin any design which was on the relief would be transferred to the paper. Several very interesting examples of water-marks so produced were found around, and amongst others was a most curious one. In this a five-pound note had been caused to reproduce in negative its water-mark by simple pressure, the difference of thickness of the paper at the water-mark and at other portions affording sufficient relief for this.

Mr. Bolas said that great as would probably be the application of the latest Woodbury process which had just been demonstrated, he believed there was a still greater development to be looked for from processes in which the Woodbury relief was converted into line and stipple. This would be demonstrated at the next lecture.

A number of lantern slides produced by the Woodbury process were exhibited after the lecture, the lantern which was used being of novel construction and worthy of notice. One half of the condenser was in its usual position. Next it, and placed at an angle of 45°, so as to cast the beam of light issuing from this half of the condenser upwards was a mirror. Immediately above this was the other lens of the condenser. The slide to be exhibited was laid horizontally on this. It was by this means that the development of the Woodbury transparency could easily be shown on the screen. Above the slide was the objective, and above that again a reflecting prism to change the vertical direction of the rays again into a horizontal one. By revolving the prism the position of the image on the screen could be altered without shifting the position of the lantern.

ON THE CAUSE OF THE SENSITIVENESS OF GELATINE EMULSION AS COMPARED WITH COLLODION EMULSION.

UNDER the above title Mr. E. Howard Farmer has published in THE BRITISH JOURNAL OF PHOTOGRAPHY an interesting study which contains many new observations, but, at the same time, gives expression to many different hypotheses that are untenable after my experiments which were published last year, and with which Mr. Farmer appears to be unacquainted.

I mention, first, a new fact observed by Mr. Farmer—that collodion emulsion is rendered more sensitive by boiling. He boiled a collodion emulsion from half-an-hour to two hours (in connection with a so-called back-flow cooler), and found that its sensitiveness was thereby doubled and its intensity considerably increased. Certainly the sensitiveness attained was merely one-thirty-second part of that of a gelatine emulsion boiled for only one hour. Still the fact is new that collodion emulsion gains somewhat, even if not much, in sensitiveness through boiling. I was *not* able to detect any such increase of sensitiveness when I kept a firmly-closed bottle of collodion emulsion in a water bath of 30° R. for a whole day. The temperature may have been just too low to produce the required effect. Mr. Farmer further precipitated bromide of silver from a very thin, boiled gelatine emulsion, and mixed one portion of it with gelatine and the other with collodion. Here he observed, like me, that the mixing of the latter was extremely difficult. The collodion emulsion proved much less sensitive than the gelatine emulsion, although both contained the same bromide of silver. These results do not coincide with mine. By using glacial acetic-alcoholic collodion I obtained plates which were only a little behind the gelatine plates in sensitiveness. I attribute the slight sensibility obtained by Mr. Farmer to the circumstance of his bromide of silver being too coarse in the grain. Such bromide of silver distributes itself very finely in gelatine, but in collodion it remains as coarse in the grain as at the commencement. I cannot, therefore, subscribe to the view that the sensitiveness depends upon the film (gelatine or collodion); in fact, gelatine has but a very slight effect as a sensitiser.

Neither is the strong developer the cause of the great sensitiveness, since, as I have already proved, one can render collodion plates also suitable for the strong developer by a coating of gelatine; yet, notwithstanding, they remain far behind gelatine plates in sensitiveness. Further: Mr. Farmer's idea that bromide of silver forms an organic compound with gelatine is not proved. *The difference in sensitiveness between gelatine emulsion and collodion emulsion rests upon this*—that *in the two emulsions very different kinds of bromide of silver are contained.*

By my spectroscopic experiments last year I succeeded in establishing that there are two modifications of bromide of silver—that precipitated from aqueous solutions and that precipitated from alcoholic solutions. The first I called, on account of the position of its maximum sensitiveness to the sun's spectrum (length of wave, 450), "sensitive to blue;" and the other, on the same principle, "sensitive to indigo," because the maximum of its sensitiveness lies in indigo by length of wave 438—410.

It makes no difference whether the aqueous or alcoholic fluid in which the bromide of silver is produced consists of gelatine or collodion; whether the precipitation be undertaken with excess of soluble bromide or of the silver salt; whether it take place in the cold or in heat; or whether the bromide of silver is treated with ammonia, is cooked or is not cooked. The only condition is that solutions be used for the precipitation of the bromide of silver sensitive to indigo, which are prepared by means of almost absolute alcohol (96°). From aqueous-alcoholic solutions bromide of silver sensitive to blue also is precipitated, as by Mr. Henderson's process. Some people may object that these spectral differences are not sufficient to found the assumption of the existence of two different modifications. To these I would answer that these two modifications are not only distinguished from one another by their different spectral sensitiveness, but are also determined by other and not less characteristic properties, so that no doubt can prevail respecting their nature as quite different modifications of the same substance. Five of these reasons follow:—

1. *The Unequal Distribution in Gelatine Solution as Compared with Collodion.*—If one prepare a solution of three grammes of bromide of ammonium in 100 c.c. of alcohol, and to this add five grammes of nitrate of silver dissolved by boiling in ten c.c. of alcohol of 86°, one obtains a curdy deposit in no respect distinguishable from that precipitated from an aqueous solution under like circumstances. Now, if both deposits be washed—the one with alcohol and the other with water—one obtains when dried a coarsely-granulated mass, which, in order to be tested photographically, must be distributed or divided by being shaken up with a collodion or a gelatine solution. Here a very remarkable difference is observable. *The bromide of silver precipitated from alcohol does not distribute itself in the gelatine solution at all, while that precipitated with water, on the contrary, does so with ease.* Both substances behave in exactly the opposite way towards collodion. Here the bromide of silver precipitated with alcohol distributes itself beautifully, and that precipitated from water very badly. The distribution of the latter in collodion, however, succeeded so far as to allow of the comparative experiments mentioned above being established; whilst, on the other hand, all attempts to distribute bromide of silver, precipitated from alcohol, in gelatine solutions failed. Another difference between the two modifications is—

2. *The Unequal Susceptibility of Reduction. The Bromide of Silver Sensitive to Blue is much more Difficult to Reduce to the Metallic State than that Sensitive to Indigo.*—If a "chemical" developer be poured upon a bromide-of-silver collodion plate and upon a bromide-of-silver gelatine plate the collodion plate becomes rapidly blackened, accompanied by reduction of the bromide of silver, while the change in the gelatine plate is very slow. For this reason much stronger *chemical* developers may be used for gelatine plates than for collodion plates. (See also under 3 below.) The explanation that the collodion film is much more easily penetrated than gelatine by fluid agents is untenable, since the two sorts of bromide of silver exhibit this same difference when in the same medium (viz., collodio-gelatine). A further difference is—

3. *The Unequal Behaviour towards Chemical and Optical Sensitisers.*—It is acknowledged that there are substances which, by their power of combining with one of the constituents of a substance sensitive to light set free by exposure to light, very considerably promote the action of the light. As I have already made known, this action of the sensitiser or accelerator shows itself very conspicuously with collodio-bromide of silver, but much less so, however, with gelatino-bromide of silver. Here a secondary action upon the gelatine film may partly bear the blame. Yet, in my experiments with collodio-gelatine, where no such secondary action was present, the slightness of the action of chemical and, still more so, of the optical sensitisers was also manifested. The favourable effect of chemical sensitisers upon the bromide of silver sensitive to blue has as yet only been proved in the case of nitrate of silver with pyrogallic acid and of optical sensitisers of fuchsine. A still further difference is—

4. *The Unequal Behaviour towards the Photographic Developer. The Exposed Bromide of Silver, which is Sensitive to Blue, is very Considerably (at least fifteen times) more Sensitive to the Chemical (Alkaline) Developer than to the Physical (Acid) Developer.*—The bromide of silver which is sensitive to indigo is, on the other hand, at most but three times as sensitive to the chemical as to the physical developer. This difference is the more surprising from a photographic point of view, as here the astonishing sensitiveness of the new gelatine plates, as compared with all other preparations, is only conspicuous when the plate is treated with the *chemical* developer after exposure in the camera. Towards the *physical* developer the bromide of silver sensitive to blue does not show itself to be more sensitive than the bromide of silver sensitive to indigo. In conclusion: both modifications show—

5. *An Unequal Behaviour when Heated. The Bromide of Silver Sensitive to Blue, and Prepared with Excess of Bromide, is very Considerably Increased in Sensitiveness by Prolonged Heating under Water. The Bromide of Silver Sensitive to Indigo has not its Sensitiveness Changed by Heating, or, according to Mr. Farmer, only a little.*—This increase of the sensitiveness of the bromide of silver sensitive to blue by digestion or cooking has long been known, while the spectral behaviour and the characteristics described under sections 1 to 4 were first observed by me. The preparation of the highly-sensitive gelatine plates now common is based on the increase of sensitiveness effected by means of heat in

bromide of silver sensitive to blue. With increase of sensitiveness the spectral behaviour of this bromide of silver only changes from a quantitive point of view. It assumes a greener colour, and exhibits an increased sensitiveness—not only to the light blue, but also towards all the other rays of the spectrum. The other qualities—difficulty of reduction, difficult division or distribution in collodion, and indifference towards the physical developer—of bromide of silver sensitive to blue are not changed by heating. These very remarkable differences in chemical behaviour should be sufficient to establish on a firm basis the assumption that two quite distinct modifications of bromide of silver exist. H. W. Vogel, Ph.D.

—*Mittheilungen.*

A FEW HINTS ON THE EASY PREPARATION OF GELATINO-BROMIDE OR CHLORIDE PAPER.

With the ever-increasing demands exacted by photography in its various aspects, it was to be expected that something superior to the heavy, dull enlargements of the last two decades should have to come to the front and fill the demand the public have a right to make for a picture that will give a richness approaching that of silver printing but on a larger scale. The thing, however, was to find the means, and this done photographers are in a position to increase their income and do better work of the class, while amateurs are furnished with the means of getting results such as hitherto were altogether beyond their reach. These last may from small negatives revel in the production of handsome-sized pictures, wherein much of the beauty of the detail concealed in the small print is fully revealed, and effects almost unsuspected realised in the enlargements. Hours may now be by them utilised in an enjoyable way in the production of the very foundation of the large picture, namely, the preparing of the paper, which last may serve the twofold purpose of enlarging or direct printing, where rapidity of production is desirable, as is not unfrequently the case.

There is an additional charm, in the production of a developed picture, in the well-known fact that, when properly carried out, it is one of the most permanent of photographic productions; but that one must not be afraid of going to the pains of thoroughly washing, and seeing that the picture is soaked in the alumo-citric solution, is a matter that needs no comment. Cleanliness, too, in manipulation is indispensable, and each operation should be done in separate dishes, each having its own special object, and being well cleaned both before and immediately after use; otherwise stains and shortcomings are sure to result, and the process be blamed owing to the carelessness of the operator. All this I have wished to enforce on the mind at the outset, that things may be set about in the proper way, and failures avoided from the very first.

Coming to the point—namely, the production of the enamelled surface paper, for either enlarging or contact printing—I found the following to be the most direct and simplest way of setting to work:—Procure a good glass, free from flaws and scratches, or, better still, a patent plate; thoroughly clean it, and finish by polishing with French chalk. It is generally believed that the plate should be coated with collodion to obtain the high gloss. Such is not the case, however, the direct coating with emulsion producing equally good results.

The next thing then is to make a good but slow emulsion and coat direct, taking care to previously warm the glass sufficiently for the emulsion to flow over it easily, and put it down afterwards on a well-levelled surface to set. While the emulsion is setting on the plate, take a sheet of Monckhoven's enamel double transfer paper—tinted or white, at the choice of the user—or the autotype double transfer paper answers very well. Put this paper to soak in perfectly pure water; on coming out of which it must be well drained, and is then ready for application on to the emulsion film left setting. The paper is lowered gradually and carefully on the film and next lightly squeegeed, after which it is reared to dry in a cupboard *ad hoc*, and the drying should proceed with not too much heat.

After thoroughly drying, the paper is gently drawn from the glass plate, and on removal is found to have the perfect enamel gloss which conveys that depth of shadow and fulness of detail and gradation found only in albumenised prints. If proper care have been taken the papers will strip off the glass perfectly easy, without any previous coating with collodion, and, notwithstanding, with all the gloss desirable. The paper is now ready for packing or exposure, for printing by contact or for enlargement.

With regard to the emulsion proper: any of the formulæ given by the Editor in The British Journal Photographic Almanac for last year will answer, but, as it is intended to make a slow emulsion, no recourse need be had to boiling. In all probability a quarter of an hour's stewing at (say) 140° to 150° will answer every purpose. Whether there is an advantage in using the salts of potassium over those of ammonium, were better left for each one to decide for himself. What is certain is that good results are obtainable with either. It may be, too, that a less quantity of silver would answer equally well for the individual purpose in view.

I shall now enter into the manipulations gone through in enlarging, and proceed *seriatim* with details.

The first thing to do, at this stage, is to procure a perfectly flat board, place it *in situ* on a stand or easel, and on this board pin a sheet of white paper of the size of the intended enlargement, carefully focus, after which insert a diaphragm in the lens to ensure the utmost sharpness, and now cap the lens with a piece of orange glass fitted to the cap. The use of this is to admit of the picture to be still seen and enable the manipulator to adjust the sensitised paper at his ease, without injurious actinic action whatever.

As a matter of course, the length of exposure must depend, first, on the character of the light, then on the density of the negative, and finally on the speed of the emulsion proper, which, I repeat, is best slow, so as to leave plenty of latitude in exposure, the greater quantity of which is of no consequence, as what is wanted now is perfection of results, which is best attained, by amateurs at least, with ample latitude in exposure. The expert enlarger knows how to modify his developer to suit the case of slight under- or over-exposure that may occur, but it is not quite the same with one enlarging only occasionally.

The exposure made, next comes development. Since, however, so many good formulæ are already extant, I shall rest contented in saying simply that I prefer the ferrous oxalate with citric acid in minute quantity. By the way, a ten per cent. stock solution of citric acid and water is a good thing to have at hand when developing; for, if the picture come up too rapidly, at once pour off the developer in the developing cup, quickly flood the paper with plain water to arrest development in its progress, put half-a-drachm or so of the said citric acid solution in the developer, and, after stirring, now pour back the developer on the picture in progress, and things may now proceed as if a normal exposure had been given. A quick eye and hand are required for all this. With a slightly under-exposed picture more energy may properly be added to the developer. The picture developed, it should be well washed and afterwards fixed in a strong solution of hyposulphite of soda; after which wash again and put to soak for a short time in a solution of alum and citric acid, whereby greater purity of the whites is obtained and the durability of the picture increased. Finally: thoroughly wash and hang to dry. Now, if all the operations have been properly conducted, exposure correctly timed, and rational development resorted to (the negative being what it ought to be), a beautiful picture, full of delicate gradations and rich in depth, should be the result. A stout mount, perfectly smooth, is best to mount upon. Rolling completes the operations. Too much care cannot be taken in handling the paper, the face of which, I hold, should never be touched if perfection of final results be wished for.

Further Use of the Enamelled Paper.

The above are all that is requisite for a picture in black and white made from a good and suitably-retouched negative. Many, however, may wish to do something more—in fact, to tint or colour; but the gloss is then terribly repellent and obstinate, yet magnificent Vanderweyde effects are to be got with all the apparent delicate stipple. To do this the parts to be acted upon are simply abraded with finely-powdered pumice stone, applied round and round with the tip of the finger. Now that a tooth is obtained the pastels or coloured crayons are easily applied in the usual way, and exquisite vignettes are readily produced. From this it is clear that the paper is admirably fitted to take chalk. Where a highly-finished monochrome is desirable, any plain picture with a not over-dark background can be most felicitously produced by the use of the stump and chalk.

Chloride Emulsion Paper.

This form of paper produced with chloride in conjunction with citric acid, as per formula already published, is stripped from the glass as above, and may be used for printing out direct, the toning being done with gold. The advantages of this paper is the enamelled surface—which is produced as described in the course of this article—and the fine depth obtainable in the print. Once more: this surface being very fragile requires great care in handling, as the freshness once gone the charm of this sort of work is done away with immediately.

The Preparation of Plain Surfaced Paper.

There are many instances where a gloss is not only not desirable, but positively objectionable; and this is especially the case with proofs destined to pass through the artist's hand for treatment in water-colours or oil painting. He (the artist) mostly shrinks from this sort of surface, in the teeth of the public, and will audibly utter "*bonbons* box!" with a scorn unsurpassed even by Juno. Whatever may be thought of his view of the case, certain it is that frequently a need arises for absolutely plain or glossless paper. This can be produced in the following manner:—

Proper emulsion having been obtained or prepared, and sheets, large or not, of the autotype single fine transfer or well-sized paper procured, the paper is first damped thoroughly, laid on a sheet of absolutely flat glass, and its edges are turned up about a quarter of an inch all round, so as to form a kind of tray, after which the paper is perfectly smoothed flat on a glass by the aid of a damp sponge used lightly. On the paper thus prepared now pour in the centre a pool of emulsion, sufficient to cover it well all over, and make the emulsion flow from corner to corner as you would collodion, taking care to have a perfectly even coating—that is, not too thick in parts and thin in others. The drying may be done by simply leaving the paper on the glass, or, when thoroughly set, it may be hung by a pin or two or put astride on a rod to dry spontaneously. This gives a very fine paper, fit for all ordinary purposes of enlargements where a gloss is undesirable.

This paper is probably exhaustive, and meant, at anyrate, to answer any query that might be propounded in search of a reliable *modus operandi* in the individual line here treated. All available hints have been studiously dwelt upon to smooth, not only the amateur's path, but that of photographers whose experience has not lain in this direction. The system of working given is absolutely reliable, and can but tend to success where carefully and implicitly followed. At anyrate it is the result of mature experience and careful forethought, with the view of being useful to my fellow-workers, to whom I earnestly wish every success. G. H. Martyn.

MICELLANEOUS SUBJECTS.

The Illumination of the Developing Room.

To recur to the subject of the position of the lantern non-actinic screen in relation to the plate under development, it is astonishing what an advantage is gained by placing its greatest length horizontally instead of vertically. Since first pointing this out I have found the following figures bearing on the subject, though not in its application to photography, in that admirably-illustrated book, Guillemin's *Forces of Nature*:—"Of 100 rays of light received by water, glass, polished black marble, mercury, or speculum metal, with an incidence of 50 degrees, water reflects 72, glass 54, marble 60, and mercury and speculum metal 70. If the incidence augments, the number of reflected rays diminishes for the first three bodies in rapid proportion, and at most is no more than 2 or 3 at from 60 to 90 degrees, whilst under the latter incidence mercury reflects 69 rays out of 100." Therefore, supposing a photographic plate under the developer to be but three or four inches from a lantern with a window a foot high, much light from the upper part of the coloured screen finds its way to the plate, whilst more than two-thirds of that from the lower part is reflected from the surface of the liquid, and cannot touch the plate.

At present we have not nearly reached the limit at which clear, cool light can be used in a developing-room with safety; and it is to be hoped that Mr. Debenham will not stop, but push on his experiments till that limit is reached. First: the coloured screen should be a very large one—say a yard long by eighteen inches high; it should be disposed with its greatest length horizontally; and its lower edge should be at the level of the table on which the plates are developed. In no case should development begin with the plate nearer than eighteen inches from this screen; but when the image is well out, and when the bromide has well soaked the film, it may be brought nearer with impunity. Behind this screen the manipulator might have a row of gas-burners, lighting one after the other until he was able to fog a plate while developing at eighteen inches from the screen, and after first exposing the plate dry to the light for a minute, which is longer than it is likely to receive in ordinary practice. Under these conditions the brilliancy of light permissible in the developing-room will probably be most remarkable when compared with recent general experience. When plates of unusual sensitiveness are used it will only be necessary to develope them farther from the lantern. At three feet distance the power of fogging by the light will be four times less than at eighteen inches; at three yards' distance its fogging power will be thirty-six times less than at eighteen inches.

When the screen is translucent—as when tissue paper is used—the latter becomes virtually the source of the light in use. With glass, or any other medium through which the shape of the flame can be seen, there is more liability to fog. Using ground glass in the lamp is not so good as the obtaining of translucency by the opalescence of the screen; and the opalescence should not be given to glass by something which merely increases its capacity, but by surcharging it with the colouring oxide used in the manufacture. Dark greens and yellows should not be employed, but intensely bright light ones. If one plate only give the necessary opalescence more opalescence would be a disadvantage, and the plate of the second colour may be of transparent glass. There should be just enough opalescence to prevent the shape of the flame from being seen, but not a fraction more, to bring practice most into harmony with true theory. Daylight should not be used as the original source of light when uniform safety and the brightest illumination of the developing-room are desired.

Coloured oil silk will be good for those who are travelling, and should give the necessary opalescence. I am obliged to those who informed me of the silk being in the market; but Mr. Debenham's discovery will discharge all ruby colour from it in the future. With experience the size of lantern windows will largely increase; and in the future the custom will probably be to write to all the vendors of coloured oil silk for a little specimen strip only one-third of an inch wide, make a polychromatic negative of all the slips received, and then order the two which, when superimposed, give the best visual results combined with efficient absorption of the blue rays.

Should it ever be deemed necessary to add a third sheet to the lantern window, it ought to be green and not yellow, since the developer will give some of the latter colour, and it should not be the same green as the other one in the lantern. I have found that what Mr. W. Brooks says about the advantage of using the pyro. developer over and over again on different plates is quite accurate, and a very great economy.

Speculations about Cleaning Lenses.

The use of wash-leather for wiping lenses just before use has often been specially recommended in print by practical photographers; and I think that this preference is not founded merely upon fancy, but upon a scientific basis. The surface of any lens must be but ground glass; for increasing the fineness of the polish merely means increasing the fineness of the abrasion, until, in finished lenses, the irregularities of the surface are far beyond the reach of detection by the most powerful microscope.

If a thin film of grease be rubbed over common ground glass its transparency is increased; but the finer the surface of the glass the thinner must be the oily film to produce this effect, for a visible film of grease on polished glass diminishes the transparency. The law, therefore, is that the more polished the surface of the glass the thinner must be the film of grease to increase the transparency.

In the course of the manufacture of wash leather the leather is well soaked in oil, which oil is afterwards apparently removed. My idea is that actually it is not entirely removed, and that the mere trace left in the leather is just enough to give a film adapted to the increasing of the transparency of the apparently perfectly-polished surface of the lens.

German Photographers in France.

L'Anti-Prussien, a newspaper in Paris, is trying to make things "warm" for Germans residing in that city. It has just fallen foul of a photographer there in its edition of January 8th, and I translate its statements as follows:—

"On the occasion of the new year the photographers of Paris received a little rag of blue paper, in imitation of a French telegraphic form, folded up and delivered at the house. The advertisement in question came from a certain M. Fernand Brunk, 13, Rue Chaudron, Paris.

"It states, among other things—'The house of F. Brunk has no travellers or branches; it is, therefore, able to do cheaper work than all others.' Farther on is the trade-mark of an English paper-maker. The rag also says:—'Photography plays a leading part in modern art, therefore every photographer should keep in the front rank of his industry. In consequence, M. Fernand Brunk, 18, Rue Chaudron, Paris, deserves to be warmly recommended for his novel backgrounds, designed by one of the first artistic specialists on the continent, and for his other articles.'

"Finally, the tenor of this so-called telegram is as follows:—'A Happy New Year,—Fernand Brunk, 13, Chaudron, Paris.'

"Well! French photographic gentlemen! M. Fernand Brunk is nobody but the son of his father, who has an establishment at Nuremberg. If you give orders to the son in Paris at 13, rue Chaudron, the goods will come from Germany. It is unnecessary to tell you that you have good firms in Paris, French houses, jealous of their reputation, which ask nothing more than to work.

"By-the-bye, is not M. Fernand Brunk's father, perhaps, a German officer? And what grade does his son occupy in the army of our good neighbours, if we are not too inquisitive? (Signed) La Charge."

This miserable print is keeping old animosities alive by attacking various French tradesmen who employ German assistants.

Lucerne, Switzerland, January 20, 1884. W. H. Harrison.

CAMERA LUCIDA.—PALETTA OBSCURA. A STUDY IN LIGHT AND SHADOW.*

In hatching and touching your plate, which to me seems to represent the second working, think upon all the dodges of the etchers, Hayden, Hamerton, Herkomer, Whistler, &c. If you have a chemical, to eat down certain parts of it broadly, leaving the prominent parts (be sparing in prominent parts) standing out dense, do not niggle with your pencil point overmuch, except it is to blur out an accessory which may be too distinct. I do not know much about printing photographs, yet I am inclined to think it is here that the genius of the photographer may be brought out. If I were a photographer I would never leave a plate while it was printing for a second. I would try all sorts of dodges upon the sun with pieces of paper having little eccentric holes torn out where I wanted an artificial shadow to fall across my plate, by exposing the print altogether at times so as to mellow any extreme lights, painting touches of white on it to bar out the sun altogether where I wanted a mysterious gleam, whether it was on my picture or not, and never rest until I had made it my own. I may be wrong, of course, in all this; but it is the idea which now strikes me, or all that may be done already, or considered *infra dig.* or illegitimate. Yet here, I think, as in the treating of a painted picture, I imagine the photographer can liberate himself entirely from the trammels of custom, and never be at a loss for fresh tracks.

* Concluded from page 59.

In landscape photography I constantly observe good pictures rendered imperfectly through the fatal power of the camera, which must print every object before it; and yet in the printing even more than in the sorting of the plate I think much, if not all of this, might be obviated by a careful study and following up of the tricks of Rembrandt. If it be the foreground which is too plainly marked, why not take another foreground plate, and, clearing off all not required, place it over the other plate, and so let the sun strike through both and blurr that corner; or make a dark shower cloud, as in the engraving, *The Three Trees*, by covering boldly portions of the plate with paper and allow the rest to print darker, or by adroit covering and exposing simplify the whole arrangement and create divisions where you want them; a ray of light, or a part blackened, or any device that occurs to you, which is what we call "inspiration."

The magic of Rembrandt rests in this—that he seldom creates, *but he takes advantage of circumstances and local incidents* to intensify the story he is telling you. * * * * *

I take David Teniers after Rembrandt as an instance and example of successful and easy grouping. I take him as the type of a school embracing a long list of painters, ancient and modern—Wilkie, Faed, Orchardson, Cameron, Pettie, &c., &c.; and why I prefer him to our own Sir David Wilkie is not so much that Teniers was before Wilkie, because Teniers was by no means the first in that line of business, as for the reason which I think you will also agree with me if you carry back your memories to the summer exhibition, where one example of Teniers was hung in painful juxtaposition with two pictures by Wilkie belonging to Queen Victoria. If you can recal the delicate and silvery half-tones and open composition of *La Tourneuse* and compare, as no one could help doing from their close proximity, this with the hot colouring, slushy handling, and forced composition of *The Penny Wedding* and *Blind Man's Buff*, we must agree that here Teniers has the best of it. Yet I would by no means decry Sir David Wilkie, except where comparison is forced, as in this case; for I consider Sir David Wilkie, Tom Faed, and Orchardson to be the very best models a painter or a photographer can have for the composition of groups.

I am not at all prejudiced in favour of old masters or of old things, or big names, or advertised brains or dry bones; rather the reverse. I like young flesh and fresh blood, quick-beating pulses, and impetuous motions. I would rather have a living mistake than a dead perfection any day; yet, when I see the old ones far ahead of the young ones, it is both a duty and a joy to bend the knee and adore the vanished past.

Orchardson and Hugh Cameron have come up the truest to the silver and opals of Teniers, and for chaste deliberation and simplicity I can commend no one before Orchardson; he always stops painting just at the point where people should stop eating and drinking—the point this side of repletion. Study his best known examples: *Christopher Sly*, from "Taming of the Shrew," some articles of clothing and a pair of shoes in the left-hand corner, to continue the slanting line of feet of the servants waiting on Christopher; a walking-stick lying in the same line as the feet of the negro, and people behind the screen; a sheet of paper on the floor further in takes exactly the same line of direction, and the eye is no more troubled with details—we can all laugh without let. In the *Queen of Swords*, a more crowded composition, the ground lines are the same, with the Queen forming the point of the angle and a clear foreground, with the exception of a fan that carries on the same lines. In that scene from "Henry IV.," part first, *Prince Henry, Poins, and Falstaff*, we have one of the simplest, openest, and most refined specimens of humorous compositions on record. A straight, horizontal line of tapestry—broken up at the exact limit by the burly hind-part view of Sir John, the buffoonery expressed in that capacious, broad waist-belt, and the rounded folds of the doublet below it, is worthy of the mighty creator of that inflated sponge—Falstaff. A table and chair behind it keep the horizontal line, while relieving the emptiness of the floor between Falstaff and his companions. The wall starts out towards us at an angle, while, along with a chair, the Prince and Poins keep within the vanishing lines from the point of sight, which is exactly in the centre of the back view of Falstaff's waist, so that we must look (whether we like or not) first and last at him, even although, with Orchardson's usual love of refinement, he is modestly cast into half shadow.

They say Thackeray could draw a gentleman and Dickens could not. I deny this sweeping assertion in the existence of Mr. Chester of "Barnaby Rudge;" but one thing I do think, which is, that Orchardson is the painter who gives us the nearest approach to the easy insolence and *bonhomie* of a well-bred man of the world.

To return to Teniers (for a moment in passing), I cannot bring to mind one of his pictures which I have seen that could in any way be improved in the composition, added to, or taken from; every accessory tells its own portion of the general story, and this I would once more point out to the composer of a picture, along with a few simple laws which occur to me as I write. The principal object is the first object which rises up before the mind's eye, and fixes the composition when the story is heard or read, therefore the main object to be considered and first set up or drawn in—as the figure of the Queen in Orchardson's *Queen of Swords*; the philosopher nearest us in *Bacchanalian Philosophers*, by Teniers: the two front figures in Rembrandt's *Night Watch*, one dark, one light, the dark one put in by Rembrandt first; and the child with its cart even before the lighted-up woman and child who come before *The Blind Fiddler*, by Wilkie. There is too much in this composition, particularly that group of foreground objects, which bear such evident traces of having been so carefully selected and placed in such a variety of artificial carelessness—watering-pan, cabbage, box, and utensils, basin, stool, with little bat, and knife, placed so exactly, as they ought to be, like the hills of Borrowdale—all being after consideration, painty improvements, never dropped upon accidentally and not at all required. You will find nothing of this sort in Rembrandt's pictures, or in Rubens' (lavish though he is), or in Teniers', and seldom in Petty's or Orchardson's. In Vandyke's you may, or in Wilkie's, because both Vandyke and Wilkie, being Court favourites, permitted their own individuality and good taste to be oftener biassed by the buzzing of the gartered asses about them; yielding to make this or that improvement to suit a foolish patron, until their own gifts became obscured, and their taste perverted to the level of a pair of Court breeches. Rembrandt and Rubens were strong enough men always to lead the fashion, and too strong ever to be led. But the times are changed with us now, so that I do not think there is any danger of Orchardson getting spoilt by good fortune; he is not in any way hurt by it yet, at all events.

After we get the first object set up, the others all fall into place to suit that central or main object, and this rule holds with the arranging of light and shadow, as well as form;—one minute centre of light round which the half-lights range—and the deepest shadow when you can best afford it. The central form, the central light is of paramount importance—all the rest a matter of convenience, chance, and discretion.

Think less about what you may put in to help your picture as upon what you may keep out, to give it importance and repose.

Every sitter has a fine point about him, or her: find it out—the best side of the face, a nice arm, or good hand; they will reveal it to you unconsciously, before you have sighted them, and make that your first object, and all the rest subordinate so as to help that out.

Don't seize two points in one model; decide which is the most useful, and take that, without regret discarding all the others.

It may be that the only good bit is a hat, or a feather, or a pair of gloves, or a brooch. The point that first attracts your eye pleasantly is the point upon which to make your centre of vision, and around which you will arrange the rest. If it be an article of dress, of jewellery, then bring the light to bear upon it, and make all the rest in half-shades.

Study Nature for ever, if you would have any photographs you take different from the last photograph. Never take a sitter at once; leave them alone to knock about your studio while you pretend to be sorting something else, but watch them unawares; you will see a natural touch before long, a peculiar habit which they are not aware of, but by which many of their friends know them. Fix on that as your character keynote, and work up features, position, and accessories, so as not to lose sight of this peculiarity; and with this borne always in mind and a good knowledge of face and neck anatomy, without which I cannot see how anyone can touch up a negative properly, I know of no reason wherefore a photographer should not give us as complete a character study as any painter, ancient or modern, from Millais back to Albert Durer.

Yet before that state of perfection can be acquired, permit me, as one of the public and also as a frequent sufferer, to enter my protest against head-rests and long sighting, to those who still practise these abominations. No natural expression or easy posture can ever be gained, until instantaneous plates are used for everyone. Before they can well settle in their self-chosen places and posture, have them down and risk it—the chance of a spoilt picture is better than a conventional position.

Also this debasing system of smoothing away wrinkles, and blotches, and character traces. I never can see a real harsh, wrinkled face nowadays, except in some of the tintypes.

Of course I know the cry is raised that the public will have these wax productions; but as one of the public I have not yet had my own likeness taken quite right. For instance, in repose I hang my head on one side, and I have always been made to hold it straight up, like a soldier at "attention." Again, my nose is neither of a Greek or Roman caste, and yet I never do get that nose put in as I see it in a mirror, or as its humphy shadow is cast upon the wall; or, as a gentleman once closed up a wordy, if not very convincing, number of reasons against my having either the qualities to make a poet, painter, or passable labourer, by exclaiming—"Why, just look at your nose! did you ever know a clever man with a nose like that?"

I have talked a long time about realism, mixing it ever and again with the second and third objects of my lecture, as it is so impossible to separate them entirely, or to depict one properly without giving you all the rest, and therefore must now hasten to the conclusion with just a word or two about the others. Two names I may give you as specimens of feeling, M'Taggart and Hugh Cameron. I have pointed out in both what I considered to be working flaws, yet that does not prevent me from admiring their gifts and telling their virtues—rather does the one urge me to the other, as the natural promptings of manliness and fair play. Yet in neither Cameron nor M'Taggart are the qualities which render them great (to be found in engravings from their works) sufficiently strong to be utilised in the photographic studio.

For feeling and sentiment I would point out Robert Macgregor amongst our Scottish artists; through using low tones he is a very useful study for a photographer. We want yet to see general, low, and soft tones about our photographs, as well as strong and rugged effects softened down.

I could mention many others, but when I come to examine their work I find so many evidences of the palette obscuring only what the camera has made a little too lucid, my conscience bids me pause. I would like to say that they had feeling, but I see more of flimsy affectation and shallow make-believe woolliness instead of soul-stirring passion. Yet "John Blair" has feeling and tenderness, Robert Herdman has sentiment, Lockhart has force, Herkomer has force, feeling, sentiment and passion, and so many more that I cannot mention, unhonoured, and some honoured in whose works I can trace nothing original at all.

In France there is a school rising, who with the brush are trying to compete with the camera. *The Impressionists*, along with the camera, are yet fated to produce a great revolution in art. They aim at giving the impression, effect, or sensation of an instantaneous action or emotion or phase; not the phase exactly, but the swift impression which it leaves upon the mind of the spectator, with form, as it were—that is, with paints and brushes striving to embody the soul of Nature, and when the two are joined, the result will be—*perfection*.

To finish by bringing up the name which I have hitherto kept back, the exception, about which some time ago I promised to tell you—the sweetest, tenderest, mightiest art soul that ever was chained inside of a mortal body, and prompted the fingers to move as it wanted; the purest, saddest mind that ever writhed neglected and found its reward so late; the soul now free and stirring up a crowd with its pathetic activity, to be like it, pure and true—I mean *Jean-François Millet*, the French peasant painter. Mr. Hunt says of him—"For years Millet painted beautiful things, and nobody looked at them. They fascinated me, and I would go to Barbison and spend all the money I could get in buying his pictures. I brought them to Boston. '*What is that horrid thing?*' '*Oh! it's a sketch by a friend of mine.*' Now he is the greatest painter in Europe."

That is a painter's verdict about a painter.

One of his pictures is vivid in my mind just now. There is a print of it in that wonderful illustrated magazine, *Scribner's Monthly*, where engravings look like paintings or idealised photographs.

It is called *The Sower*—the dim figure of a labourer scattering seed over a ploughed field with one hand, and holding his apron filled with embryo life in the other. In the distance, and lighted up by the sun, a team of bullocks are dragging the plough, and a flight of birds over beyond the seed. That is the whole composition put into bald words. But as it has been rendered by this painter it has an embodiment of all which I have tried to explain—the spirit and body of living, working, suffering nature.

What would I not give (if I had it) to see a photograph done like that! And it can be done if you labour enough, know enough, and feel enough.

As I look upon *The Sower*, I am drawn into it, mesmerised and rendered clairvoyant; I am *en rapport* with the freed spirit which has left, along with the delicate aroma of its departing wings, a portion of its own personality, its own immortality—vague and tender—greater than Raphael, or Rembrandt, or Albert Durer; for it has taken the deepest root within humanity.

Tenderly I look upon it, not too boldly, for it seems vibrating with a sensuous existence; it clutches at my heart-sinews as it reveals the parables of Christ, accompanied by sobbing notes of melancholy spirit-music—the far-off strikings of angel harp-strings, indefinite but ravishing.

And the painter's body lies under the earth—that St. John face, with its misty development of hair; the maddened stag driven by the hunters and the hounds over the garden fence, into the snow-covered garden on that January morning of 1875,* past the dying man's window, and ruthlessly slaughtered under the eyes of the dying man; yielding up its noble life for a bit of sport, the hot-red blood sinking through the cold, white snow, and soaking into the covered hearts of the green plants beneath. One up-turned glance of the glazing eyes met the down-turned glance of the glazing eyes, and so—filled with despair and pity—two souls—the soul of a stag and the soul of a painter—drifted out into the morning light. HUME NISBET.

RECENT PATENTS.

PATENTS APPLIED FOR.

No. 2,211.—"Means and Apparatus for Applying the Electric Light to Cameras and to other Analogous Purposes." A. F. LINK.—*Dated January* 26, 1884.

No. 2,312.—"Preparation of Surfaces for Printing or Etching by the aid of Photography." Communicated by E. Kunkler and J. Brunner. A. G. BROOKES.—*Dated January* 29, 1884.

* Some days before the death of Millet a stag was chased by hunters and dogs into a neighbour's garden and butchered before the dying man's gaze. "I take it as an omen," he said mournfully, and prepared for the earth-end.

NOTICE TO PROCEED.

No. 4,794.—"Rotary Stands for Exhibiting Photographs." A. M. CLARK.—*Dated October* 9, 1883.

GRANTS OF PROVISIONAL PROTECTION FOR SIX MONTHS.

No. 5,896.—"Improvements in and Apparatus for the Production of Photographic Negatives to be Used in the Processes of Photolithography, Photozincography, Photoetching, or Phototype Productions. ALEXANDER BORLAND, Wilmslow, Chester.—*Dated December* 28, 1883.

No. 5,915.—"A New and Improved Means of Putting Designs upon Glass or other Material." WILLIAM HENRY WARREN, artist, Suffolk-place, London.—*Dated December* 29, 1883.

Our Editorial Table.

DEVELOPING DISHES. By F. W. HART, Kingsland-green, N.

WE have received from Mr. F. W. Hart a specimen of a new developing dish which he has just introduced. This is constructed of celluloid—a material which lends itself admirably to this and similar purposes, being lighter, less brittle, and cheaper than ebonite, and, at the same time, equally serviceable. The new dishes are elegant in appearance, and are provided with light ribs at the bottom to prevent the adhesion of the plate. The colour is white, or nearly so, which may prove an objection to some who have accustomed themselves to ebonite; but this is a fault which may be easily remedied.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
February 4	West Riding of Yorkshire	Godwin-street, Bradford.
" 5	Sheffield	Freemasons' Hall, Surrey-street.
" 5	Halifax	*Courier* Office, Regent-street.
" 5	Bolton Club	The Studio, Chancery-lane.
" 5	Glossop Dale	Glossop Coffee Palace, High-street.
" 6	Benevolent	181, Aldersgate-street.
" 6	Edinburgh	Hall, 5, St. Andrew-square.
" 6	North Staffordshire	Town Hall, Hanley.
" 6	Photographic Club	Anderton's Hotel, Fleet-street.
" 7	South London	Society of Arts, John-st., Adelphi.
" 7	London and Provincial	Masons' Hall, Basinghall-street.
" 7	Bolton	The Baths.
" 7	Leeds	Philosophical Hall.
" 7	Glasgow	177, Buchanan-street.
" 7	Dundee	Lamb's Hotel, Reform-street.
" 7	Coventry	Coventry Dispensary.
" 7	Yorkshire College	College, Cookridge-street.
" 8	Ireland	Royal College of Science, Dublin.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AT the meeting of this Society, held on Thursday, the 24th instant, Mr. W. Coles occupied the chair.

MR. A. COWAN said that he had recently fitted his dark room with the green glass and yellow paper proposed by Mr. Debenham, and at the same time had arranged to let reflected light only fall upon the glass, as recommended by Mr. Starnes. The advantage of using reflected light, he thought, was that the window was equally lighted all over instead of being brightly lighted at the place immediately in front of the gas jet which served as the source of light. His light was glazed with a square of the green glass 24 × 18 inches, supplemented by four thicknesses of the yellow paper. Behind this was a gas flame with a tin screen of just sufficient size to prevent the light from the flame impinging on the window. Behind the flame was a reflecting surface of the same yellow paper arranged in a concave form. He found that he had more light to work by than he formerly had when employing the usual red mediums, and to test its safety he had exposed three portions of a plate for periods of five, ten, and fifteen minutes—the remaining portion being kept covered—within a few inches of the window. This plate was handed round, but no trace of an image could be seen on any part of it. The plate was a rapid one, by one of the best known commercial manufacturers. With his former dark-room light he could get a distinct impression on the plate in five seconds, and a strong one in fifteen seconds. An example of this he had shown at a previous meeting.

MR. W. M. ASHMAN stated that for travelling purposes he thought the use of a spirit lamp with salt in the wick very convenient, as the materials could be obtained everywhere. He had been trying the photographic power of the flame by exposing plates to its light for periods of five minutes. At a distance of twelve inches from the uncovered flame a distinct image was obtained. With a sheet of ground glass six inches from the flame, and the plate twelve inches from the glass, there was still an image. Substituting opal glass for the ground glass the image was very faint. He (Mr. Ashman) also showed the results of some experiments made with a small oil lantern and various mediums. Two thicknesses of ruby glass had, with five minutes' exposure at twelve inches' distance, given a transparency. One thickness of ground glass and one thickness of orange glass had also sufficed to give an image; but one thickness of ruby glass and one of oiled orange paper seemed to be safe.

Mr. J. B. B. Wellington showed some transparencies for the lantern, made upon bromide plates and developed with iron, closely resembling the cooler of the tones obtained upon chloride plates. The emulsion was prepared as follows:—

Nitrate of silver	50 grains.
Heinrich's gelatine	20 ,,
Water	5 ounces.

The nitrate of silver is first converted into citrate by citrate of ammonia, and then redissolved in ammonia—

Bromide of potassium	40 grains.
Heinrich's gelatine	20 ,,
Water	5 ounces.

The two solutions were mixed at a temperature of 150°. Two hundred grains of the same gelatine were then added and stirred till dissolved. When cold it was washed in the usual way. The development was conducted with ferrous oxalate solution, to which had been added from twenty to eighty grains of bromide of potassium to the ounce. The more bromide added the warmer was the resulting tone. The exposure had been from half-a-minute to two minutes at a distance of six inches from a fish-tail burner.

Mr. Garrett showed a beautiful transparency obtained on a commercial chloride plate. The exposure had been six seconds to diffused daylight at four o'clock, and with the developer marked as No. 2 on Mr. Cowan's paper.

Mr. Ashman said that when describing his first experiments with Mr. Newton's developer he had said that there was not much gain from the addition of iodide of mercury. Fresh experiments had convinced him that there was no gain at all, and he should not advise anyone to waste time over the process.

Mr. Cowan had made experiments with the plan, and now showed the results, from which he concluded that iodide of mercury was not an accelerator, that there was no advantage in its employment, and none from the use of soda water instead of ammonia in the developer.

EDINBURGH PHOTOGRAPHIC SOCIETY.

The first "popular evening" took place in Queen-street Hall, on Wednesday evening, the 23rd inst.

The exhibition consisted of about 150 pictures, selected from the works produced by the members during the past year. Many were of a high order of merit, and the very large audience frequently showed its appreciation by applauding the views, which were exhibited by the aid of Mr. M'Kean's carrier.

The contributors were Messrs. R. Murray, C.E., Wm. Mitchell, F. Brigmen, A. Matheson, R. Irving, Jas. Crighton, Wm. Neilson, M. Wane, Fraser, Notman, A. B. Stewart, F. Moffat, W. T. Bashford, Crooke, Macdonald, M'Kean, M. Scott, H. Watson, and S. Tamkin.

The transparencies were produced by "coffee" plates, collodio-chloride, gelatino-chloride, bromide, and by the wet process, and most pleasing effects were also produced by different toning agents. Messrs. Turnbull and M'Kean manipulated the lantern, and Mr. Bashford occupied the platform.

PHOTOGRAPHIC SOCIETY OF VIENNA.

The last meeting in 1883 of this Society took place on the 11th December, when the chair was taken by Dr. Hornig. A number of new members were admitted.

The Chairman announced the death of Herr Jagemann, one of the oldest members of the Society. He also read a communication from Dr. Stolze, in the name of the Berlin Photographic Society, inviting the co-operation of the Photographic Society of Vienna in the projected photographic exhibition at Berlin in 1884. The matter was remitted to the committee of management for consideration.

A communication from Herr Obernetter respecting his photo-engraving process was then read.

Major Volkmer presented a report of the work done during the year at the Imperial Royal Military Geographic Institute, of which he is the director.

Herr Berger said that the arctic views he lately showed were but a small part of the series taken by Marine Lieutenant Basso on the island of Jan Mayen, when he accompanied Graf Wilczek's polar expedition. Most of the negatives were developed on the spot where they were taken, only a few being brought to Vienna for Herr Berger to develope.

Part of Professor Vogel's collection of North American photographs were next shown, and were followed by a series of portraits taken by electric light by Herr Lewitsky, of St. Petersburg.

Professor Eder then made some remarks respecting a number of miscellaneous matters, having a bearing upon different departments of photography, such as the density of solutions of potassic oxalate; the employment of hemp for the filtration of emulsion; the sensitiveness to light of a mixture of gelatine and red prussiate of potash; on the employment of salts of uranium in gelatine emulsion; the action of pre-lighting upon gelatino-bromide of silver, and the action of heat upon gelatine plates.

Owing to the lateness of the hour some of the business placed on the order of the day had to be deferred to the first meeting in the new year, and the meeting was adjourned.

BERLIN ASSOCIATION FOR THE CULTIVATION OF PHOTOGRAPHY.

This Association met, for the first time this year, on Friday, the 4th ult., when the chair was occupied by Professor H. W. Vogel, the President.

The Chairman showed a cabinet-sized landscape in which several flashes of light were photographed. Herr Hänsel, in a letter which accompanied the picture, said that he noticed a storm coming on, so he placed a gelatine plate in the dark slide, and, having placed the latter in the camera, directed the uncovered lens towards the landscape, leaving it uncovered all night, so that the flashes which came across the field of the picture recorded themselves photographically. The plate being exposed during the night there were but slight traces of the landscape. The flashes as represented in the photograph did not at all correspond with the preconceived ideas of the zigzag course of lightning.

One provincial member requested some information respecting Dallmeyer lenses; another asked for advice respecting the choice of a method of enlarging.

Herr Quidde recommended the use of Lamy's paper, which permits of printing by lamp light. Herren Graf and Joop had never been able to get such good results with this process as Herr Talbot, and, besides, many people objected to the cold grey tone of the pictures.

Herr Joop thought the best results were to be got by enlarged plates; that is, by making a transparency, and then making an enlarged negative from that.

Herr Quidde then spoke of Herr Halwas's method of enlarging on canvas in order to paint upon, and inquired whether the film of emulsion did not prevent the oil colours from adhering to the linen.

Herr Joop had not found this to be the case. He was in the habit of washing over the surface of the prepared canvas with soda, and then with citric acid. This rendered it matt, and so assisted the emulsion and oil colour to adhere.

Herr Hase inquired for a cure for the albumenised paper repelling the silver bath or taking it on in streaks.

Herr Graf had often remarked that fault in new paper, seldom in old, and he prevented it by rubbing the paper with cotton wool before silvering.

Herr Haberlandt found, now that paper is not so much salted as it used to be, that this fault was apt to occur whenever the silver bath was too strong.

The Chairman called attention to two articles in the *Photographische Correspondenz*, in which the subject of patenting inventions is placed in a true light. It was remarked that a process was by no means necessarily to be considered old because the operations of which it consisted were already known; the novelty might lie in the combination. He (the Chairman) showed some American plaques, read a communication from Herr Obernetter describing his photo-engraving process, and finally showed a collection of views in the Nile valley taken by Wilson, of Philadelphia.

Herr Graf compared them with his recollections of the Egyptian views shown at the Berlin Exhibition of 1865, by Bedford. Bedford's views were taken upon wet plates and Wilson's upon dry plates. Wilson's plates were not developed until seven months after they were exposed. He thought Bedford had selected the most artistic points of view, while Wilson's were selected more with a view to being instructive and illustrating the geography of the country.

The meeting was shortly afterwards adjourned.

Correspondence.

THE LANTERN IN THE UNITED STATES.

To the Editors.

Gentlemen,—I observe that in his paper at the opening meeting of this session of the South London Photographic Society, Mr. J. T. Taylor spoke of the United States of America as a good field in which to work the optical lantern from the commercial point of view. Would it be asking that gentleman too much to give some particulars concerning the state of this business in the New World, both as regards lanterns and slides, and to say where in his estimation a business of this nature might best be established with a view to its eventually becoming largely developed?

I have seen several American lanterns, including the Marcy sciopticon, and the lime light exhibition of Mr. Muybridge by one of a better class, but I did not think that these represented the highest capabilities of the lantern.

I would also feel obliged if an indication of the prices of lanterns and slides could be given.—I am, yours, &c., T. P. Hicks.

London, January 28, 1884.

[Perhaps Mr. Taylor will kindly respond.—Eds.]

"DIFFUSED LIGHT FOR THE DARK ROOM."

To the Editors.

Gentlemen,—I see a letter in one of your scientific contemporaries on the popular topic of dark-room illumination, in which the experimentalist seems to have tried his new light in an ingenious but not very convincing manner.

After exposing the half-covered plates to the light under trial he appears *to have fixed them without development;* then he exultingly writes that "each plate showed clear glass."

Would this scientist be surprised to find that if he had exposed these plates in a similar way to the unobscured midday sun he would have got the same result?—I am, yours, &c., K. Alnwyke Browne.

January 29, 1884.

SENSITOMETERS.

To the Editors.

Gentlemen,—Having just read Mr. W. K. Burton's able remarks upon the above on page 39 in your issue of January 18th, permit me to say that I entirely agree with them, and therefore accord him my best thanks. But at the same time I would refer him to my paper as printed in the Parent Society's *Journal*, page 163, line 6, wherein I define sensitiveness to be the time necessary to produce the minimum of effect upon a film; consequently my remarks were in reference to the production of the minimum tint in both cases when the films were of uniform composition, the light employed being the variable condition.

On page 164 I mention that I intend to continue the subject, and I hope before long, with the co-operation of a friend, to bring the subject before the Society, when we shall describe a method of standardising any tint, for the twofold purpose—Firstly, to estimate the general sensitiveness, *i.e.*, the time necessary to register a series of tints; and, secondly, whether, and in what direction, their relative gradation will be disturbed by the process of registration.—I am, yours, &c., JAMES B. SPURGE.

January 29, 1884.

DEVELOPING.

To the EDITORS.

GENTLEMEN,—As one who values the utterances of Mr. B. J. Edwards because of their general soundness and practical value, please allow me to ask him to publically detail the disadvantages he states in the ALMANAC that he has found in the sulphite of soda developer after trying it in every shape and form.

I have been trying the plates of various English makers, and find a general excellence as regards cleanliness and freedom from fog, but much variety in their powers of giving true gradation, rich and varied. General attention should be concentrated on their differences in point of gradation, with which I find more rests with the plate itself than with the developer.—I am, yours, &c., QUESTIONER.

PHOTOGRAPHIC EXHIBITIONS.

To the EDITORS.

GENTLEMEN,—Lor! what a funny man Mr. Browne is, to be sure! And I am certain it is my letter in the Journal of the 18th instant that is being honoured with his notice, because there is no other communication anent photographic exhibitions inserted for that week.

Of course, K. Alnwyke writes as though I had expressed myself quite *tout au contraire* to what I really do; but that's nothing. We all know that the excellent "science" of wrangling would almost cease to exist but for the disputants' wilful misinterpretation of each other. Besides, if K. Alnwyke had only recognised what I *did* write, why then he would have had nothing to reply about, and all that keenly pungent satire of his would have been lost to the readers of the Journal.

As I am writing, kindly let me supplement my last communication with the relation of another incident which came immediately under my notice at an exhibition (say) within 500 miles of Newcastle. You see, gentlemen, I must be cautious while K. Alnwyke and his ready pen are about.

A. and B. spend some time together in a picturesque neighbourhood adjacent to the town of this exhibition, and they jointly secure a series of photographic pictures of more or less merit. A. developes the negatives, and sends prints from them to this exhibition, with his name appended. B. acts as one of the judges who dispense the medals here, and A.'s case of exhibits are medalled! I may add that I believe B. only knows of being judge after the pictures are taken.

Naturally the virtuous indignation of you and me and K. Alnwyke would be at once roused if any doubt were expressed as to the fairness of this transaction. Somehow, though, there always are people mean enough to question these little coincidences; but judges have "an invidious, a laborious, a difficult, and an utterly thankless task," even as have the hanging committees, and, therefore, what mere exhibitor shall dare to complain even if judges award medals to the panels of the exhibition doors, or the committee hang the pictures upside down? Let such ungrateful malcontents dread the vengeance of K. Alnwyke and myself.—I am, yours, &c., LYDDELL SAWYER.

24, *Upper Bedford-street, W.C., January* 29, 1884.

Notes and Queries.

A PHOTOGRAPHER is ordered to take a group of an athletic club, and exposes a print in his show-case. He is written to by one of the group, in a very high style, threatening "proceedings" unless it is removed. With your varied experiences you might advise.—PUBLISHER.

I. K. T. inquires:—"Could you kindly recommend me some one who builds small studios and sends them to order (as greenhouses are sent), and has a knowledge of what is wanted?"——In reply: Although we are not aware of any, some reader may be able to give a response.

Is there any method by which I can blacken brass mountings of lenses that have been soldered with common tin solder? I am aware of the method of obtaining a black stain both by nitrate of copper and also by chloride of platinum; but the former necessitates the employment of a degree of heat that would undo the soldering, while the stain produced by the latter is bad for my requirements. Any information will be thankfully received.—E. T. H.

I SHALL feel greatly obliged if you, or some of your numerous correspondents, can assist me out of a difficulty. My studio is built in a garden, for which I pay an annual ground rent. The building, however, is my own, being erected nearly twenty years since. I have been all that time using the north light, and that is the only point free from obstruction to the studio. My neighbour is now preparing to build and obstruct that light. I shall be glad to know what is the law in such a case, and also which would be the best way to oppose.—PERPLEXED.

WILL you please tell me how I can remove collodion from a gelatine negative that has been so coated instead of varnish?—ALFRED JOHNSON.

1. WOULD a Dallmeyer's rapid rectilinear lens (diameter 1¼ inch, focus 7½ inches) enlarge direct, from cabinet and *carte-de-visite* negatives, all sizes up to 24 × 20?—2. Would it do as well as an ordinary Dallmeyer's *carte* lens, and which would take the longer exposure?—3. Would the rectilinear require more room between the negative and a 24 × 20 enlargement than the *carte* lens? I am "going in" for taking views, groups, &c., and enlarging them, and should be glad if the same lens would do for both.—LENS.——In reply: 1. Yes.—2. The *carte* lens will be the more rapid.—3. See the table for enlargements in our ALMANAC. From that you may obtain all the measurements necessary.

J. H. B. says:—I have a whole-plate lens which is wrong in the chemical focus; that is, when the picture is focussed sharp on the ground glass, on development it is not sharp. It is not the camera which is at fault; it is the lens. Can it be corrected? and how?——In reply: Let "J. H. B." ascertain, first of all, whether the lens is over-corrected or under-corrected for colour. Then, assuming that the front lens is the defaulter let him separate its component parts and regrind the contact surfaces, or send them to be reground. If over-correction be the fault indicated by his examination, let a longer radius of curvature be selected; but in the event of under-correction the radius must be shorter.

IN reply to a question put by "Broken Frame" relative to the right of photographers to exhibit specimens and to recover damages from anyone who smashes the frame in which such exhibit is made, I would suggest the desirableness of photographers joining together to have the opinion of some eminent counsel, and thus have the question definitely settled.—D. JONES.

I HAVE heard of several brother photographers who have "got to loggerheads" with their clients for placing their "counterfeit presentments" in show-cases, and some have had their frames broken. On mentioning this subject to a legal friend, he said that the breaking of the frame by any aggrieved party could not be upheld in law, and any photographer whose property was thus treated might sue for, and obtain, damages. "Broken Frame" will thus be enabled to obtain redress.—B. E. W.

IF Dr. Browne will substitute chloride of platinum for chloride of gold in the toning bath, making it a little stronger, he will get the platinotype tone desired. Were it not that a small modicum of silver is still left in the platinum-toned print there would be but little, if any, difference between the print thus toned and a platinotype print by the Willis process. Perhaps, however, I ought not to write thus dogmatically, but rather cast my statement in the form of a query, thus: Would there be any difference between them?—G. T. L.

THE question raised by "Broken Frame," involving the right of photographers to exhibit specimens, is one of great interest to the profession, and I hope it will be well ventilated. I give the following as a contribution towards its elucidation:—Several years ago a photographer, of Bold-street, Liverpool, summoned a timber merchant of that city for £1 19s. 6d. for damage alleged to have been wilfully done to a show-case. It appears that a photograph of a lady had been exhibited contrary to the desires of her friends, by whom its removal was requested. This not having been complied with, after the lapse of a few days the defendant pushed his umbrella through the glass and destroyed the specimen. The judge said that, however annoying it might be to ladies to have their portraits thus publicly exhibited against their wish, the act of destruction could not be justified, and the plaintiff obtained a verdict for 10s., being the amount at which the defendant himself estimated the damage done. Still, as a matter of expediency and altogether apart from the legal rights or wrongs of the case, I hold that any photographer who desires to stand well with the public should respond *immediately* to any request to suppress the exhibition of a specimen.—W. BLACKIE.

Exchange Column.

No charge is made for inserting these announcements; but in no case do we insert any article merely OFFERED FOR SALE, *that being done at a small cost in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a* NOM DE PLUME *be thought desirable), otherwise the notice will not appear.*

I will exchange an "eclipse" light for anything useful.—Address, J. HEMOTT, Photographer, Berwick.

Seavey's "Sarah Bernhardt" interior, as good as new, 8 × 7, in exchange for another interior in same condition.—Address, D. BORDLEY, Newport-road, Stafford.

I will exchange Seavey's stilo and gate for Moulton's washer or No. 4 Ross' portable symmetrical, or offers.—Address, F. M. SUTCLIFFE, Whitby, Yorks.

I will exchange two editions of *Cassell's Natural History* (one volume bound), in perfect condition, for camera, or tripod, or anything useful in photography.—Address, E. B., 10, Wellington-street, Gloucester.

I will exchange Entrekin cabinet burnisher with Bunsen burner, new condition, or a whole portrait and view lens, by Hermagis, for a small dry-plate apparatus.—Address, JOSEPH ROSS, Cadlaverock, Dumfriesshire, N.B.

Wanted 5 × 4 medium angle doublet rotating stops and sky-shade, or 5 × 4 rapid symmetrical, in exchange for 12 × 10 mahogany double dark slide and folding retouching desk (outside measure 20 × 16), with little cash; offers solicited.—Address, C. COLEBURN, The Pottery, Green-lane, Finsbury Park, N.

I will exchange Dallmeyer's *carte* lens, 12 × 10 and 10 × 8 camera; also 12 × 10 rolling-press, in exchange for studio furniture, or anything useful. —Address, PHOTOGRAPHIC Co., 26, Congreve-street, Birmingham.

I will exchange a Carver's patent bicycle, 53-inch, all bright, and all the latest improvements, cost £13, for a good whole-plate tourist camera and Ross' rapid symmetrical lens.—Address, R. S. BONNALLO, 18, Church-drive, Carrington, Notts.

Wanted, a good tourist camera, for $7\frac{1}{2} \times 5$ plates, with three double backs, and swing-back action, in exchange for a three-lens gem camera with dark slide, or whole cash; will give in part exchange.—Address, A. C. HILLIER, 1, Victoria-terrace, Snow-hill, Bath.

I will exchange THE BRITISH JOURNAL OF PHOTOGRAPHY for 1883 (quite clean), and BRITISH JOURNAL ALMANAC, and the *Year Book of Photography*, for anything useful in photography.—Address, JAMES HENWOOD, 79, Ashford-road, Eastbourne, Sussex.

I will exchange a first-class rolling-press, with steel plate 18 × 12 (cost £9), in excellent condition, or a capital Victoria or *carte mignonne* camera with four lenses (nearly new), to take eight pictures on a plate $7 \times 4\frac{1}{2}$, for a Ross' portable symmetrical No. 3 or 4.—Address, PHOTOGRAPHER, Cambray studio, Cheltenham.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPHS REGISTERED—

Richard George Arnold, Stafford-street, Market Drayton.—*Two Photographs of St. Mary's Church, Market Drayton.*

Thomas Forrest, Cambrian Studio, 14, Market-street, Pontypridd.—*Photograph of Dr. William Price, Druidic Bard.*

A. S. HOPKINS.—Any London dealer in bookbinders' materials will supply the kind of leather you require. We cannot undertake to furnish addresses in this column.

C. A. S.—The enamels have undoubtedly been over-fired, hence the cause of their faint, sunken-in appearance. Try again with far less heat, even at the risk of underdoing it. They can be returned to the muffle for more heat, if required.

J. BERRYMAN.—We regret that after examining the enamel we threw it aside, and cannot now lay our hands upon it. However, we will make further search, and, if found, send it back. It is a pity you did not say you wished it to be returned.

CHAS. WILSON (Leeds).—You may safely tone the albumen pictures in the bath as described in the article, provided the pictures are thoroughly washed afterwards. Take care that the quantity of gold is kept up, otherwise you will be toning with sulphur.

S. A. BIGGS.—If you wish to preserve the fullest gloss on the prints you must cement the mounts to them while they are still on the glass. If they are removed first there is no mountant that can be employed which will not, in a measure, destroy the highly-glazed surface.

R. C. MICHELL.—On the whole you cannot do better than make choice of the lantern with the four and a-half inch condensers. The smaller, for some purposes, might answer best; but, as you say, you will occasionally require it for enlarging purposes, select the larger of the two instruments without hesitation.

COPPER.—Tinfoil may be precured from any operative chemist, and of different thicknesses. For your purpose you require the thinnest you can procure. Mind that the surface must be thoroughly cleansed with a solution of potash, otherwise you will experience a difficulty in getting upon it an even deposit of copper.

A. P. WILLIAMS.—The "tunnel" form of studio is not much in favour at the present day. It was much lauded some years back; but many who constructed studios on that principle quickly altered them to the old ridge roof or "lean-to" form. However, good work has been done in such studios, and some prefer them still above all others.

COLLIN.—The gelatino-bromide prints are all very much under-exposed and over-developed. We can quite understand that the development occupied a long time to get out such details as you have obtained. The fault is not in the process, but in your want of judgment in the exposure. When you make another essay, try giving at least double the exposure.

B. A. (Cambs.).—The relief not being sufficiently high may arise from several causes. If too much pigment be added to the gelatine the light cannot penetrate deeply into the film, so that there will, of necessity, be very little relief. If the negative be too thin it will be impossible to obtain high relief. Under-printing is also a fertile source of want of relief.

R. HIGGS.—The specimen forwarded is an excellent sample of photography of a very unfavourable subject as a sitter. The poor fellow appears to be nearly strangled by his shirt collar, while the "horsey" pin appears to have been fixed too tightly. We fancy the general "get up" of the sitter is the chief fault with the portrait. Pay no attention to such criticism.

ARTEMUS.—We cannot in this column undertake to give you practical instructions in the preparation of enamelled paper for collotype printing. Even if we could you would find it more much advantageous to purchase it ready prepared than to attempt to prepare it for yourself. Messrs. Spicer Brothers, Bridge-street, Blackfriars, E.C., will, no doubt, let you have a few sheets for experimental purposes.

INQUIRER.—Several articles on the subject appeared in our last volume, to which we refer you.

U. V. W.—If the examples forwarded are fair specimens of your general work we should certainly not advise you to proceed to New Zealand with the idea of meeting with an appointment as operator in any first-class establishment. Our advice is—make yourself much more proficient than you now are before starting. Bear in mind that there are quite as good and artistic photographers in the colonies as there are in England, and equally good work is expected from operators.

PHOTOGRAPHIC CLUB.—At the forthcoming meeting of this Club, at Anderton's Hotel, Fleet-street, on Wednesday next, the 6th inst., the subject for discussion will be—*On Portable Cameras.*

EXTENSIVE POSTOFFICE ROBBERIES.—At the Central Criminal Court, on Monday last, John Griffiths, 38, photographer, pleaded guilty to stealing a large number of cheques from letters which he had stolen from private letter-boxes, and to forging the endorsements to the cheques. The Recorder sentenced him to ten years' penal servitude.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.—The next ordinary monthly meeting of this Society will be held at the house of the Society of Arts, John-street, Adelphi, on Thursday evening next, the 7th inst., at eight o'clock, when the subject will be—*Willesden Paper and Canvas, and Some of their Uses in Connection with Photography.* The following, from the question-box, will be discussed:—*Are Pictures upon Ready-Sensitised Paper likely to be More or Less Permanent than those upon Paper Freshly Prepared?*

THE ORIGINAL AND THE PICTURE.—Last week, at Stockton County Court, Mary Ann Best, wife of Edward Best, blacksmith, South Stockton, sued William Baker, photographer, for two guineas, being the amount paid to defendant for a painted portrait of plaintiff. Seven shillings had been paid into court, and plaintiff had received one dozen *cartes-de-visite*, value ten shillings. Miss Baker appeared for defendant. The portrait was exhibited in court, and its striking contrast to plaintiff created considerable amusement.—Miss Baker said the portrait had been executed three years since, and was exactly like what plaintiff then was.—His Honour pointed out a distortion in one of the eyes, and an entire absence of colour in the portrait, plaintiff being a handsome, buxom, fresh-coloured lady.—Miss Baker remarked, amidst much laughter, that women change a very great deal in the space of three years.—A verdict was given for plaintiff, the price of the *cartes* received being deducted.

BLACK PATCH *versus* CARBON TRANSFERS.—The last new Parisian agony, as exhibited in the Boulevard St. Michel, goes a step beyond the carbon process in its use of a flexible support. The picture is not transferred to paper, but to the human skin! A young *fiancée* who is separated by a cruel fate from her beloved object no longer carries about his portrait in a brooch or locket, but goes to the photographer's and has it printed upon the skin of her own fair arm! Among savage races tatooing is gradually giving way before the march of civilisation, and a blue anchor on the arm is no longer one of the indispensable ornaments of the "British tar." It is, therefore, amusing to find it reviving in the very centre of civilisation. There is also a rumour current that the black court plaster patches on the face, as worn in the early days of hoops and powder, are to be revived next season. Will some enterprising photographer get up more elaborate designs than the court plaster cut with scissors could provide, and offer them to his fair *clientèle*? A coach and four worn across the forehead was a masterpiece; but that is nothing to what could now be done with judiciously-arranged carbon transfers.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. STEWARD, Optician,
For the Week ending January 30, 1884.
THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

Jan.	Barometer.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max Shade Temp.	Min. Tem.	Remarks.
24	29·84	NW	40	37	—	46	37	Bright.
25	29·73	W	43	40	—	49	39	Cloudy.
26	29·32	W	41	39	—	50	39	Cloudy.
28	29·54	W	38	35	—	46	33	Stormy,
29	29·89	W	45	45	—	55	37	Raining.
30	29·84	W	53	52	—	55	43	Raining.

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1240. Vol. XXXI.—FEBRUARY 8, 1884.

THE TREATMENT OF NEGATIVES AFTER DEVELOPMENT.

We have lately been experimenting upon variations of the usual routine through which a negative passes after it is fully developed, with the idea of adding to their certainty and efficiency, and the results we have obtained have been sufficiently encouraging to warrant our giving some details of the methods we followed. At first sight the matter seems simple enough; but careful workers will bear us out in our assertion that many conditions leading to irregularity of one kind or another are readily manifested at this stage of the process. The usual plan of treatment after development is to wash the plate more or less completely (generally less) and then to fix and again wash—a mode varied, more especially in hot weather, by immersion in the alum bath, followed by washing before fixing.

The first point we would touch upon is the washing after developing. It is usually understood to be an advantage to wash the negative well, and many (perhaps most) photographers do so wash, performing the operation in many ways—placing it either in running water under a tap or in a dish to soak. It will always be noticed that unless the negative be almost violently washed under a tap a certain access of density will occur before fixing, so that the ultimate density may be greater or less than expected according to the mode of washing or the length of time it occupies. We believe that a majority of operators employ the alum bath before fixing—not as an absolute necessity, but as a safeguard against possible frilling—and our remarks will be mainly founded upon that method.

If the washing be not performed well before "aluming," there is danger that the ammonia may precipitate alumina within the texture of the film, and so cause the negative, after drying, to be slightly opalescent, thus injuring its printing qualities. It is, however, doubtful whether this is not prevented by the gelatine film, many similar organic substances preventing such precipitation. Granting, however, for the sake of cleanliness of solutions alone, that the negative is freed from the major portion of the "pyro.," it will be found, if the alum solution be much used, that it will intensify the tendency of the plate to discolour, in consequence of the pyro. not being at first entirely removed—a state of things to be avoided as much as possible if the "wet plate character" is to be attained. In fact, it may be said that all delay prior to fixing tends to produce the pyro. stain to a certain extent.

Keeping this fact in view, it occurred to us that if the alum were to be slightly acidified there would be a distinct gain up to that point in the proceedings; for a washing almost perfunctory in character might be given before placing the negative in the solution, as the acid it contained would perform the double function of assisting to remove any already existent discolouration, and neutralising any ammonia the plate so slightly washed might bring with it. There would thus be no possible danger of the alum being decomposed by ammonia, and, what is even more important, there would be no chance of any increment of intensity while the plate was in the alum, as an alkali is needed to induce the development. Staining would also be prevented, as it is known that the discolouration of pyro. solutions is a function of their alkalinity.

The danger entailed by the adoption of the plan now suggested would be the decomposition of the hypo. bath by the premature placing therein of the plate before it was quite freed of the acid solutions. The additional risk to the negative, however, is less than might be supposed; for, if there were acid in the film, so also would there be alum, and the decomposition that occurs when hypo. and alum are mixed together is well known, and is not less likely to be injurious to the image than the change brought about by mixing dilute acid with the hypo. The effect of the decomposition of the hypo. must be looked at in two lights:—First, the probability of compounds being produced that would by their continued presence lead to the ultimate fading of the image; and, secondly, the production within the film of some insoluble matter that could not be removed by washing, and would interfere with its perfect printing qualities.

We look upon the former as a contingency far from probable, while the latter would be a more serious evil, as its being brought about within the substance of the film would prevent its removal by washing, no matter to what extent carried out. There is a great deal said and written about the production of acid, sulphurous, and other compounds, most of which are soluble, while sulphide of silver, insoluble, meets with less notice. A negative subjected to the action of decomposing hypo. lies in quite a different category from that in which an albumenised paper print would be placed, and the results of decomposing hypo. upon each would be quite different. By these remarks we must not be supposed to be endeavouring to convey the notion that we consider the decomposition of the hypo. a matter of no consequence. Far from it: we would avoid it in every way; but if it must be looked in the face let it be fairly done.

If the plan of acidifying the alum solution be adopted it will, therefore, be desirable to wash as well as possible to remove all traces of acid and alum, and thus prevent any doubt being cast upon the permanence of the negatives. We would say that all through, while writing in this connection of "alum," we refer to chrome alum. A small quantity going far, half-an-ounce of this alum to a quart of water will form a solution sufficiently strong for all practical purposes, and if a drachm of citric acid be added to this quantity a solution such as we have been experimenting with will be made. We choose citric in preference to other acids as being another safeguard against the precipitation of alumina, the presence of soluble citrates preventing such precipitation.

We have found that the colour and general appearance of the negative are most decidedly improved by this slight innovation; in fact, so much is this the case that the plan may be found worthy of adoption on this very account alone, even by those who work a plate not requiring the use of alum. It may be adopted in lieu of the preliminary wash that would be given when the alum was not employed, and would not entail the expenditure of any more time, while the colour of the negative would be wonderfully improved.

Finally: we may say that where any lingering doubt exists as to the possibility of danger through the introduction into the hypo. of plates imperfectly freed from acid, all chance of it would be removed by making the hypo. solutions slightly alkaline with ammonia. The decolorising effects of the acid would have been called into play, and, even with only a slight washing before immersion, the soaking given in the acid alum solution would be sufficient to remove the greater part of the pyro., so that the alkaline hypo. need not reintroduce, or cause the increasing of, the pyro. stain to any great extent. We recommend ammonia in place of soda or potash, as it has the property of holding in solution those insoluble silver compounds sometimes produced by the mutual decomposition between silver compounds and hypo. We trust that our readers may give the method we describe a trial, and report the results. Our own opinion is that it will be a material gain to existing processes, leading to marked improvement in "wet-plate character."

THE PANORAMIC EXHIBITION OF WIDE-ANGLE PHOTOGRAPHS.

One of the most surprising effects obtainable in connection with the examination of photographs is to witness the exhibition of a transparency projected upon a large screen, the scene being then made slowly to move to one side by a continuous, steady, slow motion. On one occasion, upon which we witnessed a display of this nature, when the steady, panorama-like motion had been kept up for some time, and there seemed to be no end to the panorama thus presented, a lantern expert who was present became quite excited and shouted out—"Has the photograph no end at all?"

It is a peculiarity of a very long slide that when it is made to pass slowly across the disc the lenses get somewhat confused. Indeed, to such an extent is this the case that it is impossible even to guess how many diameters of the disc are shown during the transit. If anyone will take a sharp view embracing a very wide angle on a 5 × 8 plate, and then enlarge the horizontal central portion of this to about three diameters, allowing it to occupy two plates fifteen inches long by three and a-half inches deep, the conditions for exhibiting the picture in panoramic style will be perfect.

Two lanterns are necessary for an exhibition of this class, and the pictures must be printed in such a manner as that a portion of the end of one, to the extent of about three inches, should be duplicated in the commencement of the scene on the second slide. Arrangements must also have been made to secure the most perfect registration of the terminating portion of the one and the opening portion of the other slide.

Everything being in readiness, and both lanterns being placed under full light, the lantern "curtain" effect is raised by the means now within the knowledge and at the command of every exhibitor by the aid of the better class of dissolving lanterns, and as the curtain rises the view stands revealed upon the screen. The sliding movement is effected by means of a winch handle, which, when rotated, causes a slow passage of the picture across the lantern condenser. By the time it has reached the end the curtain effect must have been removed from the lantern in which it was shown, and the second portion or continuation slide of the panoramic pair of views substituted for it, care being taken to bring it up to registration mark. When it is seen that the termination of the view has been reached, the light, by a flashing cap action quite unperceived by any of the spectators, is cut off from the one lantern while the other is simultaneously thrown open, the same view still remaining before them on the screen; and here ensues the repetition of the slow movement of the scene across the disc. This continues, with occasional stoppages for explanations as to the nature of the scenes, should such be required, until the end of the long slide has been reached, by which time the curtain slide has once more been placed *in situ*, and the scenic curtain allowed to fall by the means to which we have already referred. No one who has not tried this photo-panoramic system of exhibiting transparencies, or who has not seen it done, can form an adequate idea of the effectiveness of the method.

Skill and tact are required in the selection of subjects properly adapted for this class of exhibition; but there is no inherent difficulty involved in its accomplishment. To produce the negative a lens that embraces a very wide angle and one which defines sharply to the extreme sides of the plate is absolutely necessary, because from the negative thus obtained a transparency magnified three diameters must be produced. This implies a degree of sharpness of which any good wide-angle lens is capable, especially when employed with a small diaphragm.

Among those public exhibitors who may be mentioned with commendation as having acquired a special facility in the display of panoramic photographs of the character described, are Messrs. Brooks and Bridge, who, in their entertainments, frequently avail themselves of this effective manner of exhibiting wide-angle views.

COMBINATION PRINTING.

Last week we explained how transparencies on thin films, such as those of gelatine or collodion, could be successfully utilised in the production of combination negatives, and it was then pointed out how admirably such film transparencies were adapted for combining as a whole several negatives to form a panoramic picture.

The same principle may also be applied in combining different negatives into one to form a panorama, without the intervention of a transparency at all. In this case the glass upon which the negatives are taken must, beforehand, be prepared either with wax or talc to facilitate the removal of the films. The compound film of india-rubber and collodion will be for this purpose found preferable to one of gelatine, inasmuch as a thinner film will suffice, and it will prove an advantage in the printing. After the negatives have been developed, fixed, and dried they are placed on a levelling-stand, then coated with the india-rubber solution, and when the solvent has all evaporated collodion is applied, as we described last week. When the second coating is dry the films are removed and then mounted on a glass plate, being matched in the same manner as in the case of transparencies already described. The slight thickness of the collodio-india-rubber film intervening between the image and the paper during the printing will not practically interfere with its sharpness.

The plan of stripping the films and then joining them may also be made available for obtaining combination negatives of groups, which have frequently to be produced in everyday practice. It often happens that one or more figures are desired to be introduced into an already-taken family group—say an enlargement. Frequently the only portraits available are not of a size to correspond with the other figures in the picture. By the following method such object may be accomplished:—In the first place, an enlarged negative of the group is made and the film stripped off, as already described. This film negative is now mounted on another glass. Then, negatives of the extra figures to be introduced are made of a size to correspond with the others in the group, and likewise stripped. Next, these figures are placed in the position they are to occupy in the group negative, and the film secured to the glass by a strip of gum paper at the edge, or at some place where it will not show in the finished picture. The outline of these figures is then cut out, both through the figure film and the film of the negative beneath, and the pieces set free removed. An accurately-fitting junction is thereby secured, and the combined negative is ready for printing from.

At one of the meetings of the Photographic Club, and to which allusion has before been made in connection with this subject, Mr. Jabez Hughes mentioned a commission he received some few years back. It was to reproduce a large panoramic view in Paris. The original was in three pieces and joined in the mounting, each piece being nearly the full size of a sheet of photographic paper, the picture itself measuring something like four feet in length by two feet in width. The reproduction was required to be the same size as the original, and to be *printed in carbon*. To make the matter more difficult to accomplish, unfortunately the three sections of the picture had faded very considerably and, at the same time, very unequally, each section possessing a widely-different degree of yellowness.

As Mr. Hughes had not the convenience for working the carbon process on so large a scale, he commissioned a London firm* to execute the work for him. The result obtained by them Mr. Hughes characterised as simply marvellous; for, not only was the reproduction better in every respect than was the original (in its

* The Autotype Company, we believe.

then state), but it was really better than it ever had been. It was better than the original then was in the following respects:—The lights were pure and white, instead of being yellow; the picture was of one tint throughout, consequently one section of it did not contrast in colour with that of the next, which would render the joins more conspicuous than they otherwise would have been. Added to this the reproduction was on one sheet of paper instead of being on three, therefore there were no joins in the paper to be seen. It was better than the original had ever been from the following causes:—Instead of the sky being white or of an uniform flat tint, showing the joins of the paper through it, this reproduction was on a single sheet, and delicate clouds had been artistically introduced in place of the white sky.

Mr. Hughes was unable to explain how this result had been achieved; but, at a subsequent meeting of the Club, one of the members explained how this identical picture had been reproduced. With his permission we shall here explain how it was accomplished, as the details of the plan may prove valuable to many of our readers, and it will serve well to illustrate what may be accomplished with stripped negatives.

In the first place, each of the three sections of the picture was copied separately the full size, the glass used being somewhat larger than was actually necessary to contain the whole of the subject in them. In the exposure and development of these negatives great care was bestowed on making them of identical density, or as nearly as it was possible to do this. The negatives being finished, a piece of thin paper coated with gelatine was squeegeed down upon the collodion film, where it was allowed to dry. When dry the paper was stripped off, bringing with it the collodion bearing the image. The paper was then rendered translucent with wax or similar material. The centre section of the three was now firmly secured, at the top and bottom, on a plate of glass the full size of the picture, with slips of gum paper. Then one of the side sections was adjusted in position and secured in the same way, and, finally, the third. As the glass used for the negatives was larger than each of the sections, it included of course a portion of the next one, and this permitted the overlapping portion of the subject to be used for securing an accurate adjustment, in the manner we explained last week.

When all three negatives were thus arranged in position, the films at the junctions were cut through with a sharp knife and the loose pieces removed, thus obtaining an accurately-joined negative on the large plate of glass. Next, the whole of the sky was blocked out, so that it printed quite white. After printing the subject, clouds, which were painted on a second piece of glass, were printed in. It may be as well to mention that in mounting the stripped negatives on the large glass the collodion film was placed uppermost, which enabled the print to be made by the single transfer process, as well as securing a crisper image when printed. From the description here given it will be seen that an apparently extremely difficult undertaking was, in reality, accomplished by very simple means.

In this and the foregoing articles—which, by the way, have extended to a much greater length than we anticipated when we commenced them—we have not attempted to describe all the various methods, or "dodges," by which two or more pictures may be combined into one. A volume would almost be required to do this completely. Sufficient, however, has been said to indicate how any person with ordinary ingenuity may adapt or modify one or other of the methods described, so as to accomplish almost anything that may be required in the way of combination printing.

PHOTOMICROGRAPHY.

The Polariscope.—This is useful in photographing some of the delicate crystallisations that form gorgeous objects under the microscope, also in detecting minute striæ, differences of structure in the transparent parts of sections of mineral rocks, and in organic bodies. The Nicol prisms should be large. The analyser can be set either near to the objective or over the eye-piece; the polariser placed below the object and used either with or without the substage condenser; the prisms crossed to give requisite differentiating appearances, the light and field being variously affected according to their position, using a low eye-piece. If a selenite film be placed beneath the object, select it of such thickness as will furnish the best contrast, photographically, in the complementary colours between field and object, or its different parts. Various tints are often rendered by various tones in the picture, showing structural differences.

Oblique Illumination.—This is less easily managed than with central light. Generally some substage arrangement, as used by Dr. Woodward in photographing difficult test objects, is required; but for ordinary work, and artificial light, there is a choice according to the end in view between the parabolic condenser and truncated lens, Wenham's reflex illuminator, semi-disc illuminator, Nachet's prism of 35°, Amici's prism, spot lens, Reade's prism and "kettledrum," Woodward's prism, achromatic condenser with central stop, or oblique aperture, a radial substage condenser, or a long-focus objective, set at the proper angle to the under surface of the slide. The selection must depend on the substage arrangements and the possible position of the source of light, the chief object being to obtain detail without *too heavy* shadows.

Professor Abbe says:—"With the nearly hemispherical immersion plano-convex lens of 6—9 m.m. radius, the ordinary concave mirror, turned slightly outside the axis of the microscope, will then give cones of rays of any degree of obliquity which may be desired." "When the detail in the real object appears in the form of striation, groups of lines, &c., a given angular aperture always reaches much finer details with oblique than direct illumination, and this irrespective of the circumstance that the constitution of the object admits or excludes the possibility of shade effects." (*M. Mic. Jour.*, 1875, p. 200.) Again: "the increased effect of oblique illumination depends solely on the inclination of the rays towards the axis of the instrument, and not upon the oblique incidence of the light on the object." A very interesting article on solar, sky, and cloud light, as reflected from the ordinary mirror of the microscope, will be found in the *J. R. Mic. Soc.*, 1880, p. 742. Speaking of spherical aberration, Professor Abbe says:—"There is no doubt that on balsam-mounted preparations striations up to 5,000 lines per millimetre (125,000 per inch), would be readily resolved by an incident pencil of the utmost obliquity, and still finer photographically." (*J. R. Mic. Soc.*, 1879, p. 822.) "The image of an object with very fine detail being, in fact, formed of two images—an absorption image and a diffraction image—the ordinary theory that explained the formation of the image by the geometrical method is fallacious." (P. 651, 1872, *loc. cis.*)

Artificial Methods of Illumination.—Besides the single-wick paraffine lamp there are others with multiple wicks. Care is needed in using these, or the shadows from the space between the wicks may interfere with perfect illumination of the object. There are also the electric, oxy-hydrogen, oxy-calcium, and magnesium lamps—each useful in about the order named. Dubosq's and Browning's electric, and Swan's incandescent lamps, are of excellent service; but the battery or dynamo current required for constant use is at present a source of trouble. Swan's is, perhaps, the easiest of application, as it can be approached very near to the object, the narrow side of the carbon thread being turned to the object-slide, care being taken that the small globe is of good figure, clear and without striæ. With the others the condensers should be arranged so as to give a beam of parallel light, or a cone of long-converging focus before reaching the achromatic condenser. Solomon's magnesium lamp is useful; but, wanting this, a piece of magnesium wire can be burnt, being steadily projected a little obliquely downwards, at the rate of consumption, through an aperture in a thin plate of iron, opposite the axis of the substage condenser. Dr. Maddox used a little apparatus for this purpose, which is figured in Dr. Beale's *How to Work*, &c. A small ball of zinc shavings was proposed by Mr. Wenham, and, if mixed with fine magnesium wire, affords a fair light. To save expenditure of wire, previous focussing, &c., can be made by the use of the paraffine lamp, care being taken to ignite the wire in the same position as the flame occupied.

Heliostats.—In addition to those already named are Prazmowski's, Dr. Willis's "simple form" (which appears very commendable), Keith's, Browning's, and Johnstone-Stoney's—described at the meeting of the British Association, Exeter, 1869

Applicability.—Besides furnishing negatives for prints of minute objects, such as can be seen in the library of the R. Mic. Soc., in different journals, and in works on microscopy, some books have been entirely illustrated by its use, and it is of considerable value for lantern slides. Lately we have seen prints obtained by it of Dr. Flögel's sections of the *diatomaceæ*, also of Möller's type plate of *diatomaceæ*, as photographed by Mr. Walmsley, U.S., having the names of the diatoms photographed beneath them on the slide—truly a triumph of photographic skill; and we are able today to refer to its great utility, as furnishing many of the beautiful illustrations to Dr. Sternberg's highly-important work on the "Bacteria," second edition, just issued.

An attempt has been made to indicate some of the most useful methods in photomicrography, but for want of space many plans have been omitted, and to the authors every apology is offered. In conclusion: the references have been considerably extended beyond those which relate to photography, in order to furnish information upon cognate subjects—many of them valuable papers bearing on useful apparatus and the higher branches of microscopy. We now leave the subject in the hands of those interested, and trust the new year may, through the aid of this imperfect sketch, bear further witness to the utility and progress of photomicrography.

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(To be concluded in our next.)

OUR attention has been called to an inaccuracy in our article on *English and French Weights and Measures* at page 51 of our present volume. In the last paragraph on that page, if the sentences commencing on the fifth line be read as follow all will be correct:—"For a very rough estimate Fahrenheit degrees may readily be translated to centigrade by subtracting thirty-two and *halving* the remainder. Complete exactitude will be found if this result be *increased* by *adding* its *one-ninth* part." Or centigrade degrees may be converted to Fahrenheit by doubling the former and subtracting from the result its tenth part. The place in the scale will then be found by adding thirty-two to the figures obtained.

WHEN in conversation with Mr. William Brooks he mentioned, with reference to the communication from Mr. G. H. Johnson, of Bridgeport, Conn., U.S.A., which appeared in our issue of the 4th ult., that there must have been some misapprehension existing on that gentleman's mind when, on the subject of transparencies, he writes—"I have been trying some of Mr. Wm. Brooks's collodion emulsion for this purpose." Mr. Brooks is not aware of having sent Mr. Johnson any of his collodion. He did, however, send him a letter on the subject, in which it is not unlikely he may have explained the principles upon which he constructed his collodion emulsion, or may even have suggested the trying of some particular formula; but he has not given full or detailed particulars of working either to Mr. Johnson or any one else, as he has reserved this for another purpose.

ON DIT that a few capitalists are going over to the United States, accompanied by several experienced practical dry-plate makers, to start dry-plate works on a very extensive scale. It is understood that Mr. W. Irving Adams, the Managing Director of the Scovill Manufacturing Company, is to be the president of this new company, or, at anyrate, that the presidency is to be offered to him. The new company will have special advantages in the purchase of glass, gelatine, &c., which will at once give them a leading place in the market.

ONE cause of the large number of experimentalists in microscopy and photomicrography in comparison with that of astronomical observers must be found in the ease with which the microscope can be manipulated, while the use of the telescope involves not only an entire abandonment of all "arm-chair exercise," but often a submission to considerable personal inconvenience. Thus, in obtaining a photograph we, a little while ago, described how the Rev. T. E. Espin had to perform the work lying on his back for the greater part of an hour. It seems probable, however, that a pleasanter state of things may exist for the astronomer of the future; for, at a recent meeting of the Physical Section of the

Royal Dublin Society, our world-famous contributor, Mr. Howard Grubb, read a paper on a *New Form of Equatorial Telescope*, in which the observer is placed in more favourable conditions, and may, indeed, be as comfortable as a microscopist. He described some small instruments he had actually made, and showed upon the screen a design for a colossal instrument, in which all the optical and large mechanical parts were in the open air except the eyepiece, which was situated in a room on the top story of a house. The observer was represented seated in an easy chair, beside which were two handles controlling hydraulic machinery, and by which all the movements of the great telescope were effected.

It appears that Mr. Grubb's new arrangement is estimated to be producible at a cost of only about one-third the usual expense, while the only approach to a similar convenience of working—the French bent or elbow equatorial—requires extreme complexity or arrangement in working, and entails enormous expense.

A few years ago the great question of "swallow-tail," or frock coats, at the Photographic Society's *conversazione* almost raised a revolution; and lately some one proposed to convert the occasion into a ball. We commend to the consideration of the gentlemen interested in this question the example of the Painters' Societies. According to the *Athenæum*, some members of the Society of Painters in Water Colours are attempting to give a social character to the body. "A similar movement has stirred the Institute of Painters in Water Colours; and partly with this object, and partly in order to augment the funds of their free schools of art, it has been resolved to hold an artists' costume ball in the magnificent Prince's Hall of the new buildings in Piccadilly. This entertainment will be opened with a procession, illustrating the different epochs of art, by ladies and gentlemen dressed in character and arranged in several groups!"

Should this hint of ours fructify, the proceeds might well be given to swell the funds of the Photographers' Benevolent Association.

In reference to the subject of dangerous chemicals, noted at the close of our *Transatlantic Jottings*, we may point out the highly-dangerous character of acid bichromate of potash, so often employed for electrical cells, and so useful for cleaning glass, as first recommended many years ago in our columns by our esteemed contributor Mr. M. Carey Lea. The powerful toxic character of this substance (which is, when not taken internally, most corrosive in its action upon the skin) may be judged by an account from France of the poisoning of two men who had swallowed a quantity of it. The men thought the pretty-coloured solution of acidified bichromate was Malaga wine, and they swallowed a wineglassful of it. Together they seem to have imbibed only about five grammes of bichromate; but the draught was a fatal one.

Our readers may remember that the action of light upon paper in causing the discolouration of certain kinds was alluded to in our columns some time ago, when an alleged fading of carbon prints was brought into prominent notice; it will, therefore, be interesting to learn how to test a sample of paper to ascertain if it contain any wood pulp or fibre. We read that either a solution of sulphate of aniline in water or a mixture of one part of sulphuric with three of nitric acid can be used for the purpose. The presence of wood will be shown by the immediate production of a yellow stain as soon as the liquid is applied, the stain becoming deeper and deeper according to the proportion of wood present.

We observe that Mr. Richard Walzl, of Baltimore, Md., U.S.A., has commenced a new monthly photographic periodical, entitled *Walzl's Monthly*. Its page is of the same dimensions as that of The British Journal of Photography, and, unlike the other American journals, it has no cover. It contains a varied amount of matter interesting to photographers.

Talking of the covers of American journals, we observe that the New York *Photographic Times* commences a fresh volume under a new cover. We must confess, however, that we preferred its appearance in its old garb, the chaste richness of which had secured for it the highest encomiums of more than one competent judge in such matters. True, the outside of a publication is not an invariable criterion of its contents; so let us hope that our contemporary, if there be any falling off in appearance, may make up for it in the greater value of its matter.

The dark colour assumed by alkaline pyrogallol has been a[illegible] to the production of purpurogallin; but, from experiments performed by Signor E. Rotondi upon the electrolysis of solutions of pyrogallol acidulated with sulphuric acid, he is inclined to think that the above-named body is not the direct production of the oxidation derived from an intermediate compound.

According to the *Bulletin de la Société d'Encouragement* M. Decaux has been making a series of experiments upon the action of sunlight and the electric-arc light upon colours used in dyeing and in painting with water colours and oil colours. His deductions agree in the main, though not entirely, with those obtained by former investigators. Colours for painting in water and oil he divides into the absolutely permanent, the moderately permanent, and the fugitive. He finds that in water colours all the most beautiful reds—carmine, crimson lake, most madder lakes, and vermilion—fall under the fugitive class. If mixed with oil the madder lakes rank as moderately permanent.

In view of the vast number of coloured photographs—good, bad, and indifferent—now produced, it behoves those who cater for the public in this direction to look carefully at their colour-boxes. Carmine and crimson lake are, the one so brilliant and the latter so readily used, that, despite their reputation for fugitiveness, they are, we are afraid, employed too frequently; but the madder preparations have a far higher reputation, and they are not generally considered as fugitive colours, yet, according to M. Decaux, they are all bad alike. However, in this respect, provided a permanent photograph be employed for colouring upon, the photographic colourist and the water-colour painter stand upon the same footing.

DEVELOPING GELATINE NEGATIVES.

In reply to the communication of "Questioner," in last week's Journal, I will endeavour, as briefly as possible, to state in what respects I have found sulphite of soda a disadvantage when used with alkaline pyro. development for gelatine negatives. I am quite aware that my opinion, whatever it may be worth, is at variance with the present conviction of many careful and experienced operators; it is, nevertheless, the result of a series of comparative trials made with a view of utilising the advantages, if any, of sulphite of soda as an aid to the perfect development of gelatine negatives.

If I understand rightly, the advantages claimed for the sulphite are—first, the absence of the usual non-actinic colour of the deposit; and, secondly, the facility of obtaining clear glass in the shadows of the negative.

As regards the first claim: the colour is undoubtedly totally different, the deposit being of a cold grey or black tone, instead of the usual warm brown given by normal pyro. development. A negative of the latter kind may not be so pleasing to look at when viewed as a transparency; but, inasmuch as it is only used as a means of producing a print—presumably on chloride of silver—the alteration of the colour will only prove an advantage provided the negative has been developed to full printing density at the first operation, otherwise, unless the negative be intensified, the print will be weak and flat, and wanting in the brilliancy which would be given by a more non-actinic colour. For this reason I find it better in practice to retain the warmer colour in the first instance, reserving the power so easily exerted of changing the colour of the deposit to any required extent, according to the density of the negative, after the completion of development, thus securing a double chance of obtaining negatives of uniform printing density.

With respect to the second claim—namely, clear glass in the shadows—there is no doubt that the addition of acid sulphite, being a powerful restrainer, does give the facility of obtaining bare glass in the least-exposed portions of the film; but, however valuable this quality may be in a positive transparency, such as a lantern slide, it is utterly unnecessary as one of the printing qualities of a negative, provided there is a proper gradation of tone from the highest lights to the deepest shadows. In fact, it is well known that a very large majority of the finest silver prints ever produced from negatives by any process, wet or dry, have been made from negatives having little or no bare glass in the shadows.

Your correspondent calls special attention to this one important quality above all others which constitute a perfect negative, namely, true gradation of tone. He also points out that this depends to a great extent upon the plate. It is, perhaps, not generally known to what extent this is true of different makes of dry plates (which vary as much in their capabilities of giving true gradation as wet collodion at its best and at its worst); but, even with the most perfect plates, it is precisely in this respect that the sulphite developer has failed in my hands to give satisfactory results. It seems to cut off a little at either end of the scale. With normal exposure a little of the detail in the deepest shadows is lost, while, if the exposure be slightly increased and the development pushed to obtain the required density, the delicate half-tones next the high lights are sacrificed. The loss is in some instances very trifling, and in small, well-exposed landscapes would probably be hardly perceptible; but in portraiture or large pictures with much half-tone the difference is at once apparent. Sulphite of soda in the pyro. developer seems to act much in the same way as the addition of gelatine to the iron developer for wet plates. This much-vaunted improvement was equally fashionable for a time some years ago, but has long since been discarded except for special work. I venture to predict a similar fate for sulphite of soda at no very distant date. Already many of our best and ablest workers have discontinued its use, chiefly for the reasons stated above.

I have omitted to mention the preservative properties of the sulphite in pyro. solution. In this respect its action seems perfect; but the same result is effectually obtained by the use of glycerine and alcohol, or a trace of acid in the aqueous solution, without the disadvantages of the sulphite of soda. B. J. Edwards.

DR. EDER'S RECENT RESEARCHES.

The properties of the ferricyanide of potassium, in combination with gelatine, discovered by Dr. Eder, and mentioned by Mr. Bolas at the first of the series of Cantor lectures, may possibly cause a complete revolution in carbon printing, and most processes of a kindred nature, where the gelatine has to be washed away, as in the Woodburytype, stannotype, &c. There are, doubtless, many points to be solved — such as relative sensitiveness to light, principally—although, not having had any experience with this combination, I should imagine that, if insolubility of the gelatine occur on mixing with the ferric salt, there would at once arise a difficulty in getting either paper or glass coated with the mixture. But if it could be employed, as are now sensitive carbon or stannotype tissue, there seems to be no difficulty in its use.

A complete reversal of all the processes would naturally occur. The carbon process would require a positive, and the stannotype a negative to work from, thus completely changing the existing order of things. In the latter process all that would be required would be to keep sheets of plate glass coated permanently with gelatine and sensitise as required for use, to expose under a negative, and wash away the parts rendered soluble by light, coating, when dry, with tinfoil, as usual. No reversal of the image would take place, as the surface image from the negative would naturally be reversed, and brought right again in the print. This is a most important feature in all photo-mechanical processes, and formed in the early days of the Woodbury process a serious drawback, until by accident a relief was laid with the wrong surface in contact with the lead—turned inside out, in fact—with no apparent difference in the resulting prints. Since then this method has been adopted in all Woodbury printing, except where film or reversed negatives were handy. In what Mr. Bolas termed the first stannotype process (although the name was only given to the later) the same difficulty appeared, all prints being reversed, which called forth the remark from a celebrated German firm that this fact took all the cream off the system. This additional reason to those given by the lecturer was the cause of its abandonment. Walter B. Woodbury.

DARK ROOM ILLUMINATION.

Since writing my last article, which was based on theoretical grounds only, I have made some experiments which, I may add, have been very carefully conducted. I considered I was in duty bound to Mr. Starnes to follow up with experiment what I had predicted on theoretical grounds.

It will be remembered that I challenged his statement that light from an orange surface gave almost as much deposit on a gelatine plate as light from a blue surface; and, further, I pointed out that comparisons of this kind were of little account if the brilliancy or photometric value of the light were not taken into account. Mr. Starnes thinks this to be of secondary importance in connection with his lamp. Now, I really do not wish to see this matter getting into hopeless confusion, as it undoubtedly will if the importance of a necessary factor in the solution of the problem be not recognised.

I insist that the photometric power—in other words, the sight-giving power—is one of the things that must be determined if comparison is to be of any value at all. It does not matter whether light proceeds from glass, paper, velvet, wood, ochre, or any other substance or combination of substances, or whether from an opaque or transparent body or a combination of opaque or transparent bodies. What we have to do with is the light after it has passed away from its source. Mr. Starnes must surely accept this as self-evident, and admit that it is as applicable to his lamp as to any other lamp. We must, therefore, reduce all kinds of light, from whatever source, to a level as to sight-giving power before any comparison as to actinicity is made; or, conversely, we may reduce to a level of actinicity before the sight-giving comparison be made.

I repeat that if we are to save this subject from confusion the photometric value must be as carefully determined as the sensitometric value. So much stress do I lay on this point that sensitometer figures I simply lay on one side as valueless unless accompanied by photometric figures. A sensitometer costs a comparatively large sum of money compared with the cost of a standard candle. Is it not a pity that figures obtained by an expensive instrument should be valueless for want of a candle?

The experiments I have completed were carried out with the aid of an improvised photometer. The reflecting surfaces were prepared in the following manner:—I procured the dry pigments used for the preparation of lithographic inks and made up a quantity of each in separate mortars with a small quantity of starch—just sufficient to prevent the pigment being rubbed off the finished surface. I now brushed pieces of millboard with the pigment and allowed them to dry. These surfaces, when examined with a glass, were practically identical, excepting the tint. My photometer was simply a box with an arrangement enabling me to vary the distance of the light from the coloured surfaces in in such a manner that I could make the photometric value of a given area equal to any arbitrary standard. I used the shadow method of determining the equality of the light. When actually carrying out an experiment I exposed a plate—one half to one light and simultaneously the other half to the other light, the edge of a dark septum dividing the plate. Comparing blue and orange surfaces I could not get even an approach to Mr. Starnes' results. Invariably the half of the plate expossd to the blue light flashed out under the developer and gave a very dense deposit, while the other half remained clean or gave only a trifling deposit.

I extended the experiments to red and orange, and must, in justice to Mr. Starnes, say that here the result was exactly as he has stated. Instead, however, of allowing this to shake my belief in the value of that beautiful instrument, the spectroscope, as applied to *practical* photography, I turned to it for an explanation. On applying the magic slit and prism I was not at all surprised to find that the particular red I was working with was of a very compound nature indeed. I have little doubt but the red employed by Mr. Starnes would be found to yield a complex light. It would, indeed, be worth recording were red rays found more actinic to silver salts than yellow or orange.

Re photographing the spectrum: what difference would Mr. Starnes expect to find between a spectrum photographed direct and one photographed after being allowed to fall on a *white* screen? Mr. Starnes says this would be an interesting experiment, and would have a most important bearing on the subject of reflected light. May I ask—In what way?

In speaking of a proposal of Mr. W. E. Debenham's to paint the interior of the lamp of a chrome yellow Mr. Starnes says:—"In each case I was very much struck with the rapid falling off of the actinic power of the light the further the plate was placed from the lamp compared to the loss of luminous power." *Impossible*, otherwise a hitherto well-established theory must terminate its day of usefulness. Light diminishes inversely as the square of the distance from the source. Mr. Starnes is struck with the fact that, although this may be photometrically true, yet it is not so photographically. In other words, that in the passage through a small column of air the more actinic vibrations are to a great extent lost by absorption, dispersion, or by other more occult means, and that the law of inverse squares does not hold good so far as these rays are concerned. There is some trouble here, I think, for Mr. Starnes.

Next week I propose to give a method that should, I think, settle once and for all the vexed question of dark-room illumination. I am at present working the matter out at such odd hours as I am able to snatch from business. As to Mr. Starnes' communication, which appeared in your issue of February 1st, entitled *Actinic Force* versus *Colour*, I will possibly have something to say. At present my feeling in regard to it is that at last the edge of a formidable morass has been reached. I have little wish to banter, but this article is simply crushing. The way Mr. Starnes makes a tilt at well-established theories, levelling them in one fell swoop, shows, to put the matter quietly, that he has the courage of his convictions.

G. D. Macdougald.

STANNOTYPE.

No. II.

The first step towards the production of the stannotype printing mould consists in obtaining a transparency from the negative to be reproduced. As the success of the subsequent operations rests very materially upon the character and quality of the transparency, the details of its production may be dwelt upon with some minuteness. Any process may, of course, be adopted; but in view of the special requirements of this particular case the carbon process is, perhaps, to be preferred on the score of convenience, as it affords considerable scope for modifying the peculiarities of different negatives. In fact, the necessity for this intermediate transparency becomes under the circumstances an advantage rather than otherwise.

The principal requirements in the transparency are sufficient vigour to withstand the somewhat long exposure to light, which is necessary to produce sufficient depth in the relief, combined with due gradation in the half-tones and perfectly clear glass in the highest lights. In fact, when laid upon white paper the transparency should exhibit the qualities of a good, strong positive. The necessity for clear glass in the highest lights must be insisted upon, for reasons that will be made apparent in a later stage of the description; suffice it to say now that a positive, however perfect it may be in its gradations, but wanting in this one element of clearness in the high lights, is useless for the purpose in question. The capability which the carbon process presents for securing this class of result from almost any kind of negative is beyond question, and it is for this reason that it is specially recommended; though with careful manipulation it is probable some operators will be able to produce satisfactory results by other means.

As the exact effect desired in the transparency is gained in a great measure by intensification or "toning" by chemical means after development, the ordinary portrait tissue is, as a rule, preferable, owing to its comparatively thick film of gelatine. A tolerably strong sensitising bath should be used—not less than four per cent. of bichromate, five or six per cent. proving, in the majority of cases, advantageous, as with this strength it is possible to obtain an image full of detail in every grade of the picture, from the highest lights to the deepest shadows.

Such an image, consisting, as it does, of varying thicknesses of gelatine (the colouring matter may be to a certain extent ignored), is capable of almost unlimited intensification in exact proportion to the gradations actually existing by any of the methods of staining the film usually adopted, and this without any risk of degrading the highest lights. As these are, or should be, represented by "clear glass"—that is, an absence of gelatine deposit—there is nothing to be stained, and so the intensification may be pushed to any extent without danger, provided a suitable collodion be used as the substratum.

For this latter purpose any good "enamel" collodion is utilisable, but it is needful to ensure that it dries without opalescence. It is better that the collodion film be not too thick. Its only object is to prevent the washing away of the delicate details of the higher lights, no further good effect being secured by a thicker film, as when it is needful to strip or transfer the picture after development. The thicker collodion film, moreover, offers greater chance of staining in the subsequent intensification of the carbon image.

In sensitising the tissue it should be immersed in the bichromate solution for from three to five minutes according to temperature, and then placed in contact with a sheet of plate glass and "squeegeed" in order to remove the excess of solution. It is then to be suspended in an airy place—preferably in a warm room—in order that it may dry as rapidly as possible. In fact, every precaution should be observed to prevent the chance of partial insolubility occurring, either from prolonged exposure in a moist state or to an atmosphere contaminated with deleterious gases. Such partial insolubility would, it is needless to say, be fatal to absolute clearness in the high lights unless under a high-temperature development, when the delicacy of the half-tones would be jeopardised. As soon as dry the tissue should be stored in a dry place under pressure in the flat state, or else in a metal case, rolled up with the gelatine side outwards. Either method will not only preserve the sensitive film from atmospheric influence, and consequently retain its solubility, but also keep it in a better state for securing perfect contact with the negative.

In printing it is scarcely needful to say that the "safe-edge" is indispensable. This should be rather wider than usual—if possible about a-quarter of an inch—in order to allow a narrow border to be left between the actual picture and the "safe-edge" used in the next operation.

The necessity for this, as well as the absolute clearness of the highest lights of the transparency already referred to, may be here explained. In the ordinary "Woodbury" printing relief—that is, the mould formed by pressure of the gelatine relief *(made from a negative)* into a plate of soft metal—the "safe-edge" is a border which practically represents the highest lights of the picture, and, as such, gives value to the whole of the gradations by limiting the depth of the layer of gelatine which forms the print. But in the case of the stannotype printing surface, which is formed by direct printing *from a positive*, the ordinary "safe-edge" would represent the deepest shadows of the print, or, in other words, the extreme *depth* of the printing mould. This, it is clear, would leave the surface without planimetry, and the gradations of the picture without any definite value. To overcome this difficulty it is only necessary to print the *transparency* with a rather broad "safe-edge"—that is, with a certain margin of practically clear glass. In using the transparency for the subsequent production of the printing mould it is again provided with a "safe-edge," but narrower than the former one, so that a border of clear glass is left between it and the picture proper, and this will form the highest portion of the printing surface, and, therefore, the highest light of the picture.

It will be plain from this why the perfect clearness of the high lights of the transparency is insisted on. If these be slightly tinted, though in perfect relation to the rest of the picture, while the "safe-edge" or inner margin is clear glass, the result will be that the printing mould will have a border slightly higher in relief than any other portion of its surface; and, consequently, that, in printing, every portion of the picture will possess more or less of a tint in proportion to the difference between its highest lights and clear glass. The printing surface must, in fact, be a *dish*, the edges of which are formed by this border resting between the "safe-edge" and the picture.

Nothing particular need be said of the operations of printing and development. These are performed in the ordinary manner for carbon printing, care being taken not to over-expose to any appreciable extent so as to form a deposit in the extreme high lights. Let the development be conducted with especial care and with water at as low a temperature as can be conveniently worked, finishing, if needful, at a higher temperature to clear the lights.

At this point the opportunity occurs of intensifying or modifying the character of the transparency. The picture now consists of a cast, so to say, in slightly-coloured gelatine, the different gradations being represented by varying thickness of gelatine. If these gradations be in due proportion one to another—it matters little whether the image be generally dense or otherwise—it follows that the mere colouration of the gelatine film will increase the intensity of the image in exact proportion to the already-existing gradations. This can be readily done by means of a ten-grain solution of permanganate of potash applied for a minute or so.

If after washing thoroughly the image is not yet dense enough, let the film be dried and then again submitted to the action of the same solution. This is preferable to the longer continuation of the treatment without drying, which only tends to stain the underlying collodion film. If the further application of the permanganate solution fail to give sufficient density a three-grain solution of gallic acid may be used followed by a solution of perchloride of iron or any ferric salt; the sulphate or potassio-sulphate answers well. The gallic acid solution, if long applied, will probably *reduce* the density, but the subsequent action of the ferric salt will more than restore the loss.

Nothing remains to be said on the subject of the transparency, in describing the production of which it has been assumed that the reader is familiar with, at least, the general manipulations of the carbon process. Should any points have been left in doubt they will be explained in our *Notes and Queries* column.

ACTINISM AND WAVE-LENGTHS.

The paper by Mr. Herbert S. Starnes in last week's number of the Journal was a very interesting one, particularly as it opened up new directions for thought; but some of the statements in it are so contrary to the generally-accepted theory of light that they should not pass without being challenged.

In speaking of the effect on light in passing through red glass he says:—"The red glass has brought the various wave-lengths of the white light all to one length—I ought rather to say nearly to one length," &c. Now this infers, or rather asserts, that the component parts of white light are changed in their character by their passage through the red glass, and that the blue rays, &c., have their wave-lengths altered and are turned into red light. This is certainly not what is usually considered to take place. The red glass does not alter any wave-lengths, but merely acts as a sort of filter, stopping the passage of nearly all the rays except the red.

In the next paragraph there is a most extraordinary statement, namely, that the "*combined wave-lengths of yellow and green are more than that of the red alone.*" If this were so, then we should get *no light* at all; for, as the wave-lengths were longer than that of red, they would cease to have any effect on the eye, and, in fact, would become part of the heat waves of the invisible portion of the spectrum beyond the red. We must look to some other theory than this for the efficiency of Mr. W. E. Debenham's plan of using a combination of green and yellow in the dark room.

Further on Mr. Starnes says:—"If we use quartz lenses the violet rays are less powerful to withstand actinic force." To me this is a very ambiguous sentence. Would Mr. Starnes explain his meaning more fully? There are several other portions of his communication that appear to be quite new departures—notably that the addition of silver bromide (presumably a slow one) to boiled gelatine will give a rapid emulsion. I must experiment in this direction. W. Horseman Kirkby.

TRANSATLANTIC JOTTINGS.

Our readers may remember the account (extracted from the *New York Times*) we gave last month of the unfortunate photographer whose camera was smashed by a supposed criminal in tow of a police officer. "Who's to pay?" said the witty writer of the paragraph in question. Mr. Norman Coe, the photographer concerned, writes to say that, so far from the slight *contretemps* in question having prevented his taking a picture of the too vivacious captive, he, by means of a specially-quick dry plate, did obtain a likeness. Although surrounded as he was "by some of the keenest-eyed detectives in New York," no one but himself and his assistant knew when the picture was being made.

Perhaps he used Mr. Eakins's drop shutter—one of the neatest ideas yet propounded in regard to quick shutters. Mr. Eakins has a shutter to uncover and another to cover the lens, and he actuates them as follows:—"Two equal weights attached to cords of different lengths were dropped simultaneously. When the weight on the short cord had fallen as far as the cord allowed the tension released a slide which uncovered the lens. The exposure continued while the other weight was falling. When the end of its string was reached it, in turn, released a second slide, which covered the lens." By varying the length of the second cord Mr. Eakins is said to be able to vary his exposures from a-quarter to one-hundredth of a second.

According to the *Philadelphia Photographer* (which, by-the-bye, is celebrating the commencement of its third decade) the New York police have got hold of a band of scandalous impostors, who, trading on the want of business knowledge of young ladies, have been netting large sums by charging one or two dollars for imparting to their victims the secret of "electrographing" for colouring photographs, and enabling large sums to be thus earned. The very largeness of their trade aroused suspicions and led to their apprehension, from three to seven hundred letters being daily received!

Photographic journalism in America would appear to be more trammelled than our own, if we are to judge by the reply of the editor of the journal first named to the request of several photographers that he should criticise more fully the pictures exhibited at the national exhibitions. He would, he jocularly says, "be compelled to move his *sanctum* a dozen or more stories higher, barricade the doors, place Gatling guns and revolvers in position, and would tremble like an aspen leaf for months after the work had been completed."

According to the *Photographic Times* (New York) some consternation is likely to be caused in the ranks of photographers by a recent decision of the postal authorities, which will result in increasing the postage on photographs by one hundred per cent.—that is, from two ounces for a halfpenny to one ounce.

The Philadelphia Photographic Society has had before it—and almost at the same time as the Photographic Society of Great Britain had a similar paper by Mr. Jabez Hughes—an interesting sketch of photographic progress in America. There is a droll account of the inception of the Philadelphia Society, which, we read, "was born at 615, Walnut-street, in December, 1860, when some twenty-five gentlemen met at the house of Mr. Constant Gillon, the first president. Although the gentlemen went there with their hearts full of the subject the whole evening passed by without its being broached at all, the host expecting the visitors to mention it first, and they looking to him for a start. *Yet a deal of thinking was done.*"

The *Photographic Times* asks why are so many operators given to adding an acid to the alkaline developer? It says—"Sulphurous, sulphuric, nitric, phosphoric, and all imaginable organic acids have been suggested, and were, in reality, used by some of the best operators and amateurs." We presume it is because the function of the acid is not rightly understood. The place for the acid is in the solution of pyrogallic, and its use is to keep the latter from becoming discoloured. When it was first employed for that purpose a large proportion was used; but, as a well-known writer in our own columns pointed out, a few grains of citric acid to the ounce of pyro. was amply sufficient to attain the required end.

We can scarcely agree with the writer in that journal who, in the same article, says the utility of sulphite of soda in the developer, "to say the least, is problematic—at anyrate it is not distinctly proven." Now, if there is one thing more than another capable of distinct proof it is the great utility of the sulphite in preserving the negative from becoming discoloured by the pyro. solution. We imagine the question intended to be called doubtful is as to whether the addition slowed the plate or not—a question that is subject of doubt.

We learn from the same journal that Mr. W. H. Sherman, of Milwaukee, has for a long time been collecting a series of negatives of pictures of the old masters, which he is now arranging in series for the study and information of artists and others who are interested in art. An immense demand is (and we should think justly) predicted for them. We do not know to what extent they will compete with the magnificent collection of the Autotype Company, but the idea is worth commending to the notice of that enterprising body as to whether a specially-selected number of their works might not be printed from and published *en bloc* at a price within the reach of all. Their permanency would be a great point in their favour.

Our transatlantic cousins seem to be rather behind the day in carbon printing, if we are to judge from the account of a meeting of the Photographic Section of the American Institute. Mr. Roche was delivering a lecture upon carbon printing, illustrating it with demonstrations of developing the film. The audience seemed to think the print came by some sort of conjuring, for we read that the President said—"There seems to be a little sleight of hand, Mr. Roche. They think that by some trick or device you have put the picture on the glass. How is the picture made?"

We will conclude our *Jottings* for the month by extracting from *Anthony's Bulletin* an account of the accident drawing attention to the care that even with the simplest chemicals should be taken in all photographic studios:—"Mr. W. D. Gatchel had a very narrow escape from death a few days since. He had been in the habit of drinking a mineral water, and kept it in a liquid ammonia bottle. By some oversight of a clerk a bottle of this fluid was put where he generally kept the water, and he took a portion of it before discovering the error. By prompt measures his life was saved, but for over a week he has been on a sick bed, not able to swallow anything. He is now in a fair way of recovery, but it will be some time before he will be enabled to fully resume his daily duties."

PHOTOGRAPHY AT THE SEAT OF WAR.

The recent intelligence from the seat of war in Egypt, giving details of the defeat of Baker Pasha, also embraces a notification that among the officers missing are the two photographers who accompanied the Egyptian army into the Soudan.

The *rôle* enacted by photographers in giving scenic representations of incidents full of eventful interest is replete with value not only to the general public, but also to geographers and ethnologists, and likewise to students of military science in an especial degree. The accuracy and almost inspired skill with which a clever artist will depict a *rencontre* between two forces ethnologically divergent, one of them adopting different arms and different modes of warfare from the other, elicits admiration, which, however, is sometimes tempered by the surmise that will intrude itself—How would such a scene have been rendered by a photograph instead of by a drawing?

We are not at present aware of photography having been actively associated with military operations previous to the Crimean war, when Mr. Roger Fenton, aided by Mr. Marcus Sparling, both since deceased, paid a prolonged visit to the military head quarters with a complete outfit for taking photographs by the wet collodion process; nor are we aware of any photographs of scenes of active warfare having been obtained by these gentlemen, as their operations were mainly confined to the taking of portraits and groups of the officers of distinction.

It was not long after this, however, ere photographers in other parts of the world were to be occasionally found taking scenes on the battlefield, and some of these were truly ghastly from the stern reality of the facts thus photographically depicted. No room for indulging in artistic licence there, nor for the introduction of any effort of the imagination! Shells seen in the act of bursting, or their dire effects as witnessed a few seconds after bursting; strong men falling to rise no more, or in the agonies of death; hand-to-hand encounters; the varied emotions displayed in the faces of the combatants—these form some of the items witnessed in war photographs, and they convey to the spectator ideas quite different from those induced by the examination of a painting or drawing of scenes of a similar character. Some of the war series of stereographs issued by Messrs. E. and H. T. Anthony and Co., in connection with the great struggle between the Northern and Southern American States, show more vividly than the pen of any special correspondent could express the horrors of war, as displayed by dead bodies lying in the trenches or on the field, some of them having portions of the head or face blown away, or being otherwise terribly mutilated from the bursting of the devastating and deadly shell.

The photographer who visits the field of battle runs a great risk, in consequence of his affording a special mark for any hostile belligerent who, out of something akin to a spirit of sheer wantonness, might "draw a bead" upon him. Conversing, some years ago, on this subject with Mr. Sparling, he informed us that he sometimes "fooled" the Russians (during the siege of Sebastopol) by displaying a make-believe camera a little above the wall of a trench and raising his cap upon a stick close beside it, although only a few inches above the line of visibility—a proceeding which invariably ensured their being almost immediately perforated with rifle bullets, a quick return of the compliment being paid by Mr. Sparling, who, as a matter of preference, spent much of his spare time in the trenches in efforts of strategy or skill against the Russian sharpshooters by means of his rifle.

SOCIETY OF ARTS.

On Monday evening last, the 4th instant, the second of a series of Cantor lectures was given by Mr. T. Bolas, F.C.S., at the Society of Arts, John-street, Adelphi, London, W.C., the subject being *Recent Improvements in Photo-Mechanical Printing*. The special department taken up was *Type Blocks from Line Drawings and Half-Tone Subjects.* Mr. B. F. Cobb, Vice-President of the Society of Arts, was in the chair.

After Mr. H. Trueman Wood had explained that the incandescent lights in the room had on the last meeting burned dimly, merely because it was necessary, for the sake of the arc light which the lecturer used, to run the engine at a slow speed and not because of any defect, the Chairman introduced the lecturer.

Type Blocks from Line Drawings and Half-Tone Subjects.

Mr. Bolas said that phototypography and photolithography were almost the same thing—by the latter the proof being pulled off a prepared surface direct, whilst by the other the surface of a piece of zinc or other metal was etched into relief. It was probable that for every one picture produced by either process at the period of his last series of lectures there were ten produced now.

The production of these blocks is very easy when the subject is a line one, but not by any means so when the picture is in half-tone. It might, however, be said that the problem was now solved. The basis of most transfers for line subjects was now, the lecturer said, as it had been before, a surface covered with gelatine and albumen sensitised with bichromate of potassium. He wished to illustrate the improvement brought about by the introduction of the velvet roller.

A piece of paper sensitised in the way described was exposed under a negative, and was inked over in the old manner with a fatty ink—that is to say, the whole surface was covered with a thin film of ink. The whole was then placed in warm water, when the gelatine which had not been acted upon by light swelled up and became repellent of the greasy ink, which was easily removed, none remaining except such as was over those parts which had been acted upon by light, and which, consequently, did not swell. This image was used to transfer on to a lithographic stone for lithographic working direct, or on to a zinc plate to be etched with acid.

With the velvet roller the process was quite different. Instead of the whole surface of the bichromated film being covered with ink the roller was passed gently over it several times, when the ink took on the exposed parts representing the lines at the end, and a beautifully delicate transfer was the result. A copy of the American *Patent Journal* was handed round to show examples of this kind of work.

At this stage the lecturer passed round a couple of prints to illustrate the influence which photography had had upon the art illustration of popular journals. One was an engraving in a London illustrated paper of 1851, and showed the conventional outlines of the wooden frames; the other was from *Harper's Magazine*, and showed a half-tone picture which was as like an idealised photograph as anything could be.

Glass had been used for blocks, being etched with hydrofluoric acid. It was said that there was less under-cutting in the case of glass than of metals. The fact was that photolithography had for long failed to make that progress which it might—not because there was anything wanting in the process, but because lithographic machinery had not been worked with very great success. To Messrs. Sprague and Co. was, in great measure, due the credit of having put photolithographic machinery on a commercial basis.

In any half-tone process it was necessary to get an image in lines, dots, or stipple. A stipple could be got, as was well known, on the gelatine direct, simply by the reticulation of a bichromated gelatine surface. This could be used as a transfer. This process had been worked by Herr Pretsch, in 1860, and he (Mr. Bolas) thought that some of the results obtained by him then had scarcely been surpassed. It was marvellous how the reticulations would at times follow the outlines of trellis work and suchlike.

Mr. Bolas warned his audience that in judging the merits of various works shown on the walls of the room it was most necessary to take into consideration the amount of care spent in the printing. Thus some of the roughest there might in reality exhibit the most merit, inasmuch as no great care had been bestowed on the printing.

The method of getting a transfer by the use of a network was mentioned, and it was remarked that Meisenbach had, amongst other things, claimed as a novelty the adoption of slight motion of this network during exposure.

In 1873 Mr. W. B. Woodbury patented a method of reducing his gelatine relief into stipple, which promised well.

The Ives process was then described and illustrated. A Woodbury relief was inked and was brought into contact with grained paper. By this means, where the image was high the pyramids forming the grain of the paper were depressed, and a large dot resulted. Where the image was low the tips of the pyramids were merely touched, and a very small dot was produced. The image thus got was used as a transfer, or, better, as a means of getting a negative in stipple. If a transfer were taken direct the small spots were liable to spread out to some extent and to give a blurred effect.

Zuccato's process was then explained. A block of type metal is planed in very fine grooves. The block is now inked, a piece of paper is placed behind it, and behind that is placed the Woodbury relief. Pressure flattened the ridges of the type metal to different degrees and produced lines of different widths. A beautifully-defined transfer was thus obtained.

Messrs. Brown, Barnes, and Bell had made many claims in a recent patent for photo-mechanical methods, but none of them appeared to be very definite.

EDINBURGH PHOTOGRAPHIC CLUB.

Taking advantage of the presence in Edinburgh of Mr. A. L. Henderson, of London, that gentleman was entertained at dinner on Friday, the 25th ult., at Young's Hotel, Cockburn-street, by the Edinburgh Photographic Club. About forty gentlemen sat down to dinner, and nearly all the members of the Club were present. The chair was taken by Mr. J. G. Tunny, who had on his right Mr. Henderson, the guest of the evening. Dr. Thomson, R.N., was croupier. Among those present were Mr. W. Neilson, President of the Edinburgh Photographic Society; Mr. W. T. Bashford, Honorary Secretary of the same Society; Mr. Henderson, Perth, and others. After the usual loyal and patriotic toasts had been drunk,

The Chairman gave the toast of the evening, "Our guest, Mr. Henderson." He (the Chairman) said that it required no words from him to say what Mr. Henderson had done for photography. The name had been long prominently before them, as one of the leading men in the photographic world of London, and what he had done was well known to them all. He had been for a very long time one of his intimate personal friends, and his success in life was, he thought, well merited. It was to that success they were met to do honour that evening. The Chairman concluded with wishing long life and prosperity to Mr. Henderson.

It is needless to say the toast was drunk in a very enthusiastic manner.

Mr. A. L. Henderson expressed the pleasure he felt at meeting so many members of the Club and other friends. He said that on his first visit to Edinburgh, about forty-five years ago, "he had neither a shirt on his back nor a shilling in his pocket," he being born in Edinburgh about that time. Shortly after he was removed to Lasswade, six miles south from Edinburgh, where he received his education at the parish school. When of suitable age he went to assist a dispensing chemist in Frederick-street, Edinburgh, who made false teeth. He (Mr. Henderson) gave an amusing account of how he discovered the secret of the composition used in the manufacture of these. He stated that his interest was at the time drawn to photography by seeing in a photographer's window in Princes-street a daguerreotype view of the Castle Rock. The view was reversed in this picture, the Castle being on the right hand instead of the left, as it should have been. He was also so accustomed to examine the photographs in the window of Mr. Tunny's studio at Newington that he was afraid he had given a permanent flattening to his nose by the persistency with which he had gazed at these. After being for a time assistant to a chemist in Musselburgh he went to London. He related how he had sufficient to purchase his first camera and lens, and how, by gradual steps, he had attained a position in London. He further mentioned that it was while visiting the great Exhibition, in company with Mr. J. Traill Taylor, that he first saw some ceramic photographs, and when examining them he told Mr. Taylor that he thought he could produce better work. In a fortnight afterwards he had produced work which, it was thought, not only equalled, but excelled, that in the Exhibition. He (Mr. Henderson) in conclusion advised all photographers, above everything, to acquire a good knowledge of chemistry. He thanked the Photographic Club very warmly for the honour they had done him, and said it was a meeting he would never forget as long as he lived.

Mr. Neilson next proposed "Prosperity to the Photographic Club." He said it was barely necessary for him to propose this toast, as the Club was bound to be a success, the members of which it was composed being the picked men of the Edinburgh Photographic Society. The pictures they produced and exhibited yearly showed that in the photographic art they were second to none.

Mr. William Dougall then sang the following song, which, as containing a special allusion to Mr. Henderson, was enthusiastically encored:—

"OUR PHOTOGRAPHIC CLUB."

Tune: "The Bonnie Briar Bush."

In art and science every one
  Should interchange his views,
For thus fresh thoughts are oft begun;
  And progress then ensues.
It's good for men of every grade
  With kindred minds to rub;
A fair example we have made
  Our Photographic Club.

Our business meetings still display
  The talents each has got;
Discussion surely paves the way
  To elevate the lot.
Our greater minds will never try
  The lesser lights to snub,
Thus every one must profit by
  Our Photographic Club.

And here tonight, our yearly feast
  Has charms of light and shade,
It is a means, to say the least,
  By which good friends are made.
Then let us drink, with hearty cheers
  (Since we've enjoyed our grub),
Success attend in future years
  Our Photographic Club.

But we have here a special guest—
  Friend Henderson I name—
Who towers high above the rest,
  Enamelled into fame.
Old Rachel's skill he has outshone,
  And left her in the dub.
Long may he kindly look upon
  Our Photographic Club.

W. D.

Mr. Norman Macbeth, R.S.A., in responding to the toast, said no one could over-estimate the advantages accruing to the members of the Club by the way in which practical matters connected with photography were treated and discussed at their meetings. In a society such as the Edinburgh Photographic Society, which numbered over 400 members, it was scarcely possible to get those present at the meetings to take such an interest in the discussions as could be done when the members were limited in number, as they were to thirty members in the Photographic Club. The Club was more like a family party, where every one was expected to contribute his views on the subject brought before them for the evening.

Mr. Henderson, of Perth, next gave the toast of "The Edinburgh Photographic Society," which was replied to by Mr. Neilson.

The other toasts of the evening were "Kindred Associations," by Mr. Dougall, replied to by Mr. Brebner; "Photographic Literature," by Mr. Forgan, replied to by Mr. Bashford; "Professional Photographers," by Mr. Stewart, replied to by Mr. McKean; "Amateurs," by Mr. Brooke, replied to by Dr. Steuart; "Trade Interests," by Mr. Crighton, replied to by Mr. Turnbull. The toast of "The Ladies" was given by Mr. McKechnie, and replied to by Mr. Frank Moffatt.

The Chairman said that as the evening on which they met was the anniversary of the birth of Robert Burns, it would not be seemly that they should part without remembering that event—a circumstance which, as Scotchmen, they never could and never would forget. He proposed "The Memory of Burns."

After the health of the croupier had been drunk,

Dr. Thomson proposed the health of the Chairman, Mr. Tunny, whom he characterised as the "father of Edinburgh photographers."

During the evening numerous songs were sung by those present. Among those who thus contributed to the pleasure of the evening may be mentioned, Mr. Smith, Mr. Reid (who sang "My Heather Hills" with much feeling), Mr. Dougall, Mr. Brodie, Mr. Wardale, Mr. Crooke, and Mr. Henderson (Perth), who sang "The Great Hielan' Bagpipe, the Pride o' the Land."

As the time for separating had come, three cheers were given for Mrs. A. L. Henderson, and the company dispersed "A wee short hour before the twal'," after spending a very pleasant and happy evening.

RECENT PATENTS.

PATENTS APPLIED FOR.

Nos. 2,766 and 2,767.—"Photographic Shutters." F. W. Branson.—*Dated February* 5, 1884.

PATENTS SEALED.

No. 3,906.—"Improvements in the Reproduction of Writings, Drawings, or the like, and in the Apparatus Employed therein." J. Henry Johnson; a communication from Ignacio Marquis de Camarasa, Madrid.—*Dated August* 11, 1883.

NOTICE TO PROCEED.

No. 4,705.—"Improvements in, and Relating to, the Art of Obtaining by Photography Definite Photographs to be Used in the Production of Typographic Blocks and in Photolithography and other like Arts." Brown, Barnes, and Bell.—*Dated October* 3, 1883.

AMERICAN PATENTS.

No. 291,544.—"Colouring Photographs." J. B. Snell.

No. 291,665.—"Apparatus for Drying Photographic Paper." B. F. Hall.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
February 12....	Newcastle-on-Tyne	College of Physical Science.
,, 12....	Glasgow Amateur	Institution Rooms, Buchanan-st.
,, 12....	Great Britain (Annual Meeting)..	5A, Pall Mall East.
,, 12....	Bolton Club	Studio of the Club, Chancery-lane.
,, 13....	Cheltenham Amateur	
,, 13....	Bury	Temperance Hall.
,, 13....	Photographic Club	Anderton's Hotel, Fleet-street.
,, 14....	London and Provincial	Mason's Hall, Basinghall-street.
,, 14....	Manchester	Mechanics' Institution.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society, held on the 31st ult., the chair was occupied by Mr. F. W. Hart.

Mr. A. Cowan exhibited a lantern for dark-room use, constructed on principles similar to those involved in the present lighting of his dark room, as described at the last meeting of the Society. The front of the lantern was sixteen inches high by twelve inches wide, and was fitted with a sheet of green glass, and several thicknesses of yellow paper of the colours used by Mr. Debenham. There was also a sheet of plain glass to keep the papers flat between it and the green glass. The curved back of the lantern was lined with yellow paper. There was an ordinary fish-tail gas burner in the centre of the lantern, and a small metal screen in front of the jet just large enough to prevent the direct rays of light from the flame striking upon the front of the lantern. The lights in the room were turned down, and the jet in the lantern was lighted to show the members the amount and quality of the light. For freedom from chemical effect it was the safest light that Mr. Cowan had employed.

A Member inquired what was the object of the green glass in addition to the yellow paper.

Mr. Cowan remarked that Mr. Debenham had better answer that question.

Mr. W. E. Debenham said that when a considerable thickness of yellow medium was employed the colour transmitted became orange-coloured or even nearly red. A solution of bichromate of potash in a thin layer appeared of a pure yellow colour, but seemed changed in character as the layer became thicker. Green glass removed the orange or red effect which was painful to the eye, and cut off certain actinic rays which would pass without it. At the same time it cut off very little of the luminosity. To illustrate this point the glass was so placed as to cover one-half only of the lantern front.

The opinion of the members being asked as to the comparative amount of light for working passed through the two portions; the replies elicited were to the effect that the addition of the green glass screen caused very little lowering of illuminating power. Some of the members could see none at all, whilst Mr. Cowan stated that the green cut off a considerable amount of actinic power.

Mr. J. B. B. Wellington showed some negatives produced on plates coated with the slow bromide emulsion that had been described the previous week as prepared for printing lantern transparencies for lantern slides. There was some halation in the lights, which rather surprised him, as the emulsion was of a ruby colour.

Mr. A. L. Henderson observed that it was now found that ruby lets actinic light through.

Mr. Wellington also showed some more transparencies printed upon the same emulsion, some of them being of very warm tone. He had found it advantageous to employ the ferrous-oxalate solution made with eight parts of the oxalate to one of the iron, instead of the usual proportions of three or four to one. The restraining bromide had been employed in the proportion of twenty grains to the ounce of developer; and the exposure had been three minutes at a distance of two feet six inches from an ordinary fish-tail gas burner. He found that he had coated two hundred glasses of lantern slide size with emulsion prepared with one hundred grains of silver nitrate. An enlargement on opal glass was also shown. The opal had been coated with the same emulsion, which was poured off as closely as possible, so as to leave only a very thin film, which, however, was sufficient.

Mr. HENDERSON, who had recently returned from Scotland, said that he thought Mr. Jamieson, of Edinburgh, was on the right track for a dark-room light. He was not at liberty to give full details, but would say that Mr. Jamieson produced a complementary colour by rotation, and this colour was thrown upon a non-actinic screen. He (Mr. Henderson) then showed a developing dish recently introduced by the firm of Messrs. George Mason and Co., of Glasgow. The sides of the dish were of wood and the bottom of glass, and there was a covered space at one end forming a well. The novelty consisted in a string lying across the dish for the purpose of keeping the plate from sticking to the bottom, and for lifting. The string passed through two small eyelets, one at each side, and knobs prevented it from slipping through these eyelets. On pulling the string on either side the plate was lifted from the solution.

Mr. W. M. ASHMAN thought that fine binding wire would be better than string, as it would last longer.

Mr. HENDERSON did not think that binding wire would do at all.

The CHAIRMAN showed a developing-dish made of celluloid. On the bottom were two ridges to prevent adhesion of the plate.

Mr. A. HADDON called attention to an inaccuracy in an article in THE BRITISH JOURNAL OF PHOTOGRAPHY, page 51, on *English and French Weights and Measures*, in which two formulæ were given for converting degrees on Fahrenheit's scale into those of the centigrade.*

Mr. C. B. Cutchey's resignation as secretary was read, and Mr. J. J. Briginshaw appointed to be Secretary of the Association.

It was mentioned that Mr. Hart's lecturette on *Residues* would be delivered on Thursday next, the 14th instant.

THE POSTAL PHOTOGRAPHICAL SOCIETY.

A COMMITTEE meeting of this Society was held on Wednesday last, the 6th inst. After the minutes of the previous meeting had been read and confirmed, the following candidates—each of whom had submitted specimens of his work and declared himself a *bonâ fide* amateur—were elected members:—H. G. M. Conybeare, Ingatestone; A. Suzanne, Woburn; Rev. A. M. Macdona, Folkestone; Rev. H. Victor Macdona, Cheadle Hulme; Rev. J. Carter Browne, D.D., Manchester; Rev. Locke Macdona, Cheadle; John Holloway, Folkestone; Rev. H. Von E. Scott, St. Leonard's; H. E. Lees, Manchester; T. Mansell, Bristol; Harold Sands, Nottingham; and F. Pardoe, Aberdare.

An application for membership was read from a French gentleman, but the Hon. Secretary was instructed to inform him that the rules would not permit of the Society's albums or collections of competition prints being sent abroad.

A letter was then read from Mr. G. Bankart, suggesting that a uniform size and thickness of mount should be adopted for future competitions for all pictures, large or small.

The HON. SECRETARY said that this would be a very great advantage, and would enable the competitions to be sent round, as the first one was, between boards. It was the small mounts which necessitated a box, by preventing a flat package being made, and by moving about they caused friction, to the destruction of the other prints. It was, therefore, resolved that for the future—"All pictures, *of whatever size*, intended for competition be excluded unless mounted on cards of the uniform size, 15 × 12 inches, and uniform thickness 4-sheet." This was a trade size, and the Hon. Secretary had seen Messrs. Woolley and Co., 210, High Holborn, who would supply boards of this size, quality "fine," in twenty-three tints besides white, at 12s. 6d. per gross, or by the dozen.

The thanks of the Society were ordered to be conveyed to Mr. Bankart, and members were recommended to obtain samples, as it was thought this selection of tints would suit all tastes.

The thanks of the Society were ordered to be sent to the Editor of THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for a copy of the 1884 edition, and to the Editor of the *Photographic News* for a copy of the *Year-Book*.

Competition No. 3, which had completed its first round, was then examined. Mr. Baylis had acted as scrutineer of the votes, and announced the numbers as follows:—

Class I. Landscape between 5×4 to 10×8.—First prize, H. H. Cunningham, 58 votes; second prize, G. Bankart, 50 votes.

Class II. Portrait of Member taken by Himself.—Prize, W. Adcock.

Class III. Architectural Subject.—First prize, F. Gorham Ticehurst, 65 votes; second prize, G. Bankart, 52 votes.

In Class II. the votes were—G. Bankart 67 votes, W. Adcock 37 votes; but the committee disqualified Mr. Bankart's exhibit, as he has not complied with the rules by giving full particulars on the back of the mount. They also disqualified Mr. Adcock's picture marked "A," as it had competed before in competition No. 2. Mr. Adcock, therefore, gained the prize for votes given in respect of his other exhibits in that class.

Dr. DAY moved that in each album a prize be given for the best picture, in order to raise the quality of the prints in the album. Each member to have one vote simply for the best picture. The prize to take the form of an enlargement in carbon from the negative.

It was pointed out by the HON. TREASURER that the question of funds was the only drawback to this, and it was resolved that so long as they permitted it this course should be adopted. The pictures were to be placed in the albums as nearly as possible in the order in which they came to hand, and members were requested to date their noting forms, as an assistance to the mounter.

Mr. J. W. LEIGH had made a report to the Society upon samples sent it of Schölzig's albumenised paper, and on Seorah's canary medium. It was ordered that he should be thanked on behalf of the Society.

* See note in leader columns.—EDS.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

THE annual general meeting of this Association was held at the Society's office on Wednesday, the 30th ult.—W. S. Bird, Esq., presiding. The minutes of the previous meeting having been read and confirmed, Messrs. E. G. Gauly, F. T. Beeson, and W. H. Penn were elected members of the Association.

The SECRETARY then submitted his report, with balance sheet and summary of proceedings of the Society since its foundation, as follows:—

SECRETARY'S REPORT.

IN submitting my report of the business done by the Association during the past year, I desire to call attention to the fact that, although the total receipts are not equal to those of 1882, the position of the Society is really improved—a considerable increase of members having been enrolled during the last few months, and the funds of the Association having increased from £139 18s. 1d. to £159 9s. 8d., being a clear gain of £19 11s. 7d. during the year.

Receipts.—The honorary members have contributed £24 3s. 6d., the ordinary members £17 5s., and the proceeds from the evening at the Exhibition of the Photographic Society of Great Britain £6 6s. 7d., making a total of £47 15s. 1d. The difference between the receipts for 1882 and 1883 (£10 0s. 11d.) are accounted for by the fact that in the former year several gentlemen combined to hold a *soirée* and ball, which realised £9 16s. 6d. in aid of the funds. It is to be regretted that the experiment was not repeated in 1883. Further: the proceeds from the Exhibition are £3 19s. 5d. below those of last year; it will, therefore, be seen that the reduction in the income of the Association has not arisen from a decrease in honorary and ordinary members' subscription, which combined are £3 15s. in excess of this source of revenue in 1882.

Expenditure.—The assistance given has been of very moderate amount. Non-members still continue to apply for assistance, and if the rules allowed such applications to be entertained the funds of the Association would be rapidly reduced. The plea generally given in reply to the query as to why applicants had not joined the Association has been—"Oh! I did not know of its existence." It is a matter of surprise how they found it out when its help was required. The working expenses have been £22 3s. 6d., or £1 16s. 3d. less than last year.

Balance Sheet for Year ending December 31st, 1883.

RECEIPTS.		£ s. d.	EXPENDITURE.	£ s. d.
To Cash in hand, January 1st..		139 18 1	By Rent of Office	1 7 0
,, Donations and Subscriptions from Hon. Members—			,, Advertisements	0 14 8
E. Horner, Esq.	£10 0 0		,, Printing	3 1 0
G. Taylor, Esq. ...	2 2 0		,, Stationery	0 5 9
A. Taylor, Esq. ...	2 2 0		,, Petty Expenses	0 12 6
Messrs. Window and Grove	2 2 0		,, Postage	2 0 7
W. S. Bird, Esq...	1 1 0		,, Assistance	6 0 0
J. R. Sawyer, Esq.	1 1 0		,, Secretary's Salary and Commission	14 2 0
W. Pitcher, Esq..	1 1 0		,, Cash in London and City Bank and in hand, December 31st......	159 9 8
F. Bedford, Esq..	1 1 0			
Messrs. Marion and Co.	1 1 0			
Messrs. Lavis and Co.	1 1 0			
Messrs. Mawson and Swan......	1 1 0			
A. Lovell, Esq. ..	0 10 6			
		24 3 6		
,, Subscriptions from Ordinary Members		17 5 0		
,, Photographic Society's Exhibition		6 6 7		
		£187 13 2		£187 13 2

SUMMARY.

Year.		Receipts.		Grants.		Expenses.		Balance, Dec. 31st.
1874-5	..	£119 11 1	..	£18 15 3	..	£31 19 10	..	£68 16 0
1876	..	39 15 1	..	16 6 0	..	41 15 5	..	50 9 8
1877	..	35 13 4	..	12 10 0	..	26 9 2	..	47 3 10
1878	..	39 7 6	..	6 0 0	..	22 15 1	..	57 16 3
1879	..	37 4 6	..	—	..	20 11 9	..	74 9 0
1880	..	42 12 6	..	8 0 0	..	21 14 9	..	87 6 9
1881	..	50 16 0	..	—	..	23 10 11	..	114 11 10
1882	..	57 16 0	..	8 10 0	..	23 19 9	..	139 18 1
1883	..	47 15 1	..	6 0 0	..	22 3 6	..	159 9 8
	Receipts..	£470 11 1			Expenditure..	£311 1 5	Bal'ce..	£159 1 8

REPORT OF THE BOARD OF MANAGEMENT.

IT is again the duty of the Board to submit its annual statement to the subscribers to and members of the Association, and to add a few words to the information as to the proceedings of the year contained in the Secretary's report given above.

The facts this year are less encouraging than in the previous one. There has been a welcome increase in the receipts from honorary sources through the generous contribution of E. Horner, Esq., but the receipts from ordinary members exhibit a slight decrease. Considering the length of time the Association has been in existence, the amount of publicity liberally afforded by the photographic press, and the advantages derived from the annual benefit night at the exhibitions of the Photographic Society of Great Britain, your Board cannot but feel that the progress made towards the realisation of its aims is but slow. At present the great majority of the photographic profession, both masters and men, are practically indifferent, and the members must take account of this fact. It behoves them to consider whence arises this apathy, and what means can be taken to remove it.

The organisation of the Association is arranged on an extremely economical scale, and it appears to the Board that nothing further can be done in this direction if any administration is to be maintained. With a very trifling extra outlay ten times the present work of the Association can be carried on, in which case the proportion of the expenditure to effective results would compare favourably with any benevolent organisation extant.

The foundations of a Photographers' Benevolent Association has been laid. There is an accumulated fund of about £160, and an effective administration; but for a real success the hearty co-operation of the members of the photographic profession is absolutely essential.

Not long after photography merged into a permanent industry it became evident that a fund of some kind was needed to assist those of its workers who were overtaken by misfortune in their new avocation, and columns of the journals were from time to time filled with suggestions as to the best mode of dealing with the difficulty. Time rolled on, a special plea being occasionally made on behalf of some fallen brother, but nothing was done until a few gentlemen more determined than the rest made an effort, in 1872, to establish an Association worthy of the profession to which they belonged. For many months the labour of organising was carried on by the promoters, who in 1873 called a public meeting of professional photographers to discuss the various schemes suggested. At that gathering was formed the nucleus of the Photographers' Benevolent Association, whose funds have slowly but steadily augmented. The Association has been instrumental in obtaining employment for many of its members, has furnished means to enable them to proceed to the provinces when required, and has rendered material pecuniary assistance to many whom adverse circumstances have placed in the position to need it.

Its power of doing good is necessarily limited by the resources at its disposal. It has now entered the tenth year of its existenae, and may perhaps claim to merit the larger support it needs for effective working. The Board now puts before its members and before the profession it desires to serve the facts of the case, and it rests entirely with the profession if the Photographers' Benevolent Association shall become a useful and flourishing institution to dispense a kindly help to members who may fall wounded in the ranks, or that it shall be denied the fruition of its good intent.

Both reports were adopted.

The Chairman then said the report had placed before its members the position of the Association, and stated that the Board, which consisted of the faithful few, would be glad to receive co-operation, and asked for suggestions which would tend to increased interest in the Association.

Mr. W. M. Ashman said the rule making two classes of members appeared to be a mistake, and to his knowledge deterred some of the profession from supporting the Association. There was no objection to receiving donations from anyone and to any amount; but why an annual subscriber of one guinea should not participate equally with the half-guinea subscriber seemed a puzzle to many. He would suggest altering the rule. Another matter was the amount of subscription. Why not reduce it to 5s.? Masters and men would gladly pay that amount who now withhold a guinea or half-guinea. When employers became regular subscribers they will have no hesitation in referring needy cases to the funds. He should like to know the views of the members generally on these suggestions.

Mr. H. J. Thorne considered the rule admitting two classes of members was one which needed altering. He was not prepared to go so far as the previous speaker and reduce the subscription.

Considerable discussion took place in which the Chairman, Mr. Rolph, and others joined. The feeling of the meeting was strongly in favour of one kind of subscription only—membership, in fact, to be on the payment of ten shillings and sixpence annually. It was felt, first, that the justice of the case demanded that every member should be entitled to the benefits of the Association; and, secondly, that many gentlemen would, in addition to the fee of membership, give a further subscription or donation. It was resolved that steps should be taken to alter the rule.

The Association having sustained a loss during the year of two officers—J. H. Dallmeyer, Esq., one of the Vice-Presidents, of whose benevolence the Society has had testimony, and C. G. Collins, Esq., a good working member of the Board—the meeting desired to express their sympathy with the relatives of these gentlemen.

The following are the officers for the ensuing year:—*Vice-President:* Rev. F. F. Statham, M.A., F.G.S.—*Trustees:* Col. Stuart Wortley and Capt. W. de W. Abney, R.E., F.R.S., F.C.S.—*Treasurer:* H. Baden Pritchard, Esq.—*Auditors:* G. Taylor, Esq., and J. S. Rolph, Esq.—*Board of Management:* W. S. Bird, Esq., Chairman; H. J. Thorne, Esq., Deputy-Chairman; Messrs. W. M. Ashman, H. J. Burton, T. Bolas, A. J. Brown, F. H. Berry, E. G. Gandy, J. A. B. Hall, A. E. Hyde, F. J. Mitchell, J. S. Rolph, S. Saunders, and R. E. Wilkinson.—*Secretary:* H. Harland.

The meeting terminated with a hearty vote of thanks to the Chairman.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

The seventh general meeting of the session was held in the Religious Institution Rooms, on Thursday, the 24th ultimo,—Councillor Robertson in the chair.

Mr. A. L. Henderson, of London, and Mr. J. G. Tunny, of Edinburgh, were introduced to the meeting. The minutes of the previous meeting having been read and approved of, the question-box was opened and found to contain the question—"What is the best method of enamelling silver prints?

Mr. Urie said the process was exceedingly simple. A glass plate is cleaned, rubbed with French chalk, and coated with collodion. When dry the collodion is coated with a thin varnish of gum dammar in benzole, to prevent the gelatine mountant permeating the collodion. The print is then mounted down on the plate with gelatine; a thin sheet of paper is mounted on the back of the print with the same medium, and when dry it is stripped from the glass.

Some discussion then took place as to the advisability of using varnish on the collodion, the arguments for and against being about equal.

Mr. A. L. Henderson thought enamelling photographs was a mistake altogether. In his experience they faded considerably quicker than plain albumenised prints. He thought the addition of the benzole varnish to the collodion was a decided improvement.

Mr. Blaikley showed a circular camera constructed almost on the principle of a round collar-box. The lid (on which the focussing-screen and slides work) revolves on the body of the box, so that either an upright or oblong picture can be taken without changing the camera. This lid is prevented from coming off by means of four pins working in a groove cut round the box. The front part of the camera is, as it were, the bottom of the box cut out. To this one end of the bellows is attached, the other to the inside edge of the box next the lid. The bellows is made octagonal, but the ends readily accommodate themselves to the circular form. The tailboard is simply a flat rod (about one inch broad and three-eighths of an inch thick) cut in two, and each half hinged to the triangular top of the tripod, so as to fold down against the stand when not in use. When in use they are kept in position by a binding screw and small plate with socket. The focussing arrangement consists of a rack and pinion, the rack being inserted along the bottom of the rod. The focussing-screen is not hinged, but slides in the same groove as the dark slide, and is prevented by a check from coming out entirely. A small spring is fixed between the box and lid, so as to snap and retain it in an upright or oblong position. The wood is plane tree ebonised, and, being all turned, the cost is very little.

Mr. McGhie exhibited several pieces of apparatus, including a camera, which was much admired; also a drying-box $21 \times 12 \times 12$ inches, capable of holding six dozen quarter-plates, the ledges on which the plates rest (face downward) being bevelled. The ventilators at top and bottom have dust cheeks, and a continuous stream of cold air is caused to pass over the surface of the plates, which dry in from six to eight hours. He further showed a dry-plate lantern with three distinct forms of light—ruby light with a shade for the eyes; clear light for making tranaparencies; and opal glass for examining developed plates. He also exhibited a studio shutter, the flap of which was divided into two parts, and opened sideways by pneumatic arrangement.

Mr. Lorn Campbell exhibited a picture of a transformation scene in a pantomime. It was exceedingly sharp and well-defined in every part.

The Secretary showed the result of experiments he had made with some extra-rapid, ready-sensitised paper which he had received from Mr. Otto Schölzig. The experiments proved the paper slightly more sensitive than ordinary paper, but more difficult to tone.

The Chairman then called upon Mr. J. Y. McLellan to introduce a discussion on *The Cause of Fading in Silver Prints.*

Mr. McLellan commenced by pointing out the importance of a knowledge of the subject from a general as well as a photographic point of view. We could not (he said) look over our own or friends' albums without being made painfully aware of the fact that many of the so-called old-fashioned photographs were rapidly fading away. This was all the more to be regretted since old photographs were often the only remaining portraits of departed friends, and their value consequently increased with years. He remarked that, in his opinion, there were two kinds of fading—one which might occur at an early stage in the life-history of the photograph, and which could generally be attributed to faulty manipulation on the part of the operator; but the more important form was that which took place after many years, and which could not be accounted for in this way. He had given the matter a good deal of consideration, and had come to the conclusion that the cause of this insidious form of fading was entirely due to atmospheric influence. He said that some years ago he was interested in a chemical investigation, undertaken to discover the cause of decay in the leather bindings of the books in a gentleman's library. These books were submitted to analysis and found to contain considerable quantities of sulphuric acid, and the only legitimate explanation of this seemed to be that the sulphur compounds in the gas on burning were converted into sulphurous acid, which was absorbed by the books, and ultimately became oxidised into sulphuric acid, and so accounting for the corrosion of the book bindings. He said that, in his opinion, this was also the explanation of the fading of photographs after keeping for many years. In order to put it to the test an old faded photograph, which had hung upon the walls for about fifteen years, was torn into pieces and immersed in water. This became strongly acid on testing with litmus paper, and on the addition of barium chloride gave a dense white precipitate of sulphate of barium, proving the presence of a large quantity of sulphuric acid. The water also decolorised permanganate of potash, which suggested the presence of some reducing agent. He said that his experiments up to the present were merely preliminary tests. He hoped soon to go into the subject quantitatively, and strongly recommended this to the members as an important subject for investigation.

An interesting discussion followed, and, several members having intimated their intention to investigate the subject experimentally,

The Chairman proposed that the discussion should be continued at the next ordinary meeting on the 21st of February, and it was arranged that Mr. A. Duthie should read a paper on the subject that evening.

Mr. A. L. Henderson was elected an honorary member, and Mr. George McKenzie, of Paisley, was elected an ordinary member, of the Association.

The meeting then closed with votes of thanks to the exhibitors of apparatus, to Mr. McLellan, and to the Chairman.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

The ordinary meeting of this Society was held at the Free Library, on Thursday, the 31st ult.,—Mr. B. Boothroyd, President, in the chair.

The minutes of the annual meeting having been read and confirmed, the Chairman, after a few graceful valedictory remarks, vacated his post, and Dr. Kenyon, the President for 1884, took the chair.

Messrs. Cockbain, Irvin, Kerry, Morris, Parkyn, Robinson, Smith, and Watts were elected members of the Association.

The Hon. Secretary read a letter from Mr. Frank Leslie, the chairman of the Executive Committee of the Associated *Soirée*. The consideration of this, on the motion of the Rev. T. B. Banner, seconded by Mr. J. A. Forrest, was deferred till next meeting.

Dr. Kenyon then delivered the following—

Inaugural Address.

In the first place, I must express my sincere thanks for the great honour you have done me by electing me your President, and I must ask your kind indulgence and assistance in fulfilling the corresponding duties.

On such an occasion as this it is convenient to take a general survey of things, and not considered unpardonable to indulge in reminiscences.

Looking at our doings from outside, we find ourselves as photographers engaged in one of the most wonderful of all the wonder-working processes of this eventful age. The dream of the necromancer of the middle ages is wellnigh fulfilled by us every day. If we cannot actually transmute the baser metals to gold we can transmute inert and sordid matter into the pure gold of ethereal beauty. We can bring to light the secrets of the invisible changes of the minutest molecules. We can seize with a rapidity which would satisfy the recording angel the fleeting actions of time. We resemble those ancient sorcerers in less agreeable ways. Like theirs, our proceedings are not very highly esteemed by the common herd. Fortunately we receive more compassion than blows; but the fact remains that we are not always so highly appreciated as we could wish. Witness Captain Abney's story of the Spanish peasant who gave him a halfpenny.

Although, unfortunately, not a very old member of this Society, my experience of photography reaches somewhat far back, and, being in itself in some degree an epitome of the history of the science, it may not be uninteresting if I give a short account of it. I would not, however, venture to trouble you with anything so personal, only it may remind some of you of similar experiences, and it may serve to illustrate the contrast between the multitudinous facilities which we enjoy here and now, compared with those obtained in a country village twenty-five years ago.

It is curious to trace the first dawnings of things photographic on the mind, so let me first carry you back to a period still earlier than that which I have named. When a child under six years of age I was taken into a show at a fair. It was a large *camera obscura*, and I can well remember the wonder with which I saw spread out on a table the image of the surrounding buildings, the richness of the colouring, and, most astonishing of all, the moving images of the people walking outside. My mind often recurred to the subject, and I tried in vain to conceive how it might be effected. Notwithstanding this experience, when later I saw a photographer at work I thought the affair was a trick.

Next, at school, playing with a lens, some of us noticed traces of an image, and on partially darkening the window were delighted with its beauty. With this fresh in my mind, school days over, I fell in with some articles by Sir David Brewster in an art journal, in which the photographic efficiency of the simple spectacle lens and the principles of the stereoscope were enunciated. At the same time some even then old magazines came to hand, giving an account of "photogenic drawing," as it was at first called. Putting together the ideas thus suggested, I began to experiment with nitrate of silver and common salt on writing paper, and also with bichromate of potash on paper. Soon a camera was constructed of pasteboard and fitted with spectacle lenses. Not even a sky outline being obtained with the foregoing chemicals, the calotype process was attempted; but this proved a failure, as might be expected, considering that in the early formula a dose of the developing solution was applied before exposure.

Next I fell in with a pamphlet, by Mr. William Crookes, on the waxed-paper process. This led to better results. Then I made the acquaintance of an enthusiastic amateur, who lent me The British Journal of Photography, and about the same time a friend gave me a copy of Hardwich's *Photographic Chemistry*. By this time, with some reluctance, the spectacle lenses had been sacrificed in favour of a good quarter-plate landscape lens by Jamin (à Paris), kindly presented to me by my father. Thenceforward progress was easy. An article in the Journal recommended a process in which turpentine was employed as a solvent for the wax and iodine. This proved a great success.

The village carpenter was now taken into confidence, and between us we constructed a very light, strong, and effective stereoscopic camera. A 5 × 4 camera was also extemporised out of a deal box. Printing-frames were, of course, easily made, pressure being obtained with india-rubber, screws, or wedges. The stand was a difficulty, but a cheap one just came out in time for me.

Objecting to the grain of paper I proceeded to experiment with glass. First I tried albumen, but this proved very awkward to manage on account of the difficulty of getting an even coating and drying free from dust. Albumen on collodionised glass, recently referred to in the Journal as the best means of making transparencies, I found easy to manipulate, but very slow. I have, however, preserved one fragment of a negative as a microscopic object, showing wonderful definition in a distant signboard and placards of a post-office window. Wet collodion was then taken up, and was, of course, a great advance; but, wishing for something portable, I succeeded very well with Fothergill plates. Dr. Hill Norris's plates gave very beautiful results, but did not always prove so reliable as the Fothergill.

From 1863 to 1878—Rip Van Winkle-like, as regards photography—I fell asleep; but when I awoke I found wet collodion still the photographer's sheet anchor, and the dry plate that was to eclipse it in rapidity still a dream—very quickly to be realised. I found, however, a startling development of collodion in the collodion emulsion processes, which I received just in time to try before they also lapsed into the limbo of forgetfulness. Then came Mr. Charles Bennett's wonderfully-lucid exposition of the principles which have worked the revolution in favour of gelatino-bromide, the success of which is the cause of our large accession in numbers. And here I am in duty bound to remind some and inform others that the collodion emulsion processes had their birth in this Society, and that we number amongst us one famous for his long devotion to gelatine.

With your permission I will now say a few words about a rival attraction which is absorbing much attention, and which is not altogether a rival either, but has special claims upon us as photographers. The development of the tricycle during the last two or three years is comparable with the rise and progress of gelatino-bromide, and like it has created a new industry of even national importance. There is a closer affinity between cycling and photography than is at first sight apparent. To paraphrase a familar saying: much though I love photography—great as is the charm of devising and accumulating apparatus and of working the varying and multitudinous processes—I love the objects I wish to photograph even more—the mountains and rocks, the landscapes, the sea, the clouds, objects of architectural interest, and the countenances of one's friends. It is because these are so dear that photography is most beloved as a means of securing a closer communion. And what, I should like to know, more deeply engraves upon one's soul the features of a delightful country than riding through it on a tricycle? The very exertion—nay, toil—of the journey ensures an acute remembrance of its details; and what more promotes good fellowship than the freemasonry of the wheel? As in photography, there is scope for exertion, inasmuch as there is a heavy weight to be carried about, and there is a delicate machinery to be cherished with almost human affection. As in the pursuit of photography, diversified scenery is brought into view. There is abundant scope for ingenuity and invention, both in mechanism and field of operations. What is more to the point: in the tricycle we have a most useful means of transporting photographic apparatus. In the autumn of 1879 I took with me on a "Salvo" tricycle through the heart of Wales a 7 × 5 camera, stand and plates, along with a knapsack, weighing altogether some thirty pounds. On my "Humber" tricycle (a fifty-two inch) I can comfortably carry a Rouch's 12 × 10 camera and half-a-dozen plates, with stand. As many of the cycling clubs are forming photographic divisions, it might be worth while for us to think of forming a cycling division.

Passing on to consider the progress made during the past year in the practical working of photography; we have to notice that in the gelatino-chloride process one source of weakness seems to have been effectually removed—a source of weakness due to the very perfection of gelatino-bromide in regard to sensitiveness. In gelatino-chloride we have the means apparently of doing with gelatine what hitherto has still to be looked for elsewhere, namely, the perfection of transparencies, whether for lantern purposes, enlargements, or reproduction of negatives. I hope, in direct printing on gelatino-chloride plates, many of us will find greater ease, certainty, and economy than in the development process. And I venture to hope that, through gelatino-chloride emulsion, we may come to a perfect paper process—one which will give the perfection of a glass transparency on paper, free from the loss of detail and finish sustained in the toning and fixing of ordinary paper prints. This, it occurs to me, might surely be attained by some such process as by coating Messrs. Goodall and Steven's enamel paper with gelatino-chloride.

The magnificent enlargements, exhibited by Professor Donkin, of Swiss mountain peaks, are a great encouragement for those who look to obtaining from small plates enlarged negatives equal to large pictures taken direct; and here, again, I would suggest that gelatino-chloride will come in useful, for a brilliant transparency may by this process be obtained from a negative otherwise unfit for enlargement.

There is still much room for improvement in cameras, but serious efforts are being made to supply the want. This, I submit, will only be satisfied with an automatic arrangement for exposing plates or films carried *en masse*: and I would suggest that a great step would be secured if the sliding shutter of the dark slide were replaced by a hinged shutter opening entirely within the camera. This might easily be done.

In the working of the gelatino-bromide process valuable additions have been made to our resources in the introduction of the citrates, by Mr. G. Watmough Webster, as a means of obviating the results of over-exposure, and in the improved methods of silver intensification by Mr. William Brooks and Mr. B. J. Edwards. The use of the carbonate of soda developer appears to be gaining ground, and I have myself had very satisfactory experience of its usefulness.

A great improvement in the illumination of the dark room for development purposes is now obtained, and this seems likely to find its perfection in the use of a monochromatic light such as is announced from Paris to be obtainable by a mixture of spirit and perchlorate of soda burned in a spirit lamp. This is said to give an abundant yellow light free from actinic influence. For the illumination of dark interiors or portraiture by night, where a short exposure is desirable, we have had brought forward in the oxymagnesium light the very *acmé* of an inexpensive and portable device.

In this connection I may point out that for copying pictures and small objects, where a longer exposure is admissible, the lens of a graphoscope, for rendering parallel the rays of a paraffine lamp, answers admirably, whilst for making enlargements on gelatino-bromide paper from small negatives the same lens, used along with a smaller, shorter-focus, double-convex lens to act as a condenser, will be found effective with the same simple source of light, the precautions necessary being to place—1. The condenser at or about its focal distance from the lamp. 2. Place the graphoscope lens at or about its focal distance from the condenser. 3. Having placed the negative close to the graphoscope lens in the slide of the camera, to use for making the image a lens of longer focus than the graphoscope lens, and, if possible, of at least so large an aperture as that of rapid symmetrical type.

In conclusion: it only remains for me to wish you all and each a happy and prosperous New Year!

Mr. J. H. Day, the Librarian, announced donations to the library of two parts of the *Photographic Times*, and a translation, by Captain Abney, of a work by Dr. Eder on *Spectrum Analysis*, for which the hearty thanks of the members were accorded to the donors.

Mr. J. A. Forrest proposed, and Mr. J. H. Corkhill seconded, a vote of thanks to the President, officers, and judges of the past year.

Mr. W. H. Kirkby then, in accordance with his notice, proposed to alter Rule V. to—"Honorary members shall be nominated by the Council; but their election must be confirmed by the members of the Association present at one of the ordinary meetings; the election, both by the Council and at the meetings, to be by ballot, and to be carried by the majority of the votes. Honorary members shall retire at the next, and at every annual, meeting, but are eligible for re-election on the recommendation of the Council. Honorary members shall be entitled to attend meetings, but are not to receive the presentation print, and shall not serve on the Council or vote on any question whatever."

Mr. B. Boothroyd seconded the resolution.

Mr. J. H. Corkhill moved, as an amendment—"That the election of honorary members by ballot and their re-election annually shall not form part of Rule V."

Mr. J. A. Forrest seconded the amendment, and after some discussion the amendment obtained a majority of votes. On being put to the meeting by the Chairman as a substantive motion the amendment was carried.

The Chairman distributed certificates of honourable mention to the following gentlemen, whose pictures had gained prizes in the competition for 1883:—Messrs. Beer, Ellerbeck, Hall, Kirkby, and the Rev. H. J. Palmer.

Mr. J. H. T. Ellerbeck (Hon. Treasurer) spoke at some length on the financial position of the Association, pointing out that, owing to the large and rapid growth of the numbers of the members and the very large attendance at the monthly meetings, it would be necessary to economise the working expenditure considerably, since it would no longer be possible to give each member a presentation print of the cost of half his subscription, and provide him with tea at each of the meetings.

After some discussion it was decided to present each of the members entitled to it with an unmounted enlargement of the usual size.

Mr. Ellerbeck suggested that a list of dates and of places for the excursions of the year should be drawn up by the Secretary, and sent to the members, printed in the February circular.

The Hon. Secretary gave a report of the Society's exhibition at the Associated *Soirée*, gratefully acknowledging the labours of Messrs. Crowe, Forrest, and Guyton in co-operating with himself in the arrangement of the pictures.

He (the Hon. Secretary) also related his experiences at Sheffield on his recent visit to the Exhibition there, to which the Liverpool Amateur Photographic Association had contributed a large number of exhibits.

Mr. McKellen, of Manchester, exhibited and explained his new portable and ingenious camera, and received the cordial thanks of the meeting.

The Rev. H. J. Palmer wished to make special mention of the kindness of Professor Donkin in sending down for their enjoyment that evening his splendid transparencies of his views in the High Alps, and a hearty vote of thanks was proposed and carried unanimously.

Mr. J. Knott then showed Professor Donkin's pictures in the oxy-hydrogen lantern, and also a number of other slides contributed by Dr. Kenyon, Mr. Newhall, Rev. H. J. Palmer, Mr. A. Scott, and others.

Hearty votes of thanks were proposed and carried to Mr. Knott and Professor Donkin and the other exhibitors of slides.

Mr. A. W. Beer showed a new carrier for the lantern by Mr. McKean, of Edinburgh, for instantaneously changing the pictures on the screen. Its ingenious construction was much admired. Mr. Beer also exhibited a portable adjustable view-meter of fine make and finish, designed by himself and made for him by Mr. Crowe.

The Rev. H. J. Palmer exhibited some fine enlargements, by Morgan, on gelatino-bromide paper, of negatives taken by him at Chartres and in Switzerland.

The Council finally decided upon an enlargement of Mr. Palmer's *North Portal of Chartres* as the presentation print for 1883.

Some prints on a new doubly-albumenised sensitive paper, by Mr. Schölzig, of London, were to have been exhibited and discussed; but, owing to the pressure of business, these and other matters were postponed to the next meeting.

Correspondence.

February Meeting of the Photographic Society of France.—Presentation of Cameras.—Presentation of a Photographic Album from St. Petersburg.—A New Photographic Journal from Oporto.—M. Audra on Hyposulphite before Development.—M. Vidal's Presentation of a Pocket Camera.—Presentation by Professor Stebbing of a Packing Box for Dry Plates.—Communication by M. de la Noë on Actinometers.—Iodide of Silver a Powerful Antiseptic.—Modification of a Travelling Lantern.

The monthly meeting of the Photographic Society of France was held on Friday evening last, the 1st instant,—M. Peligot in the chair.

M. Fontaine presented two small cameras and a rapid shutter (guillotine form)—nothing new. Evidently the inventor or, at least, the person presenting the same was not *au courant* of the progress made in photographic joinery during the last few years.

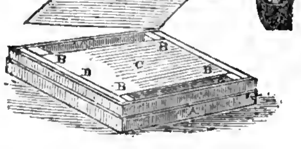
The Society received a magnificent present from Mr. Chapiro, of St. Petersburg, consisting of an album containing the collection of proofs in which a celebrated actor had personified a madman. These proofs were obtained in order to illustrate a Russian novel, entitled *Mémoires d'un fou*. On the blank side of the album, opposite the proof, is the sentence or passage of the novel which gave birth to or inspired the posture. This sentence is printed in the Russian and French languages. The preface, which was read, described how the idea of illustrating books by means of photography came into existence, and went on to say how deeply it is to be regretted that the gestures and positions of celebrated actors who have interpreted Shakspeare's plays—such as *Hamlet*—have not been handed down to posterity. The idea of illustrating books by means of instantaneous photography has opened a new field to the trade.

M. Carlos Relvas and his daughter, whose love of photographic manipulations has been so often spoken of, have undertaken to compile a monthly journal on photography. The first number was presented to the Society, but the pleasure it gave was diminished by the fact that few, if any, of the members were acquainted with the Portuguese language. The new publication was well received by all, bearing, as it does, the name of M. Carlos Relvas, which is a passport to all interested in the progress of photography. It may be remembered that this gentleman received, a short time ago, the decoration of the Cross of the Legion of Honour from the French Government, as a homage to his indefatigable perseverance and disinterested application to the progress of photography. The British Journal of Photography and its legion of correspondents will not be behindhand in wishing success to the *Arte Photographica*, and health and strength to its distinguished *collaborateurs*, Mademoiselle and M. Carlos Relvas.

M. Audra made a very interesting communication on the advantage of plunging a gelatino-bromide plate into a weak solution of hyposulphite of soda before developing the latent image with ferrous oxalate. After the immersion in a solution of about one grain of hyposulphite of soda to about one quart of water the plate is well washed and developed. M. Audra exhibited some very fine negatives treated in this way. He says it is far preferable to putting hyposulphite of soda (as formerly proposed) into the developer.

M. Vidal, who, it may be remembered, made a very interesting communication (of which I gave an account in my last letter) on the ease and convenience of films for photographic excursions, their development, and other manipulations. This gentleman completed his communication by the presentation of a pocket camera made by himself, as no camera-maker would undertake to construct such a small instrument. A pocket camera indeed it was, taking up very little space, and with six double dark slides weighing only two or three ounces. No glass plates are used. M. Vidal informed the Society that the dark slides were furnished with Prof. Stebbing's new transparent films, which were very light and convenient for the purpose, and which preserved their flatness when the diachylon is employed to aid adhesion. The camera and dark slides were very much admired, and M. Vidal was highly felicitated on his new talent in cabinet work.

Prof. Stebbing submitted to the Society a new packing-box for dry plates, presented to him, during his last visit to England, by Mr. A. L. Henderson. This box is not unknown to the readers of The British Journal of Photography, having been brought to their notice by Mr. A. Cowan. It merits, nevertheless, a slight description. The box may be made of wood or eardboard. It is the exact length of the plates which it is intended to hold, but a quarter of an inch larger on each side. To keep the plates from shaking or moving four pieces of wood a-quarter of an inch square, and in length the height of the box, are glued firmly to the sides, about three-eighths of an inch from the ends of the box. These wooden pillars serve two purposes—first, to keep the plates, as was said before, from moving; secondly, to maintain narrow strips of paper, used to separate the plates one from the other, so that the sensitised surface should not come in contact with the back of the plate. This is attained in the following manner:—A piece of eardboard is cut into strips in length the width of the box, and about five-sixteenths of an inch wide. A plate is lowered down into the box, sensitive side upwards; two bands are now taken, one of which is dropped down between the pillars at one end, and the other between the two pillars at the opposite end. Another prepared plate is now put in, but this time with the sensitive surface downwards. Two more bands are introduced in the same manner, and another glass added, face downwards, and so on until the box is full. The cover is then adjusted, a band pasted round to keep out light, and the parcel is ready for the market. The box presented was examined with great interest and care by the members.



A, plate box. B B B B, wooden pillars. C, stock of prepared plates. D, band of paper separating plates. E, plate about to be put into box.

M. Guilleminot informed me that he had had a great number of such boxes made about a year ago.

The advantages as well as the faults of this box were duly discussed Whether the stains at the end of the plates caused by the paper wil counterbalance the great advantage which a photographer, and especially an amateur, must derive by being able in semi-darkness to take the plates out of the box and put them, by feeling only, into the dark slide, remains to be proved. As for stains: if pure paper or strips of pure gelatine be used instead of cardboard no trace of stain can be detected.

M. de la Noë communicated to the Society his observations and practical experiments with Mr. L. Warnerke's actinometer. This instrument is fully described in THE BRITISH JOURNAL OF PHOTOGRAPHY, 1880, page 53. It appears, as far as I could understand, that M. de la Noë obtained results which were completely the opposite of those secured by Mr. Warnerke. The reason he gives for this dissimilarity is that the dilatation and contraction of the eye will not permit of a perfect reading, whereas in the new sensitometer, containing the luminous tablet and magnesium ribbon for judging the different sensitiveness of dry plates, the latter can be more relied upon.

Since gelatine has been employed in the preparation of silver bromide solutions different chemicals have been employed to preserve the gelatine from decomposition, as gelatine can be kept during the summer for only a very short period without becoming, if not putrid, at least of no service in the manufacture of gelatino-bromide of silver plates. If employed frilling will result, with all its evils. Now, it appears that emulsions containing a small quantity of silver iodide have been free from this defect, in consequence of silver iodide being a powerful antiseptic. A great many experiments upon chemicals having antiseptic virtues have been carried out at l'Observatoire de Montsouris, Paris, and a list has been given. It appears that the bin-iodide of mercury is the most powerful antiseptic known, after which comes the silver iodide; in fact, it requires $\frac{1}{30}$th in weight more of salicylic acid to have the same power to arrest putrefaction than if silver iodide be employed. The attention of emulsion makers will be drawn to this fact, if it be true.

Mr. W. H. Harrison asks in the Journal for a good, flexible material for the light of a travelling lantern. "Lux" answered in describing a lantern [see diagram in THE BRITISH JOURNAL OF PHOTOGRAPHY, 1884, page 31]. The disadvantage of that lantern is that it cannot be held in the hand with ease. I informed Mr. W. H. Harrison of a simple "dodge" by which it can be carried with ease. (This kind of lantern I first saw at Messrs. George Mason and Co.'s establishment at Glasgow.) To make this lantern perfect solder a hook to each angle of the triangular tin top and bottom of the lantern. By putting three indiarubber rings from the top corners of the lantern to the bottom ones the lantern will be firmly held together. E. STEBBING, *Prof.*

25, *Rue des Apennins, Paris, February* 4, 1884.

CELLULOID DEVELOPING DISHES.

To the EDITORS.

GENTLEMEN,—I must have omitted to inform you that my new developing trays can be had in almost any colour, as you appear from your editorial notice to think that there are only white ones.

I have them in black, coral-red, and clear like horn—the latter with or without one end covered to form a well.—I am, yours, &c.,

8, *Kingsland Green, February* 4, 1884. F. W. HART

P.S.—In my advertisement the compositor has made me say that they are "all but breakable." My intention was to describe them as "all but *un*-breakable."—F. W. H.

AN ADAPTING SWING TO THE CAMERA.

To the EDITORS.

GENTLEMEN,—The sketches herewith show a very simple method I have adopted for obtaining a swing front to an existing camera constructed without a swing-back.

The one illustrated is a quarter-plate of the ordinary folding tailboard pattern, and all the alteration necessary is to make a new brass plate, marked A, with a slot in it, in place of the original one, and to cut away a similar slot in the woodwork to allow the clamping screw to traverse it, as shown.

Fig. 1 shows the camera set up as usual, *square;* and *fig.* 2 shows the swing in action. All that is needful is to slack the screw abovementioned, and re-clamp it in any required position in the slot. The focussing-screen will still remain vertical as before. The front will rise and

FIG. 1.

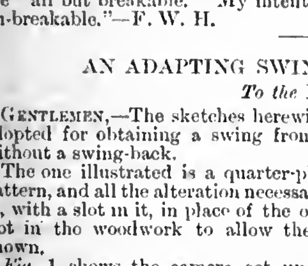
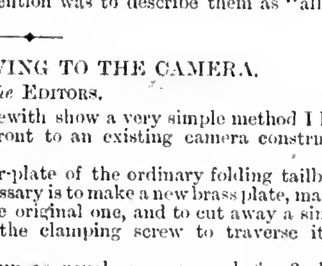


FIG. 2.



incline backwards, revolving about the hinge B at the bottom of the camera, and the part of the base-board attached to it will leave its bearing on the tripod; but, as this is only a small portion of the whole area of the top, it will not matter. There will be a small displacement of the image on the ground glass, so the lens will require lowering in its slide to suit.

I do not know if this be an original idea or not, and simply put it forth for the opinion of your readers as a means of converting an existing camera with very little trouble; at the same time, I do not claim any superiority (or, indeed, equality) to any of the ordinary means of obtaining the vertical swing, inasmuch as it will probably not come in for landscape work, but only for those positions that require the lens to look up at an object, such as a building.

I might mention that the swing cannot be used with a *very* short-focus lens unless specially mounted, because the dovetail slide carrying the back part must be behind the hinge B. For this reason, also, the camera must be set up, as in *fig.* 1, in order to open it out, after which the front may be inclined as desired.—I am, yours, &c., G. W. ATKINS.

Sheffield, February 4, 1884.

ENGLISH PHOTOGRAPHS IN FLORENCE.

To the EDITORS.

GENTLEMEN,—It will probably interest the readers of the Journal to know that the fine series of photographs by Messrs. Dixon, of the animals in the "Zoo," are commanding a considerable sale in Florence. They are a great attraction to the windows of Messrs. Brogi, Via Tornatuoni, opposite Vieusseux's well-known library, and the windows are usually crowded with gazers from morn till eve. Messrs. Brogi tell me they have sold a large number at five francs each (a high price for unmounted photographs in Florence), and they are sending for more.

I would make a suggestion that fine English photographs would get a good sale here during the winter season, and I am told that many of those of the animals in the "Zoo" were bought by artists who reside here permanently.

Some of my friends were much struck with the fine sea-pieces of Colonel Wortley in the late London Exhibition, also with those of Mr. Mayland, and some of yachts—racing and otherwise. It is probable that many of these would be likely to sell. If any of your readers are inclined to send specimens, addressed to "Captain Turton, R.N., Florence," or to "Mr. Brogie, photographer, Florence," it would soon be seen if they were saleable. They should be registered, as I have on more than one occasion lost parcels of sensitised paper sent me from England by post.

I have not had the opportunity of visiting the London Exhibition now for three years, but have sent to many of my friends in England, and have received but one report of the great advance made in photography during the last few years. The greatest compliment, however, paid to the advance of the photographic art was contained in a letter written to me last November by Sir Ralph Thompson, Permanent Under-Secretary for War. He says:—"I really thank you for causing me to go to the Photographic Exhibition. I had no idea that there had been so great a stride in photographic art within the last few years." This is a good tribute, and one unsought, in favour of photography.—I am, yours, &c.,

20, *Via de Benci, Florence, February* 2, 1884. FRANCIS W. TURTON.

Notes and Queries.

I HAVE several wooden dishes with glass bottoms. I want to use them for developing gelatino-bromide enlargements. Could you kindly let me know whether shellac or paint would be the better coating for the wood? Or is there anything better?—NOVICE.

F. C. S. asks—"Can tannin be added to gelatine without causing a precipitate? I have heard that it can, but I have not succeeded in doing so." ——In reply: Dissolve the tannin in glycerine instead of water, and then add it to the gelatine. A slight opalescence will be produced, but no insoluble precipitate will be formed.

G. F. B. W. asks if it be possible to take photographs by moonlight.——In reply: It is quite possible, but such photographs are more curious than beautiful, judging by those we have seen. But from what our correspondent remarks in the course of his letter we believe that instead of real moonlight photographs he probably means moonlight effects in photographs, which is quite another matter, and one easily accomplished in bright sunlight.

SARTOR RESARTUS observes:—"My present inquiry has reference not to a point of *practical*, but of *theoretical*, accuracy in the projection of a photographic view upon a plane surface. Is it possible to take a view which shall be theoretically accurate as one sees it in nature?"——In reply: If the photograph have been taken by means of a non-distorting lens and be viewed by one eye from a point distant from the picture equal to the focus of the lens employed in its production, then, we think, the conditions will be fulfilled of the theoretical accuracy mentioned.

QUERCUS inquires if it be fair in a man who is the proprietor of a photographic business to employ a first-rate operator for a few weeks in order to secure a collection of specimens of a higher class than any he had formerly been able to exhibit as having been taken on his own premises, and then to turn round coolly and say he would have to dispense with his services for the future, unless he (the operator) would consent to submit to a reduction in his wages amounting to nearly one-half that which was originally promised, and which was paid for three weeks.——As "Quercus" states the case, it is certainly unfair of anyone to act as this employer is said to have done; but we cannot offer any opinion unless made acquainted with the whole details of the agreement. Certainly we should like to hear what the employer had to say before we did so. Every story has two sides; but we do not compromise ourselves by saying that if the employer secured the services of the operator solely for the purpose of having him to make a few fine specimens, and then, without a proper reason, acted in the manner alleged, he was guilty of a dishonourable act.

T. S. Johnston inquires what is the cause of certain transparent spots which sometimes appear in his collodion emulsion negatives. He takes special care in filtration, employing for that purpose a piece of wash leather. He keeps his operating-room scrupulously free from dust, and he even filters his developing solution; and yet, notwithstanding all these precautions, he gets spots of the nature described. He would be grateful to any correspondent who would throw some light upon this annoyance.——We remember this question having been brought prominently before the readers of this Journal seven or years ago, without any solution of a definite character having been suggested. We shall be glad to receive the opinions of such readers as are conversant with the subject.

F. W. is desirous of ascertaining how it is that after preparing sensitive paper which will remain without being discoloured for months, and upon which he can get a good print, he experiences so much difficulty in getting it toned to the requisite tint that he is almost driven to despair. He employs citric, and sometimes tartaric, acid as the agent to confer durability, and floats the paper, after sensitising, back downwards, upon a thirty-grain solution of either of these acids.——We imagine that the error of our correspondent will be found in the great strength of the preserving bath, by which such a large amount of acid is left in the paper as to prevent its toning readily. If this be so the remedy is easy, consisting, as it does, in reducing the strength of the acid by varying stages until, instead of being thirty grains, there will be only five grains to the ounce of water.

R. B. Brown wishes to take some negatives from paper prints with a view to having them utilised in the production of transparencies for the optical lantern. He was present at the lantern exhibition of the South London Photographic Society, and very much admired some of the views which, as was stated at the time, had been obtained by copying prints on ordinary albumenised paper. He would be glad if we or any correspondent would give him some practical information by which he could be enabled to obtain transparencies under similar circumstances.——In reply: There is no difficulty about the matter. It is only requisite that a strong light be made to fall *directly* upon the picture to be copied; for, as we have frequently said, a side light renders noticeable the grain of the paper. Take the negative upon a gelatine plate and the transparency by collodion. We shall be glad to have the opinions of those who do not coincide in the recommendation here given.

Our attention has been called to a question in your Journal of the 1st inst. The querist asks to be informed where he can obtain a studio, and also refers to greenhouses. We are constantly sending out the latter, and have had some little experience in the former. Perhaps you will kindly make this known to your client.—Beckett Bros., Chelmsford.

I would suggest to "Publisher," who asks respecting the exhibition of a photograph of an athletic club, that he should stick a black patch over the gentleman who objects to being exhibited. It would attract as much attention, and all inquiries could be answered. I think that, unless the gentleman has an absurdly protuberant abdomen, &c., he would like the black patch removed.—H. R. S.

Exchange Column.

What offers in exchange for six cloud negatives 13 × 10, and three 11 × 6?—Address, C. R., 16, Gilpin-street, Liverpool.

Wanted, half-plate triplet lens, Dallmeyer's No. 1 preferred; good exchange offered.—Address, F. M. Pugh, 23, Bayham-terrace, Ealing Dene, W.

I will exchange a good old violin and bow, splendid tone, cheap at three guineas, for studio accessories.—Address, D. Blagrove, 73, High-street, Lewes.

I will exchange Bowman's hot rolling-press or other photographic apparatus for a set of first-class lantern slides.—Address, P. Swanson, photographer, Irvine, N.B.

I will exchange a cabinet-size lens by Lerebours, and a cabinet rolling-press, both in good condition, for anything useful in photography.—Address, A. Bishop, Station Hospital, Lichfield.

Wanted, Burrows and Colton's *Retouching*, also Bigelow's *Album of Light and Shade*, in exchange for Ross's focussing eyepiece, &c.—Address, A. Francais, 70, Myddleton-square, E.C.

I will exchange a Stanley five-inch square, sliding body camera and portrait lens, adaptable for small studio, for whole-plate landscape lens, or offers.—Address, T. J. Adams, Barnes-row, Carmarthen.

I will exchange a pair of posing chairs and photographic couch, by Cussons, of Southport, for dining table or accessories, or anything useful.—Address, W. C., 12, Westbourne-grove, South Kensington, London, S.W.

Wanted, in exchange for a large rolling-press, by Bury Bros., Manchester, plate size of 18 × 14, and some Seavey backgrounds, a good balustrade and pedestal. Send photo. to Imperial Studio, Beverley-road, Hull.

I will exchange a stereoscopic camera by Dallmeyer, with two dark slides, rising front, sky and foreground shade, almost new, for a view lens of a good make that will cover 8½ × 6½ short focus.—Address, C. Chambers, artist, 64, Mill-street, Crewe.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

Photograph Registered—

Arthur Silvena, Wellington-arcade, Glasgow. — *Photograph of "A Dream of Love."*

J. Traill Taylor.—Received. In our next.

J. K. T.—Inquire of Messrs. Barnard and Co., Oxford-street.

A. J. R.—Moule's photogen, perhaps, is lower in price. The oxyhydrogen light is of no use for portraiture.

J. C. Longford.—The formula is quite correct as given. Remember the toning and fixing is done in one operation.

Wicklow.—The only fault is that the prints are very much over-toned. The fixing bath is of a very suitable strength—certainly it is not too strong.

C. D.—So far as we are aware only one optician constructs his landscape lenses of three glasses. Most of the cheap landscape lenses consist of two glasses only.

A. B.—Some makers proceed one way and some the other. The castor oil will do no harm in the collodion. By alum, in this case, the common alum of the shops is meant.

A. J. Atkins.—The form of studio appears very suitable indeed. You might, with advantage, however, make the roof a little higher—say thirteen feet, instead of eleven feet six.

Novice.—The unpleasant smell is due to the paper being prepared with albumen which has become somewhat decomposed. Decomposed albumen is said to confer a higher glass than fresh.

S. J. B.—1. A pale, unobtrusive green or a French grey will be a good colour.—2. We should prefer the ground glass for the roof and the plain for the sides.—3. Better print the slides by superposition.

J. S. L.—The spots are caused by the hyposulphite of soda not being thoroughly eliminated before the negative was varnished, and damp silver paper being pressed upon it during the printing, which has stained the film.

C. H. B.—The paper is sensitised on the front surface, and printed on the back. Canada balsam, we imagine, will not hide the grain any more than will the poppy oil. Protosulphate of iron—not the ammonia sulphate.

Amateur.—Yes; pyrogallol and pyrogallic acid mean one and the same thing. From what you say it appears that it is the salicylic acid that is thrown out, and not the pyrogallol. The changes in colour the solution undergoes is due to the different degrees of dilution.

James Henwood.—If you register the photographs, each one will require a separate registration; or, if you register the mounts, only of course one registration will suffice. We do not understand clearly whether you desire to make the photographs copyright or only the mounts upon which they are placed.

C. Eskell.—It would almost look as if the plates were at fault—as if you had kept them so that some noxious vapour or other had contaminated them. Red-toned transparencies can be produced by the gelatino-chloride process. Not suitable for the exchange column, which is confined exclusively to exchanges and not to advertise special requirements.

J. (Wood Green)—If a solution of cyanide of potassium will not remove the stains, we fear the negatives are worthless. If the negatives are thoroughly freed from the hyposulphite before they are varnished a moderate amount of damp will not materially injure them, although it is always advisable to preserve them from moisture as much as possible.

Mancunium.—1. The wide-angle lens will certainly answer; but we should prefer to employ a lens with a larger aperture than that possesses, so as to secure a shorter exposure.—2. You may certainly construct a doublet out of the two lenses named; but you will have to employ a very small stop, and then the field covered will not exceed an inch or two square.

A. Bell.—If the varnish made with sandarac only does not abrade easily enough for you (though we should have thought it would), mix with it a little common rosin—say one-fourth the quantity of sandarac used in the varnish. Of course the larger the proportion of rosin used the less durability there will be in the varnish, as it will be very easily abraded.

C. C. B.—We have not received the letter which your correspondent has promised to forward to us; but your own communication and enclosure contain sufficient information on the subject to justify us saying that you are undeniably in the wrong. What possible objection you can have to supplying such simple and straightforward information respecting the business you have advertised as "lease, rent," &c., whether "old or newly-established, price," &c. (we quote from your own correspondent's letter), we fail to see. If, in answering such questions, you have to divulge any of the "secrets" of your business, then we can only say that the would-be purchaser is to be congratulated upon the collapse of the negotiations.

Received.—E. G. O.; A. R. Fenton (Collingwood, Australia); "May;" "Albumen." In our next.

Photographic Club.—At the forthcoming meeting of this Club, at Anderton's Hotel, Fleet-street, on Wednesday next, the 13th inst., the subject for discussion will be—*On the Development of Gelatino-Chloride Plates.*

Canary Medium.—We have received from Messrs. G. D. Scorah and Co., of Bradford, samples of the "true canary medium." This is a pale yellow paper possessing considerable substance, and is used, we believe, in the Bradford trade for packing purposes.

Photographic Society of Great Britain.—The next meeting of this Society, being the *annual* one, will take place on Tuesday next, the 12th instant, at 8 p.m., at 5, Pall Mall East, when the report of the Council will be read, the financial statement made, the election of officers will take place, and other business brought forward.

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

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THE PERMANENCE OF PRINTS ON READY-SENSITISED PAPER.

It is frequently asserted that photographs—that is to say, silver prints—of modern production fade or deteriorate more rapidly than those which were formerly made; and we have more than once heard the opinion expressed that much of this fading is to be attributed to the very general use that is now made of ready-sensitised paper. If the allegation be true (?) that prints do fade more quickly now than formerly, it very naturally becomes a matter of importance to inquire into the reason, if one can be found.

At the last meeting of the South London Photographic Society the topic set down for discussion, in addition to the paper read, was—*Are Pictures upon Ready-Sensitised Paper Likely to be More or Less Permanent than those on Paper Freshly Prepared?* Owing to the late period of the evening at which the matter was brought forward it received very little attention. This is to be regretted, because the South London Photographic Society numbers amongst its members many of the oldest and most observant photographers, and the subject is one, in face of the allegations to which we have referred, that might well have been fully discussed. So far, however, as opinions were expressed at the meeting, they were to the effect that there was little or no difference in the permanence of prints made on ready-sensitised paper and paper of home preparation.

The term "ready-sensitised paper" is an exceedingly vague one, and it must not be assumed that papers under this title procured from different sources are all of the same preparation, and, therefore, are identical in properties. Every photographer knows that there is a wide difference between the working of the different samples now in the market. Some print very red in the frame, and others of a much more purple shade. Some tone very readily—quite as readily as paper of home sensitising—while with others there is a great difficulty in getting them to tone at all. With some kinds, with a very small quantity of gold, rich tones are obtained, while others will require a much larger proportion.

It is well known that some brands are perfectly sweet, indicating that they were prepared with perfectly-fresh albumen; others, on the contrary, smell most offensively, clearly showing that they were prepared with putrid albumen or with blood albumen, and, in some instances, the latter not of the finest quality.

With these facts before us, even if some prints on certain samples of ready-sensitised paper have proved more fugitive than corresponding ones on paper of home preparation, it must not be assumed that all kinds would of necessity yield similar results. This subject cannot be satisfactorily discussed, inasmuch as we are quite in the dark as to the preparation which the paper has undergone; for manufacturers, one and all, treat the formula and method they employ as a profound trade secret. One fact is certain, namely, that some descriptions of paper are prepared on much weaker baths than others, as may be proved by analysis; yet some of these weakly-sensitised papers yield prints quite as vigorous as the more strongly-sensitised, and they tone quite as easily.

With some kinds of paper it is impossible to get anything beyond a very warm brown tone without producing mealiness; but are the prints likely to prove more evanescent on this account? Those who hold to the opinion that deep purple tones are necessary to ensure permanence will not be slow in arriving at a conclusion—erroneous or otherwise. As a rule, ready-sensitised paper yields far more vigorous prints from a given negative than does that which is sensitised at home, even if the latter be floated on a much stronger solution. For this reason it might well be assumed that the ready-sensitised would produce the more permanent results of the two.

In alluding to the characteristics of different commercial samples of paper we mentioned that some had a most offensive smell (strongly suggestive of sulphuretted hydrogen), indicating that putrid, or blood, albumen had been employed in its preparation. Now many, we are aware, have a strong prejudice against using such papers, as they have an idea that it is liable to yield prints deficient in permanency. However, this idea is not always a correct one, as we have in our possession at the present time some prints produced fifteen or twenty years back which show no signs whatever of deterioration, yet the paper upon which they were made possessed the most offensive odour we have ever encountered in photographic paper. This experience with "stinking paper" can, no doubt, be confirmed by most practical photographers who have used it.

There ought not, one would think, to be much difficulty in arriving at a fairly correct conclusion as to which kind of paper yielded the most permanent pictures, if there be any difference, seeing that in many establishments both descriptions are in constant employment with negatives of a similar character, and have been for several years past. Ready-sensitised paper has been an article of commerce now for a period of fifteen years or more, although it may be said that it is only within the past few years that it has come into such general use; yet there has been ample time for observation. Still there is a difficulty in the way, namely, when fading occurs, can it correctly and without doubt be attributed to the paper itself, or may it not be due to something unnoticeable in the manipulations? It is within the experience of nearly every photographer that out of a batch of prints all produced at the same time, on the same paper, and, as far as is known, under identical conditions, some at times fade rapidly, while others prove practically permanent.

When discrepancies such as these occur with prints made, undoubtedly, on the same paper, it at once shows how difficult it is to arrive at a correct conclusion, when different kinds are compared, as to which of them really yields the greatest permanence. However, it would be instructive to learn the general opinion of those whose extended experience with both papers qualifies them to form a fairly correct judgment on the point, and we trust the matter will not be lost sight of until it has been duly considered and the point determined.

THE INFLUENCE OF ENAMELLING.

A statement was made at the last meeting of the Glasgow Photographic Society to the effect that the speaker thought the enamelling of paper prints a mistake altogether, and that in his experience they faded considerably quicker than plain albumenised prints.

As regards the value of the former expression it is, of course, a matter of individual taste, for which, as the proverb says, "there is no accounting." The function of enamelling is to destroy visibly the texture of the surface of the paper by imparting a glass-like, homogeneous surface which rivals that of a vitrified photograph upon opal glass or enamel; whence its name. So far, therefore, as mere appearances are concerned, the same reasons which, æsthetically, operate in inducing an admiration of a well-printed vitrotype upon enamel operate with equal force in evoking similar admiration for the enamel print upon paper. This estimate of enamels upon paper is shared by the great majority of photographers and also by the public.

The burnishing of prints is merely a compromise, or halfway house, between the perfect enamelled or *glacé* print and the plain albumen surface, and it is resorted to as an expeditious and cheap method of approximating, in a small degree, to the smooth, polished, *glacé* surface of the other. There are, however, numerous classes of photographs for which enamelling is quite unsuitable, these being, speaking in general terms, such as are of large dimensions; for example, collodion transfer enlargements, which, when stripped off polished glass and issued in that form, are simply vulgar—a vulgarity from which they are not always redeemed even by loading them with oil colours. For the highest class of large photographs it is probable that a surface as nearly matt as is consistent with preventing the image from sinking-in will ever be most preferred. The unglazed surface of the platinotype will always secure for it a high degree of admiration, while the carbon system is so facile as to be readily amenable to any requirement, from the most exquisite enamel-like polish to a canvas-like coarseness of surface.

While on this subject, we may observe that of all the various methods of securing the highest degree of brilliance, conjoined with the most absolute matt surface, none, as applied to silver printing, have surpassed or, probably, even approached to the Brinckerhoff "porcelain paper." This was introduced (nearly twenty years ago) under circumstances from which a prosperous career was augured; but, for commercial reasons connected with the patent—so, certainly, it was said—it became lost to the world just as the demand for it arose. No patent now bars the way. It is prepared by dipping the paper in a hot emulsion composed of three ounces of gelatine, six ounces of kaolin or terra alba, and a gallon of water. When dry, or partially so, it is immersed in a solution of alum or tannin to render the porcelain sizing insoluble.

A few years ago there was quite a mania for applying encaustic paste to the surface of photographs, with a view to impart a species of polish, and with an expressed hope of conferring durability. This was deposed by the introduction of the hot burnisher, which, like the use of double-albumenised paper, was adopted as a means of securing the highest surface by means short of actual enamelling.

The experience of the speaker whom we have quoted relative to the more rapid fading of enamelled than of plain albumenised prints is not borne out by such specimens of *glacé* work as we possess. We have examples of enamelled photographs produced long anterior to the introduction of alkaline gold toning; and candour compels us to say that, as regards fading, they are in quite as good a condition as some taken within the last five years on plain albumenised paper by a London photographer who is justly credited with being a master of the technics of his business. Nor have we ever seen, or even heard of, the fading of a photograph induced by enamelling. The encasing of the albumenised surface of the photograph in gelatine, and thus aiding in preventing the access of deleterious atmospheric influences or noxious gases to the image, should, in reality, conduce to the permanence of the image; and we believe that, if skill as well as care have been brought to bear upon the operation of enamelling, the photograph will be rendered more permanent by this treatment than without it.

We are quite aware of all that was claimed for an application of collodion as a varnish to prints, a few years since, with a view to imparting a greater degree of stability to them, and we are further aware that an effect was produced quite contrary to that anticipated and desired; but in enamelling, as now practised, inert gelatine alone comes in contact with the image, although collodion takes a part in the formation of the enamelling film as an external coating. But from the very nature of the modern methods of enamelling the collodion is rendered in the purely pellicular form, and the ether and alcohol are all evaporated previous to its being brought in juxtaposition with the gelatine which is sandwiched in between the print and the collodion, so that this latter is thus doubly incapable of affecting the stability of the photographic image.

From the foregoing considerations it will be seen that we do not sympathise with the remark made at the Glasgow Photographic Society, the substance of which we gave at the commencement of this article.

ANIMAL PORTRAITURE.

It appears to us that the obtaining of correct portraits of domestic animals—we have in our mind when thus writing horses and dogs more particularly—is, comparatively speaking, a neglected art. Mr. Dixon has done for lions and tigers what a hundred others could do for dogs and horses, with both profit and *éclat*, and with a hundredth part of the trouble involved in the production of pictures so grand as the celebrated studies by that gentleman. That there is or would be a demand for such photographs scarcely admits of doubt. The wonderful pictures by Landseer do not owe all, nor even, we believe, the chief, part of their attractiveness to that human expression he so deftly conveys into their faces. Every Englishman loves a horse or a dog, and it is the portrait of the dog and not its expression that appeals to the public. Who is there that does not remember *Dignity and Impudence* (not the original title of the picture, by the way)? And is it not simply the portraits, in quaint juxtaposition and arranged with great art, it may be, of two dogs—a grand animal and its small friend—that compel admiration?

Yet, we think, most of our readers will agree with us that there is little in that particular picture which, granting the skill to design and the brain to conceive, could not be achieved by photographic means. What a run such a picture would have! We do not suggest an imitation of *Dignity and Impudence;* that would be base art. We merely allude to the picture as a guide to show the lines in which photographers might work; and we see no reason why a picture almost as effective should not be made by a photographer possessing artistic feeling and a love for animals.

The absence of colour, which is the characteristic of photography, would in this case be a positive advantage. It has been said—and, we believe, with considerable truth—that it was the engravings of Sir Edwin Landseer's pictures that made him so famous; yet we would not go so far as to say it was the skill of the engraver. No doubt his animal pictures were engraved with rare skill, but there was fidelity to the original painting as well. We have before us as we write a number of photographs of studies of heads of deer and sheep in coloured chalks by Landseer. Every touch of the master is shown and has been so successfully rendered in the photographs that no one would imagine the original pictures were coloured. They are as successful as the best engraving could be.

Again: photographic representations of animals, if well done, should form references of great value to breeders and lovers of all live stock. In this country the breeding of animals is carried to a perfection that is looked for in vain in any other land. A series of photographs of some animals that, in bygone years, were the foundations of a particular breed, would now be priceless, to fix the type and show the progress made. Similarly, photographs taken at the present time would be of value to the breeders of the twentieth century. Perhaps it might be a little difficult at first to get such photographs into large circulation, for there would be less chance of their verisimilitude being injured, as so often happens in a painting. He would be a very conscientious artist who could ignore his patron's hints to paint out any defects which the owner's skilled eye had detected. Let his subject be a sheep, and the end aimed at length of wool; a cow, and peculiarities of build; a dog, and special characteristics of coat and form—it will be strange if in a painting points of coat or build or form do not get exaggerated under the eye of the patron, if only by reason of the reiterated stress laid upon them.

At the present day, when books and periodicals are devoted to almost every hobby of this kind it is possible to ride, the need for correct photographs is great; for the engravings and chromolithographs that are employed for the purpose are often worse than useless. In no case, perhaps, is this more glaring than in canine portraiture. When we see shows held many times during a year, with upwards of a thousand animals exhibited in each, it may be guessed what a valuable property a highly-bred animal must be to its possessor, and we may be quite sure that no picture would be allowed to be sent abroad in which defects were at all accentuated; the consequence is the multiplication of thousands of really useless representations.

Whether for *genre* pictures or as technical portraits of typical specimens of breeds, the photographing of dogs might take a fairly important place. Unlike horses and cattle they can be brought to a studio, where all that is required can be done, and we feel confident that a ready sale would be found for pretty studies or more ambitious pictures, while an increasing demand would arise for portraits of celebrated or champion animals.

It requires, however, some little knowledge to take the latter class of picture, and considerable patience. The fancier will not be content with a picture only of his dog—he will require a portrait; and if certain points that he knows of (but which very likely the photographer does not) should be lost sight of in the portrait obtained he will not care for it. We do not think it would pay many professional photographers to undertake this class of work for private individuals unless very well paid or a large quantity were ordered.

As an example of what we mean, let us take a pug dog, one of whose "points" is to have his tail tightly curled and lying close to his body on one side. No picture would be accepted should "doggie" uncurl it in excitement or nervousness caused by his novel surroundings. A terrier, as a rule, is easily taken, and the pricking of his ears in the endeavour to attract him gives him a lively and terrier-like appearance; but the case is very different when a majestic Mount St. Bernard or a huge mastiff is the subject. They are too self-contained to be represented pricking their ears; and a photograph so portraying them, if not absolutely rejected, would not be cared for. Some dogs must carry their tails in a certain fashion. We have seen a picture, that has been largely sold, in which the photographer was commissioned to make a highly-finished opal picture with a "tail to order," and this opal was then copied from.

Again: the limbs must be straight and regular. No pretty positions will be allowed by the fancier, lest through the necessary foreshortenings the public should think the animal deformed. Finally: we must lay great stress upon getting the animal's body exactly "square" to the camera in all studio work; for, when any but the longest focus lenses are used, the slightest deviation from this position will place the body in perspective, so that if the head be nearest to the camera it will be magnified, while the hind-quarters will be dwarfed and appear weak. If the reverse be the case the head will look poor and feeble and the stern unduly proportioned.

For the professional photographer, as we say, we should think such work only worth doing on special terms; then he might make it worth while to spend time, and produce pictures likely to have a long, steady demand. For the other kind of canine subjects the ground is comparatively clear, and the successful worker in it should reap a rich harvest for the practice of his skill and patience in that class of work.

Our attention has been called by the inquiry of a correspondent to a slight injustice apparently done to Mr. B. J. Edwards in our advertisement of the frontispiece to our Almanac for 1884. As our correspondent suggests, many readers would be glad to know upon whose plates the "charming picture" was taken. We have pleasure in doing what is needful.

We shall next week have something to say on the subject of Mr. Geddes's remarks on *Halation* made before the Dundee Society, the report of which reaches us too late for this week.

We must not be understood to endorse all the speculations put forth in the interesting article of Mr. H. S. Starnes in another column; for, to tell the truth, we have scarcely yet had time to digest it or to define the exact meanings of his terms "counter-force to actinism" and "density." The term "actinism" has for years been discarded by scientific men, so that its "counter-force" must, from a scientific point of view, be a doubtful quantity, while, in the matter of "density," Mr. Starnes seems to get rather "mixed" between *optical* and *mechanical* density.

The state analyst of Boston, Mass., has devised what he considers a "more simple means of inducing rapid filtration" than any he has yet seen. He pumps air from a Fletcher's bellows "to *any* desired pressure," and applies the pressure by covering the funnel with a piece of glass an inch thick, six inches square, and provided with an india-rubber cushion cemented to it; through a hole in the middle of this plate he forces the air into the funnel. As this glass may weigh perhaps about three pounds, it would afford a pressure upon a funnel of three inches diameter of less than half-a-pound to the inch. The value of such a pressure we leave to our readers to gauge. This filter, if of any practical use whatever, is not likely to be serviceable for emulsion filtration.

An attempt is about to be made in the Senate of the United States of America to reduce the duration of the existence of patents to five years. It is believed the measure will be carried.

A continental chemist, M. Gruning, having found that the preparation of hydrobromic acid by the usual methods of distilling sulphuric acid and bromide of potassium, or sodium, always give an acid of indifferent quality, has devised a method in which pure phosphoric acid replaces the sulphuric acid. In a flask of about a pint capacity are placed three ounces of coarsely-powdered bromide of potassium, and five and a-half ounces of phosphoric acid of 1·304 specific gravity. A spirit lamp or Bunsen burner will supply sufficient heat to cause the acid to distil over. The first part of the distillate may contain hydrochloric acid from the presence of chloride in the salt, and in this case must be rejected.

We have often had occasion to draw attention to the use of alcohol in withdrawing water from gelatine films, whether in the form of gelatino-bromide plates or carbon prints, yet we see that an operation of an almost contrary nature is recommended, though the contradiction is more apparent than real. It is stated that alcohol can be dehydrated by suspending it in sheets of pure gelatine, which will gradually and slowly absorb the water. The alcohol remains bright and clear, though the gelatine becomes soft. The process is very slow.

Workers in special trades and professions have often been found to possess immunity from certain contagious or infectious diseases in a manner that is not always clearly understood. It would be an interesting problem to ascertain to what extent photographers might be so invulnerable to the attack of germs, seeing that they—at anyrate in the pre-gelatine days—almost lived in a special atmosphere, ether, acetic acid, hydrocyanic acid, and soforth being daily inhaled by them. One particular salt (hyposulphite of soda) would seem to offer special privileges to them, as it has been found by Dr. Duncan that both as remedy and prophylactic it is beneficial against diphtheria. In instances where districts were suffering from an epidemic of that disease he found that its further spread was arrested by the administration of small quantities of that salt to healthy persons.

We hope Dr. Duncan's views may be correct, for the prevention of this fell disease by such simple means would be a boon of incalculable value. We are, however, doubtful upon the matter; for we well remember the same salt being recommended, a number of years ago, as a certain prophylactic against the rinderpest at the time that complaint was devastating the herds of the country. It was found useless!

A somewhat singular result followed the recommendation to use hypo. at that disastrous period. Such an instant demand arose for the salt that the manufacturers could not supply all that was required. For a brief period the price (which, since the days of the discovery of its photographic usefulness, when it was worth a guinea a pound, had been a continually falling one) went up in a brief space of time to almost double the then average market price.

Since, however, all these impure atmospheres have almost departed from the *atelier* of the photographer, there may be less expectation of him enjoying any especial immunities; but a new hope may arise. Dr. Carter Moffat has designed an instrument called the "ammoniaphone," and Mr. T. Gilbert Bowick is its prophet. The latter gentleman has noticed that free ammonia exists in the air of Italy to a larger extent than "even in the atmosphere of many parts of the seacoast of other countries." A number of small lakes are largely impregnated therewith, and we know that Tuscan ammonia from the lagoons is an article of commerce. The doctor above-named is an ardent chemical investigator, and has been investigating for nine years in this connection. The logic is beautifully simple—Italians are splendid singers; they breathe more ammonia than the rest of the world. Problem: find a means of giving the same benefits to ordinary people, and the result will be equally fine tenor and bass, soprano and contralto. The audiophone solves it, and Dr. Carter Moffat proves it. His voice, originally very weak, harsh, and destitute of intonation, has by the use of the ammoniaphone become "a pure tenor of extraordinary range!" In the course of a decade England ought to possess an army of "pure tenors" if alkaline development continue.

Pandastic is stated to be made by burning, without injuring it, a mixture of bisulphide of carbon and hyponitric acid. It burns quietly with a brilliant white light, and, we read, may be used for spectacular effects to represent moonlight. The liquids are to be kept separate, and burnt, somewhat after the fashion of an oxyhydrogen light, by bringing them together upon a dish which has to be kept quite cool—rather a difficult feat, we should imagine!

Heliophanite, or sunshine, is the name given to the mixture when phosphorus is dissolved in the bisulphide—an addition which greatly increases the illuminating power of the flame.

Pandastic is scarcely a mixture advisable for use in the everyday practice of the photographer; for, under suitable conditions, it explodes with terrific violence. In truth, the mixture is devised specially as an explosive, and from experiments carried out at Cherbourg it would seem that dynamite was a harmless toy in comparison with pandastic.

We are forcibly reminded of Sir Edwin Landseer's picture of *Dignity and Impudence*—alluded to in another page—by an incident that has recently caused considerable amusement throughout the country and is going the round of the papers. An actor who in a Christmas pantomime "makes up" as the Right Hon. W. E. Gladstone has been photographed in character as the "Grand Old Man," and has sent a copy to the Premier, who, so far from resenting what the groundlings would term an impertinence, has honoured the actor with an acknowledgment through his secretary, who, in signifying the acceptance of the picture, was instructed to thank the actor for his courtesy, and to say that Mr. Gladstone had very much pleasure in accepting the photograph, which he thinks testifies to a clever impersonation. Professional photographers often tell their sitters they are not good judges of their own portraits, but in this instance we can bear testimony to the truth of Mr. Gladstone's verdict, for Mr. Bannister's "get up" is singularly like its prototype, and is deficient only as regards the feet.

CAPTAIN ABNEY, F.R.S.

In presenting, this week, the second of our series of portraits—that of Captain Abney—it is scarcely necessary for us to enter into any elaborate introductory remarks. Captain Abney has for many years past played such a prominent part in contemporary photographic history, and his name is so intimately identified with recent progress in the science, that our readers, one and all, must be perfectly familiar with all but his *personnel*.

It would be superfluous to allude in detail to the numerous contributions made by Captain Abney both to the literature and science of photography. In addition to many papers read before different scientific bodies, as well as original articles which have appeared in our columns, he is the author of several works on photography, and many communications from his pen have appeared in the *Philosophical Transactions*. For some years in charge of the photographic department of the Royal Engineers, it became Captain Abney's duty to direct the photo-astronomical operations of various government expeditions for the transit of Venus and eclipse observations; and, though his official connection with Chatham has ceased some years, he is still practically the chief adviser in such matters. On the relinquishment of his duties in the higher branches of the science, Captain Abney was enabled to devote more time to the practical side of photography—with what success his labours in emulsion phototography sufficiently testify.

Captain Abney is a Fellow of the Royal Society, the Royal Astronomical Society, the Chemical Society, the Institute of Chemists, and is on the Council of the British Association. Before the first-named Society he, two or three years back, delivered the Bakerian Lecture, the subject being a photographic one. He has just retired by rotation from the vice-presidency of the Photographic Society of Great Britain. Our portrait is from a photograph by Messrs. Adams aud Scanlan, of Southampton.

"ACTINISM AND WAVE-LENGTHS."

Before replying to the various questions raised by Messrs. Kirkby and Macdougald, in your last issue, I wish to say that I was perfectly aware that my statements were contrary to the generally-accepted theories of light. But old theories did not explain to my mind certain points which practice has proved to be facts. I therefore tried to the best of my ability to find an explanation for certain phenomena which have been discovered since the accepted theories of light were first put forth. The subjects of my articles were not written on the spur of the moment, but were the results of months of thought. They were written and published with a feeling rather of dread than of arrogance and self conceit, for which Mr. Macdougald evidently gives me credit.

Of course theories are only the *supposed reasons* for certain phenomena which practical knowledge proves to us to be facts; if theory will not explain these facts, so much the worse for theory. If anything is discovered which old theories will not explain we cannot alter the fact of its existence; the only thing we can do is to try to find a theory that will explain it. It is of no use thinking that the world is going to stand still, and that all the discoveries of the present day will be suspended just because they clash with the theories of fifty years ago, which were only the supposed explanations of certain facts that had been discovered up to that time.

I think theories are often started in the following way:—Someone gives a supposed reason for certain phenomena, others without going into the matter accept it as correct, and when it gets into the textbooks people do not think of questioning the matter; but, if anyone does, he is looked upon almost as a lunatic for doubting a well-established theory, when, perhaps, at first it was only given as a possible explanation, and no one has since thought of going into the matter. How often, in the history of an invention, do we not find that the casual hint of another person will overcome a difficulty which had, perhaps, cost the inventor months of thought without giving him the key to the mystery.

The reason my articles were written was to give a few hints to far wiser heads than mine as to the direction in which I thought an explanation could be found for certain facts that have been discovered of late years in connection with photography. My reflecting lamp—which was only a little rough deal box and a piece of tin—*has* served as a hint to Mr. A. Cowan in making his lamp, so that he has been able to expose a rapid plate for *fifteen minutes* to a safe light, besides having a more luminous light to work by than hitherto. He had previously obtained a deposit in *five seconds*. Mr. Cowan tried the idea practically, with the above excellent results; but Mr. Macdougald has endeavoured to see what bearing the subject has on old theories first, without considering that one ounce of fact is worth a ton of theory.

About forty years ago the photographic experimentalists of that time gave certain theories, or supposed reasons, for the action of light on different salts of silver. In their experiments they found that, when copying the solar spectrum on a surface of iodide of silver, the actinic power of light only affected the film where the violet, indigo, and blue rays fell, and that the green, yellow, and orange rays had no power on the film. They also found that a bromide of silver film was slightly sensitive to green; but, as that colour could be made with blue as one of its component parts, they therefore called violet, indigo, and blue actinic rays, and supposed that these three colours were themselves the forces that acted on the

CAPTAIN W. DE W. ABNEY. R.E. F.R.S. &c.

INK-PHOTO, SPRAGUE & Co LONDON

film, and that actinic and luminous spectra were totally distinct from each other, and that light was split into three divisions by the prism, namely, heat, luminous and actinic rays. Since that period these theories have scarcely been questioned. We have gone on accepting them as correct without asking how far later discoveries have affected them.

But what important discoveries practice and experiment have brought to our knowledge during those past forty years! For instance: we have found actinic force not only passing through red and yellow glass, but Captain Abney and others have found it, even with the ultra-red rays, beyond visible light. How will the old theory of the three actinic rays explain why actinic force is found at the other end of the spectrum? How is it that a bottle of collodio-bromide emulsion can be placed in bright daylight for hours, and, after well shaking up the bottle and coating a plate in the dark room, that a perfect picture can be obtained on development, showing only a slight trace of fog.

Again: how is it that by putting a gelatine plate or emulsion in a bath of bichromate of potassium we can eleminate fog, even when produced by light? How is it that friction will have exactly the same effect on a gelatine film as light? How is it that (as mentioned by the Chairman of the Leeds Photographic Society the other day) a gelatine plate can be exposed, and after having been put aside for a time exposed again, without any trace of the first picture being found on development? Or how——, but I think I have given sufficient questions for the present for Mr. Macdougald and his well-established theories to answer.

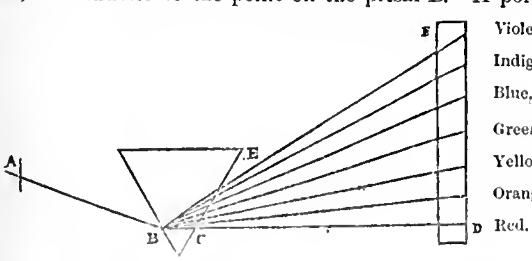
I have been working out experiments on these subjects, and have been able to find, to my satisfaction, solutions of them all; but they tell so heavily against the present accepted theories that, for weeks past, it has been a grave question to my mind whether it would not be better for me—a young experimentalist—to drop the subject rather than have to fight, at first alone, against these old-established theories and prejudices, to say nothing of running the risk of being the butt of attempts at scarcely-veiled sarcasm, of which Mr. Macdougald's articles are such fine examples. He says that I have the "courage of my convictions." What else *can* he expect? If I did not say what I thought where would be the use of thinking? Would he have me wait until he and the well-established theories have explained the various difficulties which I have mentioned above?

But to go to a more pleasant subject, viz., to reply to the interesting questions put to me by Mr. W. Horseman Kirkby.

Firstly: Does red glass bring the various wave-lengths of light all to one length in their passage through it? or does it absorb all the other colours but that of red?

I hope to prove farther on that the former is correct. To my mind the supposed absorption or filtering out of all rays but the one colour has always been the weakest point in the generally-accepted theory of light, and is one that I have never seen satisfactorily explained. Why should the action of light be different to everything else in nature—even to that of sound? If all the other rays but the one are filtered out what becomes of them? I think even the prism shows that my theory—that wave-lengths are a counter-force to actinism and are governed by the density of the substance which transmits the light—is correct.

We will suppose that a pencil of sunlight has passed through a hole, A, in a shutter to the point on the prism B. A portion of



this pencil of light is refracted to C, and then on to D, to form the red end of the spectrum. In its passage it has to pass through the least dense portion of the prism, so that the loss of power in passing is less than it would be in passing to any other part of the spectrum. But there are other portions of the pencil of light passing through the prism at various angles of refraction, right up to the point E, and then on to F, which forms the violet end of the spectrum. Now these portions have to pass through a gradually-increasing density in the glass of the prism which will absorb a corresponding increase of the propulsive power from B. This will explain why the wave-lengths, or counter-force to actinism, gradually decrease from the red to the violet end of the spectrum; but the propulsive power of the various rays when starting from the point B would be equal.

Perhaps it would help to make my meaning plainer if I endeavoured to represent the various powers of the wave-lengths by numbers. Let us suppose that each ray at the point B is equal to 15 parts: 5 of these parts in passing from B to C will be absorbed, which will leave a force equal to 10 at the point C, which number would represent the power of the wave-length at the red end of the spectrum; but the light in its passage from B to E would absorb (let us say) 10 parts, which would leave the counter-force to actinism at the violet end of the spectrum at 5 parts, or half the wave-power of the red. Any transparent substance which is of exactly the same density as the prism from B to C will transmit red light; or, contrariwise, if any substance transmit violet light, the ray of light has in its passage through the medium met with the same resistance as it would in passing through the prism from B to E.

From this I argue that coloured glass—say red—does not absorb all rays but the red, as maintained by old theories; but that light in passing through this coloured medium has lost the smallest amount of power in its passage, and has, therefore, the strongest counter-force to actinism remaining. The various colours of the spectrum would, therefore, be caused by the amount of force which is taken up in passing through the prism at the different angles of refraction.

Secondly: Are the combined wave-lengths of yellow and green greater than that of red? I saw the force of Mr. Kirkby's objection when I wrote the paragraph, but it was the only way I could see of explaining it. If we put pieces of yellow and green glass between a sensitive plate and white light the combined counter-force to actinism of the two glasses is more than if red glass were used alone; but the light passing through the two glasses appears to the eye almost a white light, or at least but faintly coloured. This matter seems to me to be governed by the same laws as those which, under certain circumstances, produce from the colours blue and yellow, pure white light.

Thirdly: By using quartz lenses I mean that a gelatine film will be found to be more sensitive to the violet rays than if glass lenses are used.

Fourthly: I should have said that a corresponding amount of the boiled gelatine should be taken, instead of the few grains of gelatine which are boiled with the silver bromide during the preliminary stage of emulsion-making. Thus, if a formula gave twenty grains as the necessary weight of gelatine, we should take one ounce of the boiled gelatine in lieu of them. Of course the bulk of the gelatine should not be boiled. The reason, I think, that this way of preparing the emulsion is best is because one only requires to heat it to about 130° Fahr., so that the particles of the silver bromide cannot sink to the bottom of the vessel and "club together" as easily as they would if the gelatine were made more fluid by raising it to boiling-point.

In a future communication I will reply to Mr. Macdougald's questions. However, before then I hope to have the pleasure of reading his paper, which is to "settle once and for all the vexed question of dark-room illumination." HERBERT S. STARNES.

SODIC SULPHITE: ANOTHER VIEW OF THE QUESTION.

AN interesting article appeared in last week's number of THE BRITISH JOURNAL OF PHOTOGRAPHY, from the pen of my friend Mr. B. J. Edwards, giving his reasons for objecting to the use of sodic sulphite in combination with pyrogallic acid as a developer. Whilst giving his motives for dissent, Mr. Edwards also gives what he states to be the *primum mobile* for its use; and this forms such a very small portion of the real facts that I ask for space to give once more, though I have often, by your favour, stated them in these columns, the actual reasons which induce those who use sodic sulphite to do so. They may be divided into three heads:—

1st.—That the negatives being of what is known as wet collodion colour, yield nearly double the number of prints that can be obtained from a negative developed with pyro. without sodic sulphite. "Time is money," and an enormous gain is thus found in publication work and in the execution of business orders in winter time.

2nd.—That the developing solution with sodic sulphite remains clear after use, instead of becoming at once, on mixing, thick and turbid, throwing down a solid opaque deposit, from the fact that oxidation commences when the ammonia and pyro. come together.

In plain English, instead of the pyro. being precipitated the sodic sulphite prevents oxidation, and gives the whole of the materials to be used in forming the image. Hence a great saving in pyro. and in time, because one portion will develope a number of plates. But one of the greatest charms in the use of sodic sulphite is that the most delicate fingers are kept perfectly clean, and dishes also. This alone would make its use certain.

3rd.—That the image corresponds in colour with the retouching pencil. Thus the exact value of each touch can be estimated. Again a great saving of time and labour.

Now, when all these considerations come to be added together, a strong case is shown. It is not correct that the use of sodic sulphite is decreasing—far otherwise. It is a large and important manufacture, both here and abroad, and its use is daily increasing. Some difficulty and discouragement arose at first from want of a definite formula; but since the adoption and full recognition of my method (as given in these columns) of making a boiling, saturated acid solution this has disappeared.

On the continent the colour of pyrogallic negatives caused the ferrous oxalate system to be adopted; but the sodic sulphite is now fast gaining ground. Excellent sodic sulphite is now being made by Messrs. Malétra et Cie, manufacturing chemists, Rouen, so that our French workers get it just as good as we.

Mr. Edwards says he finds that the scale of gradations of tone is distinctly shorter in negatives thus developed. In this I differ entirely from him. They are really shorter where anything like alum and citric acid is used to clear negatives, instead of using sodic sulphite. My belief, after having had excellent opportunities of judging, is that sodic sulphite is a distinct advance, and has remedied many of the minor objections to dry-plate work.

SAMUEL FRY.

STANNOTYPE.

No. III.

THE transparency having been obtained, the next step in the process consists in the formation of the relief or printing mould. For this purpose a tissue is employed many times thicker than ordinary carbon tissue, in order to afford a sufficient degree of relief, and containing a very small proportion of colouring matter to enable the light to penetrate to as great a depth as possible.

The special relief tissue is obtainable commercially, and differs from ordinary carbon tissue in being made in small sheets instead of bands, as the great thickness of gelatine required will not permit the long rolls of paper to be coated in the ordinary manner. For the benefit of those who may be desirous of making the tissue experimentally the accompanying directions are given. The following formula for the "mixture" is a good one, but the proportion of hygroscopic matter may be varied within certain bounds to suit particular circumstances, its function being merely to render the thick tissue pliable and prevent its cracking. Take—

Gelatine	4 ounces.
Glycerine	½ ounce.
Sugar	180 grains.
Colouring matter	*quant. suff.*
Water	16 ounces.

The character and quality of the gelatine employed is a matter of paramount importance. It must be a soft and easily-soluble kind, or the development of the relief will occupy an inconveniently-prolonged period; and it must be free from all traces of alum or other contaminations, accidental or otherwise, which are likely in conjunction with the bichromate to cause insolubility. Most of Nelson's will answer admirably, the cheaper samples of "flake" being quite good enough for the purpose.

Place the gelatine to swell in the water, having previously dissolved the glycerine and sugar therein; leave it for some hours in order that it may become perfectly soft, or at least as soft as the small quantity of water will permit. Care must be taken, especially in the earlier stage of the soaking, that the gelatine is pressed below the surface of the water and well stirred about in order that the absorption may be uniform, otherwise on applying heat the solution will take place slowly and with difficulty. When the gelatine has thoroughly swelled the vessel containing it is immersed in hot water, the contents being well stirred until completely dissolved, when the colouring matter is added.

With regard to the last no definite rule can be laid down as to quantity. The colouring matter might be omitted altogether, were it not for the difficulty—if not impossibility—of judging the progress of development of a colourless relief. It was at one time supposed that the colouring matter was necessary to prevent loss of sharpness by the spread of light in the gelatine film, but this has been found not to be the case. It will be seen, then, that, so far as the *formation* of the relief is concerned, the colouring matter plays a comparatively useless part; in fact, it may be said to be actually detrimental, inasmuch as by obstructing the action of the light it limits its power of penetration, and hence the depth of the relief as well as increasing the exposure necessary. The only rule to be followed is that the mixture when spread upon glass to the requisite thickness shall be just short of absolute opacity; that is to say, shall show daylight through when held up to the sky.

In order to arrive at this, actual experiment is, of course, necessary, as everything will depend upon the thickness of the tissue and the nature of the colour employed. It should be borne in mind that for the reasons stated above the quantity of colour, or, rather, the degree of opacity of the tissue, is capable of modifying the character of the relief, and may be utilised as a power for that purpose. Thus, the more opaque the tissue the shallower will be the relief, owing to the arrest of the light's action, and so a tendency to flatness is produced. For this reason a deeply-coloured tissue will be found more suitable for negatives with strong contrasts, and *vice versâ*. It follows that the substitution of an actinic colour, such as blue for black, acts in the same manner as reducing the opacity; whence blue tissue may be employed with advantage with very soft negatives.

Knowing the thickness of the layer of coloured gelatine which will be required to form the tissue, it is an easy matter to test for the quantity of colour required by examining a layer of the proper thickness held in suspension in water. If a measured quantity of any liquid preparation, such as those readily procurable at the artists' colourman's, be diluted with water until it begins to show translucency when placed in a glass tube of the necessary diameter, the end is gained. A slightly-modified plan is the following, which has been found to work with the quantities and measurements given in the present article:—Into a narrow test-tube, as nearly as possible half-an-inch in diameter, one ounce or any measured quantity of water is placed, and to this is added, drop by drop, the liquid colour until opacity is produced; if very concentrated, the colour should be first diluted. Proceeding in this manner it is found that a single drop of liquid colour of a certain make suffices to give the requisite opacity to two and a-half ounces of water, from which data it is easy to calculate the quantity necessary for any bulk of mixture.

As to the colour employed: the choice is immaterial, though Indian ink or China ink is usually selected, chiefly on the score of convenience. Prussian blue is frequently employed; in fact, any colour may be adopted if due attention be paid to what has been said regarding the modifying effect of the colour upon the opacity of the tissue and the bearing that this will have on the depth and printing qualities of the relief. The mixture now requires filtration, which is an operation of the utmost importance, as the minutest speck of dust or other foreign material will produce a corresponding defect in the relief. In consequence of the thickness of the gelatine solution and its ready tendency to set, it is almost absolutely necessary to employ special means to retain it in the liquid state during filtration. The filtering medium should consist of, at least, four folds of muslin, and if the filter be placed in a warm oven, or near a bright fire, the heat will suffice to keep the mixture fluid. Felt and similar filtering media are useless for this purpose unless the filtration be performed under pressure. The exhausted-flask arrangement of Mr. C. Beckett Lloyd answers for the purpose; but even with that the filter soon becomes clogged.

The mixture being ready there are several ways of converting it into tissue, the object to be aimed at being the production of a perfectly even layer of considerable thickness. The method recommended by M. Léon Vidal consists in immersing in warm water a sheet of glass, and a sheet of good, even photographic paper. In a few minutes both are withdrawn, placed in contact, and the surplus water removed by means of the squeegee. The paper-covered glass is placed upon a previously-prepared levelling-stand to receive the mixture, which is spread by means of the finger or a glass rod. When set the plate is put in a drying-closet or warmed room until thoroughly dry, when the paper carrying the gelatine film is separated from the glass. This plan has the disadvantage that the upper surface, which is exposed to the air in drying and may attract dust, besides exhibiting other defects, is the one which comes in contact with the *cliché* in printing, and thus retains on the relief all imperfections. It is, moreover, difficult to retain a sufficient quantity of the mixture on the plate.

Mr. Woodbury's plan consists in pouring the mixture into shallow plate-glass trays previously coated with ox-gall and accurately levelled; when set these trays are placed on the racks in the drying-room—an apartment heated to about 70° Fahr.—where they dry in about a couple of days. Sheets of paper of the required size are then wetted and squeegeed on to the dry gelatine surface, and the compound films again placed on the racks, where they now dry in about a couple of hours. By performing the first drying before applying the paper a great saving of time is effected, as the surface of gelatine is then freely exposed to the atmosphere. The small quantity of water subsequently absorbed by the gelatine from the paper is rapidly got rid of. The tissue may be kept in this state until required for use, when, previous to sensitising, it is stripped from the glass by inserting the point of a penknife under one edge, when the whole comes away with the greatest ease and with a beautifully-smooth surface. The smooth surface is a double advantage: it secures close contact in the printing, and, having been in contact with the glass, has been protected from dust and other defects.

The method we have ourselves adopted is substantially Mr. Woodbury's. Plate glass is polished with wax or talc, collodionised and converted into a dish by means of strips of paper pasted round the edges. This is then levelled and filled with a measured quantity of the mixture as already described, and treated in a similar manner.

With regard to the thickness of the tissue it is impossible to lay down any definite rule, as, like the variation in its opacity, so its different thickness has a bearing on the depth of the relief. Too thin a layer must be avoided, as it is impossible to make up for its want of depth; too thick a layer is only objectionable on the score of economy, and in taking longer to develope, dry, &c. A convenient thickness for the gelatine film when dry we have found to be from one-twenty-fifth to one-twentieth of an inch; with the mixture of which we have given the formula such a thickness is obtained by allowing for each square inch of surface about forty minims of the mixture. Thus for a 12 × 10 plate about ten ounces of mixture will be required; and this will form a layer, when wet, of the depth of about one-fifth or one-sixth of an inch, drying down to about one-quarter of that.

The drying of these thick films is a tedious operation, unless hastened by heat or by means of chloride of calcium. It is worthy of observation, however, that as the sheets of tissue are not sensitive to light they may be dried in any open and warm room, under which circumstances thorough desiccation occurs in, at the most, two or three days; any dust adhering during the drying is of little consequence, as that surface of the film is washed away in development.

Next week the sensitising and subsequent operations involved in the formation of the relief will be dealt with.

DARK ROOM ILLUMINATION.

In continuation of the subject of dark room illumination: the method I propose is based upon an assumption that it is vain to attempt finding a light that has no action on a gelatine film. What is wanted, and what I think is ultimately to be found, is a light-giving material which will impart the highest proportion of sight-giving power as compared with its action on a sensitive plate. In searching after such a light we are not pursuing a shadow, but something capable of being found and utilised.

Looking at the matter theoretically, there must be some part of the solar spectrum which gives out light having the property mentioned; that is, the highest possible sight-giving power as compared with its power of acting on a gelatine plate. That being so, there are two things to be done:—

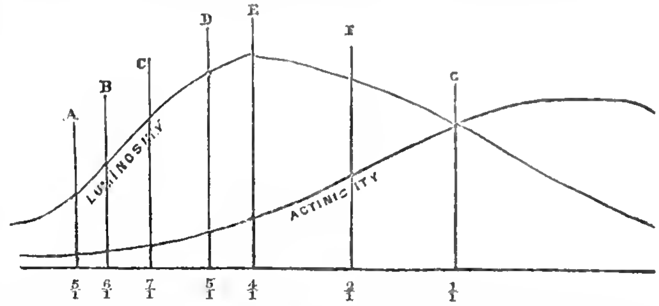
1. To find the position on the spectrum where this is true.
2. To find a material or combination of materials which will give a light nearly approaching the tint already found.

Now these two proportions may, to some, look very like two propositions—1st., to find a fortune; 2nd., to find the best way of keeping the same! But to me the first two propositions are infinitely easier of solution than the second.

The great difference of opinion as to lighting, and the greater difference in the various shades employed by photographers, show that the subject is one which has never been thoroughly investigated on a scientific basis, or at least that no authoritative fiat has gone forth sufficiently powerful to convert the majority.

The way I propose to set to work is to erect two curves—one representing the luminosity or lighting power of the spectrum; the other the actinicity or plate-acting power of the spectrum. Having done so, the point having the greatest proportional lighting power is easily found by a little measurement and calculation.

It will be seen that, although the luminosity is greatest at E, the proportion of luminosity to actinicity is only $\frac{4}{1}$, while at C, although



the luminosity is much lower absolutely, the proportion is $\frac{7}{1}$. At no other part in the spectrum is the proportion so high, and, therefore, this part of the spectrum will give the greatest amount of light compared to its action on a sensitive plate.

What remains to be done is to find a medium answering to the colour of the spectrum at the point C; and this may be effected by passing a number of pieces of glass or other material, supplemented with paper if necessary, in front of the spectroscope, observing when there is a near approximation to the tint wanted.

The only other way that I know of arriving at the same result is the lengthy process of actually trying the various light-giving media and their action on gelatine plates—a kind of "survival of the fittest" process, somewhat akin to that of a man marching over a field and knocking his toes against all the stones to find out which is the hardest.

From two curves which I have erected, and which I think are nearly correct, I make out the tint required to be identical, or nearly so, with the β or orange line in the lithium spectrum.

G. D. Macdougald.

ON THE VALUE OF DIAPHRAGMS IN PHOTOGRAPHIC LENSES.

[A communication to the Photographic Society of Ireland.]

Most amateurs on commencing landscape work are troubled by the various stops which are supplied to the lens they possess not bearing any definite relation to the full aperture of the lens, so that, even if they know the rule to square the exposure for each decrease in size of the stop, they are still in trouble on account of the numbers on them not having any definite relation; and, further, if they try to employ another lens after having got used to their own they are rather worse off than before—for a time, at least. All photographers know that different lenses possess different rapidities; but yet this difference is more apparent than real, the whole difference lying in the stops.

In order to define accurately the size of a diaphragm used in any lens a formula is usually given for it, it being generally written as an italic "*f*" divided by some number; for example, $\frac{f}{10}$. This simply means—assuming that *f* means "focus"—the length of the focus of the lens divided by some figure that will give the size of the stop. Thus, if we have a lens of eight inches focus, and find by measurement that the largest stop be half-an-inch, on dividing the latter into the former we get sixteen as a result. Now write this as $\frac{f}{16}$, and we have the exact relation of the stop to the focal length. If another stop measure one quarter inch, the resulting fraction will stand $\frac{f}{32}$. By this simple means we see at once that the latter stop is one-half the size of the former, and that it will require four times the exposure.

Again: should it be necessary to have two different lenses in use, as it may not always be possible to have them of the same class—a short-focus symmetrical and a long-focus single landscape lens, for example—some means of comparing the rates of exposure should be at hand. In two such lenses at present in my possession I find that the full aperture of the single lens is $\frac{f}{10}$, while that of the symmetrical is $\frac{f}{8}$. On squaring these the relation stands pretty near as one is to one and a-half, so the latter lens requires an increase of exposure in that ratio. From this we see that all lenses possess the same rapidity, *provided the stop bear the same relation to the focus*—the great difference in the rapid lenses over the slow ones being that they can work with much larger aperture.

In order to equalise the various makers' lenses the Photographic Society of Great Britain have recommended what is termed a "uniform system" of numbering the stops. They recommended that all stops having the formula $\frac{f}{4}$ be stamped with the figure 1—this being the largest aperture that it is at present possible to make

—and every other stop with that number which would indicate the exposure in comparison with the standard $\frac{f}{4}$, without regard to whether all the stops can be found in the lens or not.

The figures would run thus :—

$\frac{f}{4}$	$\frac{f}{5\cdot6}$	$\frac{f}{8}$	$\frac{f}{11\cdot3}$	$\frac{f}{16}$	$\frac{f}{22\cdot6}$	$\frac{f}{32}$	$\frac{f}{45}$	$\frac{f}{64}$
1	2	4	8	16	32	64	128	256

The intermediate ones can be calculated in proportion. If this were carried out by all makers, no matter what lens we take up the exact rapidity can be seen at a glance.

To those of my readers who prefer comfort in the field to a little trouble I would strongly recommend a slight modification of the above. I have tried it for the past summer and found it of great help:—

Firstly: Calculate the formula of the various stops in the lens. Select three or four of them that bear a direct proportion to each other, so that the exposure may be—say, the middle stop—four times the full aperture, and the small one four times the middle, consequently sixteen times the full aperture.

Secondly: Calculate from the table of *Comparative Exposures*, compiled by Mr. W. K. Burton, in THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC, page 259, and carry it to the field. I have mine pasted round the focussing-glass. If every exposure be given in accordance with that list, and a note of each exposure be kept at the same time, much may be done in getting accurate ideas of dull and cloudy weather, &c.

The following are a couple of lines from the above table for the average full apertures of the rapid rectilinear and portable symmetrical lenses :—

	Sea and Sky.	Open Landscape.	Landscape with Heavy Foliage Foreground.	Under Trees.	Fairly Lighted Interiors.	Badly Lighted Interiors.	Portrait in Diffused Light out of doors.	Portrait in Good Studio Light.	Portrait in Ordinary Room.
	Sec.	Sec.	Sec.	Sec.	Sec.	Min.	Sec.	Sec.	Sec.
$\frac{f}{8}$	$\frac{1}{40}$	$\frac{1}{12}$	$\frac{1}{2}$	40	40	8	$\frac{2}{3}$	4	16
				M. Sec.	M. Sec.				
$\frac{f}{16}$	$\frac{1}{10}$	$\frac{1}{3}$	2	2 40	2 40	32	$2\frac{2}{3}$	16	64

As an addendum to the above I may add some of the results I found during the past summer and present winter, in the hope that other observers may go on in the same path and check my results. The above figures appear correct for a "ten-times" plate in bright sunlight in summer, between the months of April and September.

In an ordinary dull, cloudy day in summer I found it necessary to double the exposure. After four o'clock p.m. the light gets much worse, so it is necessary to double it then also, even if the sun be shining brightly. After five p.m. treble exposure was given. On a bright, sunny day, this winter, at mid-day, I got good pictures with four times the normal summer exposure.

While I know that many may not agree with me that the above simple rules are any use, yet I cannot help thinking that the fact of having them so tabulated is a great help in practical work; and, even if a little error do creep in, it does not do any harm, as double or half the correct exposure does not make very much difference, a slight modification of the developer making matters right again. Even in cases where I accidentally gave four or five times the correct time the plates were still saved by intensification. I never completely lost a plate from over-exposure unless I gave it from ten to one hundred times the time allowed in Burton's table. This ought to give enough margin for inaccuracies in the figure.

In conclusion: if any present have found different results to the above I am sure they will let me know, as I would be very glad to get as near as possible to the correct figures. JOHN A. SCOTT.

A FEW "TALES OUT OF SCHOOL."

A VISIT northwards early in January would seem to be a little out of place, but when one considers that residents in most of the Scotch towns rusticate for some months in summer, either at the seaside or inland, this fact creates a difficulty as to reaching them, and photographers are generally busy with tourists, so that they have little time for gossip. I visited my namesake, Mr. J. Henderson, of Perth, and enjoyed his hospitality. That gentleman, like myself, has nearly abandoned wet collodion; and, in spite of the want of uniformity in the plates he uses (which is also my own experience), produces splendid work.

A little party of us ran down to Dundee to pay our respects to the great whale. Here a travelling photographer was doing a roaring trade in positives. A chair was placed close to the mouth of the whale, and the open jaws served as a background. One thing I noticed, namely, that his exposures (six to eight seconds) seemed lengthy. Imagine our surprise to find that he was working without any diaphragm, and that the photographs were fearfully over-exposed. A ferrotype plate cut up served to make a stop, and we had the satisfaction of seeing his teeth (the whale's) much sharper.

No complaints as to slackness of trade were made—in fact, all agreed that the last season was "no bad;" but to me it is the credit system that is bad. Photographers have to wait at least twelve months for their money. I noticed that in several cases cash at sitting might have been obtained. I remember having my portrait taken by an Edinburgh photographer some twenty years ago. The photographer sent the *cartes* home to my hotel and left them without the cash, having no idea who I was. I would advise my northern brethren to keep in mind that "a bird in the hand is worth two in the bush."

I heard much to interest me from Mr. Tunny, in Edinburgh, of his American experiences. I saw the wonderful waxed-paper negatives taken upwards of thirty years ago, seemingly as perfect as when newly done—certainly photographically as good as any gelatine negatives taken at the present time.

I had the honour of attending one of the meetings of the Edinburgh Photographic Club, and there was much energy and competition displayed—indeed, second to no other club. Mr. Smith exhibited his bijou camera, and negatives taken with it while in Italy last season. The discussion was principally on a safe light for the dark room. Many lamps were exhibited, and a short, suggestive paper was read by Mr. Jameson on that subject. I was invited by the Chairman, Dr. Thomson, to offer some remarks, but Mr. Tunny quite "took the wind out of my sails" by asking me not to say anything until I had heard all. The wisdom of Mr. Tunny's suggestion I very much question. Mr. Jameson and I are working on the same tack, and I do not object that Mr. James *Sun* should shine above or eclipse Hender *Sun*. All I want is a good, safe light (not yet found). Allow me to say that no light will suit me that will affect the most sensitive bromide of silver, or render luminous a very sensitive sample of phosphorescent sulphide of calcium.

My entertainment socially by the Edinburgh Photographic Club has been so well told in these pages that I need scarcely say more, except that the whole affair took me so much by surprise that I was rendered almost speechless. I heartily thank all for the trouble and considerable expense incurred on my behalf. My wife quite agrees with me that the kind expressions towards herself were merited, but not those bestowed on the writer.

Mr. Marshall Wane's magnificent gallery has, I fancy, been noticed before. That gentleman does not believe in washing his prints very long. At his establishment I saw a large rotary washing machine at work, driven by a water motor. The time employed to wash is about twenty minutes. The water is turned off, and a few turns more by hand suffices to nearly dry the prints. Mr. Wane prefers water power, as it does not neglect the work. Another "dodge" I saw at Mr. Wane's which may be new to several of your readers, namely, a chair for supporting the sitter while taking vignettes. The chair has two backs —one in front of the other. The front one is hinged to the seat, and a quick-acting screw is fastened to this from the back, so that when the sitter is seated one or two turns of the screw brings the back to the sitter. Since my return home I have rigged up one, with this difference—that I have fastened two backs together by a hinge, these backs having a vertical movement, which I think is an advantage.

In Glasgow, as regards the weather, I had my usual luck—that is, when not raining it snowed! But once under the hospitable roof of Mr. George Mason, of Sauchiehall-street, the elements were defied. Anyone visiting Glasgow should call and see his stock of photographic goods. The Glasgow Photographic Society received me with open arms, and added to my vanity by electing me an honorary member.

Visiting the veteran photographer, Mr. James Bowman, who shook me cordially by the hand, and, after a little chat on a subject very interesting to both (the phenomenon called "spiritualism"), I was invited to look round and see if there was anything novel. One thing worth mentioning is a negative drying-frame. It is a copper box twenty-four inches high, twenty inches wide, and two inches deep. Across this are several laths (adjustable) to rest the plates on. At one end, about midway, a pipe is attached to a small boiler over a Bunsen burner. By regulating the supply of gas any temperature may be kept up uniformly. At one of the lower corners is a small outlet to allow the condensed vapour to escape, and I saw a vessel placed to catch the distilled water. I think a good name for this apparatus would be "a double-distilled negative drier." Mr. Bowman has a convenient arrangement in his printing rooms—four or five large tables, each about seven feet by five, lathed across to support the printing-frames. The tops of these tables are swung on pivots like a table mirror, so that they may be inclined at any angle in fine weather. The printing is done in the open air, and, on a shower approaching, the tables, being on wheels, are moved under glass.

My next visit was to Mr. John Stuart, of Glasgow, and Provost of Helensburgh. There I saw his superb new studio, beautifully fitted, and almost indescribable. His backgrounds were particularly noticeable. If all the backgrounds that I have seen (some miles) bearing Seavey's name are genuine, he must already have considerably overdrawn Rubens. Photographers get good commissions here. Fancy an order for some hundreds of large carbon pictures about four feet by three! All the printing is done at Mr. Stuart's Helensburgh studio. I observed that, although the day was sleety and wet, no moisture seemed to get into the glass-room. This was explained by the fact that the glass was bedded-in only, no putty being used outside. The edges of the glass and bars are well painted, and, while the paint is tacky, powdered mastic is dusted on. Mr. Stuart's experience of this method extends over some years. Half-a-day's sail on the Gareloch, accompanied by Mr. and Mrs. Stuart, convinced me that many pretty "bits," especially the snow-tipped mountains, could be secured even in bleak January.

I fancy my little account has got somewhat "mixed." If I have not given credit to whom credit is due, I beg they will not blame me but my memory and the want of a note-book. Thus ended a very pleasant trip. I would strongly recommend photographers who cannot spare time in summer to run north in winter. They will not experience any trade jealousies, and always find something to learn.

A. L. Henderson.

COPYRIGHT LAW IN BRIEF.

Copyright means the sole and exclusive right to copy, reproduce, and multiply, by any means and in any manner, any original painting, drawing, photograph, or other work of art.

Copyright accrues to the *author* of a work of art by virtue of authorship, and lasts for his or her natural life, and seven years after death.

As soon as the copyright in any work is registered in accordance with the provisions of the Act of Parliament known as Vic. 25 and 26, cap. 68, it becomes personal estate, and can be sold, assigned, or demised, just the same as any other personal estate.

A properly-registered copyright will enable the owner to take proceedings and recover penalties against anyone who, without permission, copies or imitates, wholly or partially, the whole or any portion of the orfginal work of art to which such copyright applies.

Under the Copyright Act an original negative, or the photographic copy of it, is considered a work of art.

A photographer can make a negative of a landscape, of natural objects, of architecture—in short, of any object or objects in which there is no copyright—and the correct registration according to the Act will secure to him his copyright in that particular negative or photograph. He cannot, however, prevent any other person making another negative of the same objects, even from the same point of view, and as nearly as possible under the same circumstances.

If a photographer take the portrait of a person of eminence—a member of the Royal Family, musician, actor, &c., &c.—copyright can only be secured by a signed agreement, made at or before the time of sitting, between the person whose portrait is made and the person who makes the negative. If this be not done, and the names of the parties to the agreement properly filled up in the registration form, there will be no copyright.

If a *group* of persons be taken, it will be necessary to have the signature of every member of the group to the agreement.

Seeing that copyright accrues only to the *author* of the work, a principal cannot send out his operator to execute his commission and then take the copyright to himself; it will, in every case, accrue to the author of the work.

In the present state of the law it would seem to be absolutely necessary that where a principal does not himself execute the work, or have it done under his personal direction and supervision, he must have an assignment of the copyright from the person he employs, and who, in the eye of the law, is the true author.

Portraits taken in the ordinary way of business have no copyright, except by special agreement; but that does not give the right to the photographer to print from the negative for his own purposes. He is bound to use the negative, if he retain it, only to the order of his employer.

The owner of a copright picture cannot have it reproduced or copied unless he *also* possesses the copyright.

Authors of original works should secure copyright by registration as early as possible; illicit copying of an original work before the copyright is registered is actionable, and confers no copyright.

In transfers of photographic businesses each copyright negative must be duly assigned, and the assignment registered at Stationers' Hall. Unless this is done the purchaser of the business does not acquire the copyrights.

Proper copyright forms can be obtained for one penny each at Stationers' Hall.

The penalties for infringement are very heavy, the offender upon conviction being liable to be adjudged to forfeit a sum not exceeding ten pounds for each copy sold or offered for sale.—*Autotype Notes.*

SOCIETY OF ARTS.

At Mr. T. Bolas's third lecture at the Society of Arts on Monday evening last, the 11th instant, which was the concluding one of the series, the chair, as on the two previous occasions, was occupied by Mr. B. F. Cobb, Vice-President of the Society.

Mr Bolas, referring to the anastatic process, submitted for examination some prints obtained by a recent modification of this process. Whereas in the anastatic system, as originally practised, an affinity was established between the dried-up ink of any printed matter and fresh transfer ink applied by careful friction with a roller, in the new modification the transfer ink was applied in a fluid form, adhering only to the printed portion, and not to the paper. This was then transferred to a lithographic stone or zinc plate, and impressions obtained by the usual process of lithographic printing, or, if desired, by converting the plate into a phototypic surface.

Long previous to the introduction of photography, mechanical appliances had been introdued to effect the conversion of objects in relief into lines adapted for the requirements of the engraver or etcher. Colour printing had also been applied to photolithography, and the lecturer directed attention to some excellent examples of this class of work by Mr. William Griggs, of Peckham, which were suspended on the walls.

Alluding to the prospective importance of phototypic over photolithographic processes, he (Mr. Bolas) said that any process whatever which could yield an impression in fatty ink was applicable for either of those two methods of printing, owing to the facilities which now existed for forming a raised typographic surface. Concerning intaglio or cavity printing from photographic sources, it was now only very little practised on a commercial scale. In 1859, Her Pretsch established works at Holloway for the purpose of practising this method of printing, the process employed being his own invention; but the photogalvanographic system was introduced before its time—the world was not ready to receive it.

Various applications of the stannotype process of Mr. W. B. Woodbury to the production of printing surfaces were referred to, and some of these were illustrated in operation. A stannotype plate having been inked was pressed in contact with a grained sheet of paper and an image in transfer ink obtained as the result. This image could be either positive or negative according to the nature of the stannotype original. In the course of various experiments a print in fatty ink was transferred to a wood block and handed round for inspection.

Two plates produced by Niepce in 1827 were submitted for examination, and were inspected with great interest. Niepce's process consisted in coating a plate of metal with bitumen and then subjecting it to light, by which certain portions were rendered insoluble. It was stated that surface blocks produced through the agency of bichromated albumen were now coming into general use.

The Goupil process of *photogravure* was next introduced, and it was stated that, while the precise method adopted was retained as a secret, there was every reason to believe that it was one closely allied to a process published several years ago by Mr. Woodbury, in which a grain was obtained by the mixture of a gritty powder with the gelatine of which the relief was composed, this being afterwards embedded in a metallic plate by pressure. Several excellent and suggestive specimens by Mr. Woodbury, executed at an incipient stage of the process, were exhibited.

The Waterhouse grained process was of a somewhat similar character to those just mentioned. The grain in this case was obtained by sifting fine sand upon a gelatine image while still soft, and brushing it off when quite dry, by which the surface was left in a granulated state. A specimen was exhibited.

Specimens of a grained process by the Autotype Company were shown, attention being directed to the affinity that, to judge by their similarity, seemed to exist between the latter process and that of Waterhouse.

Another process, concerning which no intimation of its nature had been published, was one by which Mr. Alfred Dawson had reproduced, with great excellence, a copy of an indian-ink drawing.

Mention was made, but no specimens exhibited, of a process of etching by Obernetter, in which an image formed of chloride of silver in a gelatine film was pressed in contact with a smooth plate of copper, the action resulting in the formation of chloride of copper in the metallic plate, which salt on being removed left the image etched.

Several applications of photographic printing to pottery and general ceramic work for burning-in were referred to; among others, some by Mr. Duncan Dallas. Several specimens of work in printers' ink by this gentleman were exhibited, including some of the first ever executed by him, and thus possessing historical value; also several examples of Dallastint copperplate work applied to pottery decoration, bearing dates 1863-65. One of these, burnt in by Copeland, of Stoke-upon-Trent, was stated to be the first application of a photographically-engraved plate to the ornamentation of pottery done in this country. Examples of Dallastint surface-block work applied to pottery were also shown; and we may here remark that at the close of the proceedings a *plaque*, upon which a photograph had been printed in ceramic "ink" five years ago by Mr. Dallas, and which had remained unburnt since that period, was fired in a gas furnace upon the table, with a perfectly-successful result, although kept so long.

In speaking of the applications of collotype printing, Mr. Bolas said it was almost incredible at what a low price these pictures were produced on the continent. As an example of this he exhibited two match-boxes full of wax vestas, and each adorned with a pretty and really creditable collotypic photograph, respectively, of *Cologne Cathedral* and a *View of Naples*, the two being purchased retail for one penny. With respect to this process he observed that the water-glass substratum of Husnik was now quite superseding the old-fashioned substratum formed by coating with thin albumenised gelatine and then exposing it to light. The specimens of collotype printing exhibited by the Autotype Company were, he thought, as fine as anything that could be produced.

At the close of Mr. Bolas's lecture, the CHAIRMAN offered the thanks of the members to that gentleman, and expressed the great pleasure it had afforded them to listen to such a series of practical lectures, in which so much matter had been compressed into a small space. This was seconded, and carried by acclamation.

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RECENT PATENTS.

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No. 2,987.—"The Easy Copying and Toning of Photographs and other Prints." ALBERTA M. F. CASPAR, of 200, Regent-street, London.—*Dated February* 8, 1884.

No. 3,026.—"Apparatus for Exposing Sensitive Plates in Cameras.' (Complete specification.) J. and A. G. HOPKINS, Hoddeston, Herts.—*Dated February* 9, 1884.

NOTICE TO PROCEED.

No. 5,947.—"Improvements in the Preparation of Photographs and Treatment of Drawings or Designs Printed upon Paper for the Purpose of Imitating Stained or Embossed Glass." GEO. RYDILL.—*Dated December* 31, 1883.

PATENT SEALED, FEBRUARY 8, 1884.

No. 3,948.—"Improvements in the Manufacture of Pliable Plates as a Substitute for Glass for Photographic Purposes." J. J. SACHS.—*Dated August* 14, 1883.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
February 19....	Bolton Club..................	Studio of the Club, Chancery-lane.
,, 20....	Photographic Club	Anderton's Hotel, Fleet-street.
,, 21....	London and Provincial	Mason's Hall, Basinghall-street.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

THE annual meeting of this Society was held at 5A, Pall Mall East, on Tuesday evening last, the 12th instant,—Mr. James Glaisher, F.R.S., President, in the chair.

The minutes of the last meeting having been read and confirmed, the following gentlemen were elected members of the Society:—Messrs. J. Desiré England, Norman May, John Henry Knight, and Robert S. Kidd.

The ASSISTANT SECRETARY then read the Council's report for the session 1883:—

The Council observed that during the year 1882 great mental activity had been exhibited in investigating the chemical relations of dry-plate photography. This activity had been followed by some reaction in the year 1883. There was now comparative rest; for, although it could not be claimed that the reactions were thoroughly understood, yet the practical results were so fairly uniform that the question had ceased to be a burning one. There had, nevertheless, been great activity during the past year, as would be understood by reference to the list of papers which had been read.

The Council referred with much satisfaction to the completion of the standard for flanges and screws, which had been under consideration in 1882. Actual gauges had been manufactured for the Society by Messrs. Whitworth and Co. and Messrs. Ross and Co., and these standards would be open to all engaged in mechanical photographic work. This marked the end of the year's proceedings.

The subject would receive further consideration at the photographic congress to be held at Brussels, to which delegates would be appointed by the Society.

It having been considered desirable to have an optical lantern, the Society had had two made—one, by Dallmeyer, for the oxyhydrogen light, and the other for oil. These formed part of the property of the Society, and, it was hoped, would assist in many investigations of photographic problems. Already on two occasions they had rendered good service. They had also been most successfully used at the evening meetings during the last exhibition.

The value of the technical meetings continued to be evident, the most regular attendants being gentlemen known as skilful observers; and it was to be noted that knowledge was freely communicated by them. Sometimes original ideas were brought forward. It was a notable feature of these meetings that the proceedings need not be confined to those present; country members could join in discussion by letter.

The exhibition of 1883 afforded very clear evidence that the introduction of gelatine plates into every branch of photographic work is an accomplished fact, and is one not to be regretted. The work had reached a high average of excellence, nothing fine having been done in collodion. Many considered that the last exhibition had been the finest held by the Society. A promise was held out of new work still better. No doubt the exceeding rapidity of exposure, enabling high artistic merit to be introduced, was the chief feature of the last exhibition. The success of the Monday evening lantern meetings had been very great, and the increasing interest in the matter was shown by the fact that the attendance had increased from 97 on the first night to 777 on the last. The Council would consider the advisability of setting aside more than one evening of each week for lantern work next year. The constitution of the jury for deciding awards had been altered, no painters being upon it this year. Very full statistics of the exhibition were then given, showing that the number of exhibitors, of pictures, and of visitors had increased since past years. There had been so much application for space that it had been found necessary to reject many pictures, and it was expected that still more would have to be rejected next year, whereby the standard of excellence would probably be raised.

Presentation prints had been sent to every member of the Society. The Progress Medal of the Society had been presented to Dr. Eder.

It was regretted that the Secretary, Mr. F. Maxwell Lyte, had had to retire on account of ill-health.

The Society had sustained the loss of six members by death, and five had retired. The membership had been increased by forty-two, making a total of 363 members—a greater number than the Society had possessed for many years.

The Council hoped, in conclusion, that the future would continue to reveal more of those discoveries which might be said to lie dormant in the minds of members.

Mr. C. RAY WOODS proposed that the report be received, adopted, and printed in the usual way. He praised the manner in which the Council had laid the report before the meeting.

Mr. JOHN SPILLER seconded the motion, which was carried unanimously.

The TREASURER then read his report for the past year. The income of the Society had considerably increased, and, although the expenditure had also increased, and, indeed, had been during the past year in excess of the income, there was still a large balance in hand. The extra expenditure was more than accounted for by property in the possession of the Society.

Mr. T. SEBASTIAN DAVIS moved the adoption of the report. He congratulated the Society on the manner in which the extra expenditure had been incurred, whereby it had become possessed of the standards and lanterns already referred to.

Mr. G. L. ADDENBROOKE, as one of the auditors, seconded the motion, and mentioned how easy the audit had been rendered by the excellent order in which all the accounts had been found.

The vote of thanks was carried.

The CHAIRMAN said that, considering the report that had been read, they ought to be very gratified to their Treasurer for having not only done his work so well, but for having been so zealous in the interests of the Society. He also referred to the fact that although there had been more additional work to do, and although the editor had been unwell for a great part of the year, the editorial expenses had been diminished by £14. He therefore asked for a hearty vote thanks for Captain Abney.

The vote of thanks having been passed,

The CHAIRMAN asked that a vote of thanks be given to the auditors, and afterwards to the scrutineers of the votes. Both were carried.

The Progress Medal was then handed by the Chairman to the Treasurer for transmission to Dr. Eder, as a reward for his investigations in gelatino-chloride plates. He briefly recapitulated the useful work which had been done by Dr. Eder during the past few years.

The scrutineers having by this time counted the votes, the new officers were announced as follows:—*President:* Mr. James Glaisher.—*Vice-President:* Colonel H. Stuart Wortley.—*Treasurer:* Mr. W. S. Bird.—*Council:* Captain Abney, Messrs. F. Bedford, T. Bolas, Professor W. F. Donkin, Messrs. Jabez Hughes, W. B. Bolton, and W. England.

Colonel WORTLEY rose to propose a vote of thanks to the President. He considered that a great portion of the success of the Society was due to the exertions of their President, who managed to give a great portion of his time to the work in spite of his being such a busy man. He hoped that he (the President) would continue to rule over the Society for very many years.

Mr. SPILLER seconded the vote of thanks, which was carried by acclamation.

The CHAIRMAN, in reply, said that on looking back to the time, thirty-five years ago, when he had worked at photography, he thought he must be becoming a very old man. Nevertheless, he would continue to exert himself for the Society so long as it was asked of him and he was capable of work.

Mr. W. F. DONKIN was announced as Honorary Secretary in place of Mr. F. Maxwell Lyte whose prolonged illness compels him to resign the post.

Mr. W. E. DEBENHAM wished to call the attention of the Society to a matter which might be of considerable importance—that was to the changes which might be made in papers read before the Society and afterwards printed in the *Transactions.* He referred particularly to a paper read by Captain Abney in June last. He said that certain statements with regard to the effect of pressure on sensitive films were made in the paper as read; that such statements were criticised afterwards, an error being pointed out, and that advantage was taken of the criticism, the subject matter of the paper being materially altered in the report of the proceedings of the Society. He (Mr. Debenham) read various letters which had passed between himself and the Council of the Society. He put forward various arguments in support of the correctness of his statements, and proposed a motion as follows:—"That this Society disapproves of any material alteration being made in papers after these have been read before it, and before their being published in its *Journal.*"

Mr. W. M. ASHMAN seconded the motion.

Mr. T. SEBASTIAN DAVIS proposed an amendment to the effect that the motion was unnecessary.

The amendment was carried by a large majority, and the meeting was then adjourned till the 11th March.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

THE usual monthly meeting of this Society was held in the room of the Society of Arts, John-street, Adelphi,—the chair being occupied by the Rev. F. F. Statham, M.A., President.

It was announced that the committee had decided that the subjects for competition, instead of being sent in monthly as heretofore, might be sent in at any time before the end of the session, when they would all be judged together.

Mr. F. A. BRIDGE then read a paper on the subject of *Willesden Paper.* He began by saying that he was not in any way interested in Willesden paper from a pecuniary point of view, but that he brought it forward merely with the idea that it might be useful to photographers in several ways. The paper might already be known to many present, as it had been extensively used at the Fisheries Exhibition. The Willesden paper was paper of various kinds treated with a bath of copper and ammonia. This renders the paper waterproof and rot proof—he had almost said thief proof. One ply of paper might not be absolutely waterproof, inasmuch as there might be small accidental pinholes in it, but by having two or more plies the danger of this was avoided. When the paper was cemented together in layers with the Willesden composition it might be boiled, and still would not separate. It had struck Mr. Bridge that a temporary, or even permanent, dark room might be made out of the paper. Mr. Healey, the manager of the Willesden Company, had been good enough to construct a portable dark room, which was fitted upon the platform. He (Mr. Bridge) had seen buildings made of the paper which had been standing long exposed to the weather. A vessel constructed of the material was shown full of water to exhibit its water-tight properties. To photographic printers the paper would be useful. On a shower of rain coming on the frames could be covered with a piece of Willesden paper. For amateurs, who often found that a dark room indoors was considered to interfere with domestic arrangements, the paper would be unfit. They might put up a dark room, for example, at the bottom of the garden. The backing of pictures was suggested as a possible use of the paper. It was also thought that it might be useful for packing dry plates in. It appeared particularly suitable for developing dishes. He (Mr. Bridge) made a dish out of a piece of the paper to show how easily it was done. The corners were fixed up with marine glue. He had developed a plate in such a dish that day, and the chemicals appeared to have no effect upon it; but, if there were any doubt, it was most easy to cover the paper with plain, colourless varnish or india-rubber in benzole. Samples of the paper so coated were shown. Hyposulphite of soda had a bleaching effect on the paper if it were unprotected, but appeared to have no further action. He (Mr. Bridge) had seen a drain or water-pipe made of the material. The pipe had been in use for a long time, and this proved the durability of the material. A set of pieces of Willesden paper and Willesden paper cemented with Willesden composition to canvas was placed in boiling water. Beside it was placed in a set of pieces of ordinary paper and paper shred to canvas—a portion of a registered envelope, in fact. The latter were all reduced to pulp, whilst the former were unchanged. Some lantern blocks made of the paper were shown.

The CHAIRMAN said that, although the subject was not a strictly photographic one, it was one which was most suggestive, in showing how many ingenious inventions were indirectly applicable to photographic work. Mr. Bridge had pointed out several uses to which the paper might be applied. There were, doubtless, many others. For example: the temporary repairing of roofs; also for the packing of apparatus. Mr. Warnerke had recently told of the destruction of a quantity of his apparatus on board ship by wet. By the use of Willesden paper this might have been avoided He suggested that by its means hay and corn might be protected from the weather, and thereby often saved.

Mr. HEALEY handed up a photograph showing that the paper had already been used for this purpose. The covering complete for a large stack would cost £18.

Mr. W. M. ASHMAN asked if that material could not be *welded* into developing duties.

Mr. HEALEY said the difficulty was to get a perfectly waterproof glue. The Willesden Company had a glue which was perfectly satisfactory when applied with the necessary skill, but he did not know whether the general public would be able to use it.

Mr. KEEN said that the Willesden canvas made excellent backgrounds where no great width was necessary.

Mr. MACKIE asked if a thick board of *papier-maché* could be impregnated with the composition.

Mr. HEALEY said it could not. It was necessary to put a layer of the composition between each two thicknesses of the paper.

Mr. WILLIAM BROOKS, referring to some Willesden writing paper which had been shown, suggested that if such could be produced without lines it would make a good support for collodion emulsion.

Mr. HOWARD mentioned the difficulty that amateurs often had in getting a room really dark, and particularly in having a means of getting in and out of the dark room without letting in a flood of white light. He said that by means of Willesden paper they might, so to speak, have a dark room within a dark room.

Mr. HARRISON said that the paper might be used for many odd-and-end purposes.

The PRESIDENT suggested water pipes, amongst others.

Mr. BRIDGE mentioned that canvas and ropes were treated with the composition; they thus became waterproof without the weight which tarred ropes had.

Mr. HEALEY said that ferrocyanide of potassium might be used as a test to discover whether so-called Willesden paper was genuine or not. If it were, the ferrocyanide turned the paper dark brown.

The CHAIRMAN proposed a vote of thanks to Mr. Bridge for his papers.

Mr. BRIDGE said that, as by far the greatest part of the trouble had fallen on Mr. Healey's shoulders, he would transfer the vote of thanks to him.

Some canary medium was distributed by Mr. Bridge.

Several prints on "enamel paper" were shown. They were considered very satisfactory.

A question was read from the question-box, asking if ready-sensitised paper gave prints more or less permanent than ordinary paper did.

Mr. A. COWAN said there had not been time enough as yet to find out.

Mr. BROOKS confirmed this, but said he had found one point in which ready-sensitised paper failed. After the lapse of sometimes months a lemon stain would appear on the paper.

Mr. F. HOWARD remarked that the permanency or otherwise of the print depended much on the strength of the negative. A strong negative always gave a more permanent print than a weak one.

Mr. E. W. FOXLEE corroborated this. He had prints twenty-five years' old as good as at first, but they were only such as had been got from strong negatives.

Mr. W. M. AYRES showed a number of prints from twenty to twenty-five years' old, which had been done on paper sensitised with a sixty-grain bath, and had been toned on a mixed hyposulphite of soda and gold bath. They were as good as new.

The subjects for the competition were then balloted for. They were read out as follows:—Landscape: *A Shady Nook, A Country View, Enchanting, A Church with Ivy, A Study of Leaves, Clouds and Trees, A Water Trough and Horses, A River Scene, Hay-Making, A Lake with Swans or Water Fowl, A Roadside Inn, A Village.* Figure: *The Shepherd, Afflicted, Happiness, Unearthing a Treasure, Indecision, Mother and Child, Wrath, Rustics, Gone, Dejected.*

The pictures representing these subjects were to be sent in any time before December next.

The meeting was then adjourned.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AT the meeting of this Society, held on the 7th inst., Mr. A. L. Henderson occupied the chair.

Mr. J. B. B. WELLINGTON showed two plates from same emulsion—one developed with ferrous oxalate and one with pyro., both of them having decided green fog.

The CHAIRMAN thought there might be excess of silver in the emulsion to cause such a decided manifestation of green fog under both developers.

Mr. WELLINGTON replied that the emulsion was made after the formula given by him a fortnight earlier. In mixing it, however, the nitrate of silver had been added to the gelatine solution before being converted into citrate, the citrate of ammonium and liquid ammonia being afterwards added.

Mr. W. E. DEBENHAM thought that this might account for the different behaviour of the emulsion, as in gelatine solution the conversion into citrate would be slow, and probably not complete when the bromide was added.

Mr. F. W. HART showed some celluloid dishes similar to those that he had exhibited before, with the exception that one of these was of transparent instead of opaque material.

Mr. W. H. PRESTWICH thought that this change made them perfect.

A question from the box was read:—"Are albumen prints made upon citro-chloride of silver more permanent than upon the usual chloride paper?"

The CHAIRMAN was inclined to think that they were, and that prints upon the commercial ready-sensitised paper, which, it was understood, contained a considerable amount of citrate of silver, would prove more permanent than those made upon ordinary albumenised paper.

Mr. DEBENHAM said that he could see no reason why the silver reduced by light from citrate of silver should resist destructive agencies more than that reduced from chloride, and he thought that some reason should be given before such an idea could be accepted. Then, too, it was probable that more chloride was reduced than citrate in the papers prepared with the combined salts.

The CHAIRMAN said that another question arose relating to the permanency of silver prints—whether burnishing tended to preserve these or not? He thought that it did.

Mr. J. J. BRIGINSHAW asked whether any member could tell him a ready method of ascertaining the strength of a bichromate bath. He had an old one on which he had sensitised some carbon tissue, and wished to know how to find its strength. He would also inquire whether an old bath was fit to use, as he had understood that it should be freshly prepared.

Mr. A. HADDON said that the readiest way of ascertaining the strength was to evaporate a small quantity—say half-an-ounce—to dryness and weigh the residue.

Mr. DEBENHAM did not think that it mattered if the bath was old in point of time, but that it should not have been much used.

M. BRIGINSHAW replied that the bath in question gave results that he could not distinguish from those furnished by a new one. The bath had been made for more than a year, but had been very little used.

Another question was read:—"Is there no method of coating paper with emulsion, so that after exposure the film may be stripped?"

The CHAIRMAN suggested that paper should be prepared with a varnish the solvent of which is alcohol, and, after finishing the negative, wetting with alcohol should allow the paper to be removed.

Mr. J. BARKER thought that the paper should first be converted into parchment paper and then covered with French chalk. If some of this powder were left thick upon the paper it would not have an injurious effect upon the emulsion.

Mr. JAMES BURGESS had used some plates that had been polished with French chalk. On some of them the powder had been carelessly left, but it had not injured the emulsion.

Mr. HADDON said that Mr. Morgan, of Messrs. Morgan and Kidd, had promised to give a demonstration before the Society of the development of gelatino-bromide opals and of gelatino-chloride paper.

Mr. BURGESS inquired whether there was any advantage in fuming with ammonia the paper sold ready sensitised.

The CHAIRMAN thought that there was, and that that paper could scarcely be fumed too long. In answer to an inquiry, he (the Chairman) said that his fuming box measured twenty-four inches by twenty, and was sixteen inches deep. A saucer of ammonia stood at the bottom, and at a few inches from the top was stretched a piece of fishing net. Two sheets of paper were laid back to back on this net, and left for from three to four minutes. The lid was lined with felt to make the joints tight.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

THE Board of Management held its usual monthly meeting at 181, Aldersgate-street, on Wednesday, the 6th instant.

The minutes of the previous meeting having been read and confirmed, Mr. L. W. Green (Peckham) and Mr. M. A. Wood (New Southgate) were elected members of the Association.

Mr. W. M. ASHMAN submitted some proposed alterations in the rules, which were discussed. It was decided that the meeting of the Board on the 5th of March should be special, in accordance with rule 18.

The other business having been disposed of, the meeting terminated.

PHOTOGRAPHIC SOCIETY OF IRELAND.

THE usual monthly meeting of this Society was held in the Royal College of Science, Stephen's Green E., on Friday, the 8th instant,—Mr. J. H. Woodworth in the chair.

The minutes of the previous meeting having been read and confirmed, Mr. Samuel Boyd was elected a member. Messrs. J. Robinson and R. Brown were proposed for membership, and will be balloted for at the next meeting.

The CHAIRMAN then called on Dr. Scott for his communication *On the Value of Diaphragms in Photographic Lenses.* [See page 103.]

There was a very well-sustained debate on the paper, some of the members having found the system of diaphragms as drawn up by the committee appointed by the Photographic Society of Great Britain of very great value. Owing to the courtesy of Dr. Scott, who had prepared a table showing the relative value of the stops and the exposures necessary to obtain good pictures, Mr. C. W. Watson was enabled to compare this table with the actual exposures made during a tour in Wales last summer, and on only one occasion was there any difference between his note-book and the table.

Mr. GREENWOOD PIM, as also Mr. E. P. JOHNSON, exhibited a collection of lantern transparencies produced on gelatino-albumen plates. The difference between these plates and the ordinary gelatine plates was very marked, the former being much the best for this purpose. Mr. Pim also exhibited some further results he had obtained on eosine plates.

Mr. JOHNSON and Mr. WOODWARD also showed some specimens of enlarging, made on Messrs. Goodall and Steven's paper, which was very good.

Mr. J. V. Robinson passed round a *carte-de-visite* portrait which had been taken in an ordinary sitting-room at night, the subject having been lighted by two ordinary gas jets. The exposure was about fourteen seconds.

The next ordinary meeting will be held on Friday, 14th March.

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION.

The fifth ordinary meeting of this Society for the session was held on Thursday, the 7th inst., in Lamb's Hotel, Dundee, when there were about thirty members present. Mr. W. D. Valentine occupied the chair.

The minutes of the previous meeting having been read and approved of, it was arranged that the subject for the next monthly competition be—*Portrait Tak·n in Room.* Four new members were admitted, and one new application was handed in. The routine business having thus been disposed of,

The Chairman called upon Dr. Tulloch to read his paper on the *Shortcomings of Photography.* [Up to the time of going to press Dr. Tulloch's paper had not reached us.] A very animated discussion then took place.

The Chairman led off with the remark that it was not fair to institute a comparison, as Dr. Tulloch had done, between an engraving and a photograph, as the latter was printed on rough paper or in platinotype, and he also said that the widespread use of highly-albumenised paper for large pictures had done much towards preventing the artistic development of photography. He (the Chairman) remarked that the greater intensity of the shadows at the edges was in great measure due to the use of wide-angle lenses.

Mr. G. D. Macdougald said he was of opinion that the too great intensity of the shadows could be remedied by a full exposure. Dr. Tulloch stated that in a picture there should only be one point of pure black, whereas in a photograph there were dozens of such points.

The Chairman proposed a hearty vote of thanks to Dr. Tulloch.

Mr. Geddes (Arbroath) then made a few remarks regarding *Halation: its Cause and Cure.* He stated that in the beginning of December he had sent a paper on this subject to The British Journal Photographic Almanac, but it did not appear. He wrote twice to the Editor, and once to the Publisher, asking the reason of its non-appearance, but received no answer. In his (Mr. Geddes's) opinion halation was caused by the space between the back of the plate and the dark slide, and he found that the evil was completely remedied by laying a piece of blackened cardboard on the back of the plate.

The Chairman said he thought this would not be of use unless it was placed in optical contact with the glass.

Mr. Macdougald thought the cause of halation was that the particles of silver bromide dispersed the light through the film, and he also said that single lenses were much less liable to induce it than compound lenses.

Mr. Matheson had got halation in a plate which had even been backed with burnt sienna.

A vote of thanks was passed to Mr. Geddes.

A question was found in the question-box—"Is there any advantage in fuming ready-sensitised paper?"

It was the opinion of the meeting that there was a slight benefit to be derived from this, as it neutralised the acid in the paper and caused it to tone more readily.

The meeting was then adjourned.

COVENTRY AND MIDLAND PHOTOGRAPHIC SOCIETY.

At the ordinary monthly meeting of this Society, on Thursday, the 7th instant, the chair was taken by Mr. William Andrews, President, who called upon Mr. A. E. Rollason (Hon. Secretary) to read a paper on *Exposures by the Oxymagnesium Light.*

Mr. Rollason said that this phase of photography was quite new to him. It had been suggested that if members would bring cameras to the meeting a few exposures might be made. He had made several trials of the light and found it very actinic, although somewhat difficult to manage without proper apparatus. The light was too strong for direct illumination, and required the interposition of a reflecting screen. In this case the light would be much improved if placed in the focus of a large reflector. Reflectors were also required to soften the shadows, which were found to be rather strong.

As several gentlemen who had brought cameras were by this time ready, and the President volunteering to sit for the first trial, preparations were at once made for exposure. Two twenty-ounce gas jars were filled at the pneumatic trough with oxygen gas (kindly given by Mr. T. J. Lloyd). The magnesium wire was bent round a test tube into a spiral form and fastened to the stopper at the top of the jar. The jar was then placed about ten feet from the sitter (slightly to his left) on a camera-stand about four feet high, while the cameras were on the right hand. All being ready the wire was then removed from the jar, lighted, and re-immersed in the oxygen. The exposure was as nearly as possible about eight seconds. The lens was a single landscape lens, nine inches focus, No. 2 U.S. stop. The plate was one of Mr. Baynton's "Coventry" dry plates. This was a failure, on account of the small size of the stop and slowness of the lens.

The next exposure under the same conditions, but with a portrait lens about No. 10 U.S. stop and the same make of plate, was a decided success. The last was a group taken on a Wratten and Wainwright's instantaneous plate, with the portrait lens, same stop, but with two lights burning—one at ten feet and the other at fourteen feet from the group. The exposure was thought to be about twenty seconds, and was also a success.

The plates were developed exactly alike by Mr. M. J. Danks (at the meeting), in a careful and efficient manner, considering the fact that neither the correct exposure nor the rapidity of the plates were known to him.

On the whole the experiment was fairly successful, and several members expressed a wish to try the light again on a future occasion.

After votes of thanks had been passed to Mr. Rollason and Mr. Danks, the meeting terminated about ten o'clock.

SHEFFIELD PHOTOGRAPHIC SOCIETY.

The ordinary monthly meeting of this Society was held in the Masonic Hall on Tuesday, the 5th inst.,—Mr. Councillor S. Firth in the chair. There was a very numerous attendance of members—so much so that it gave rise to some talk respecting a larger room.

It being the first meeting after the exhibition, many interesting matters concerning it formed the subject of conversation; but, owing to the unavoidable incompleteness of the accounts, the presentation of the balance sheet was postponed till the next meeting. It was proposed that each member note down such ideas and suggestions on exhibition arrangements as he may consider serviceable for next year, as it was unanimously decided that there should be then an exhibition.

Mr. W. B. Hatfield proposed that the best thanks of the Society be given to the many gentlemen throughout the country who so kindly contributed to the recent exhibition, thereby enabling the Committee to organise the most interesting and complete exhibition ever held in connection with the Society.

The resolution was unanimously passed.

Mr. J. Taylor proposed, and it was carried unanimously, that a special vote of thanks be accorded to the Rev. H. J. Palmer and the members of the Liverpool Amateur Pho'ographic Association, for their large and interesting contributions to the late exhibition.

The following gentlemen were then proposed for membership and unanimously elected:—Messrs. Johnson, Hibbert, Shields, Mottershaw, and Hayball.

Mr. J. H. Rawson exhibited a negative with some map-like lines indented in the film, which caused much discussion as to the cause.

It was proposed that the members should commence a competition, the subject to form an illustration of a given word, the word to be suggested by the President, and the best pictures to be put in the Society's large album, with full particulars of the method of production. The first show of pictures to take place at the monthly meeting in April, and the word to be "Contentment."

After examining and discussing a number of prints brought by Dr. Morton, Mr. J. H. Dickinson, Mr. Seaman, Mr. Pilley, and others, a very pleasant meeting was brought to a close.

NORTH STAFFORDSHIRE PHOTOGRAPHIC ASSOCIATION.

The monthly meeting of this Society was held on Wednesday, the 6th inst., at the Town Hall, Hanley,—Mr. C. Altieri, Vice-President, occupying the chair.

The minutes of the previous meeting having been read and signed, Messrs. J. Beardmore, W. Woodall, M.P., Inshull, and Taylor were elected members of the Association.

The Chairman, addressing the meeting, apologised for his non-ability to demonstrate the progress of enlarging from negatives upon Messrs. Goodall and Steven's argentic paper, on account of an accident which had lately befallen his condensers, they having been cracked, and the new ones ordered not having come in time for the meeting. He would, however, give the members an invitation to his own laboratory next month, when he should have great pleasure in redeeming his promise. In the meantime he called upon Mr. Allison—who, he was glad to see, had brought some fair-sized negatives—to give a demonstration in printing direct upon this paper.

Mr. W. B. Allison said that having heard a day or two previously of their Chairman's accident, in case it should not have been repaired in time for the meeting he had brought a few negatives and some of Messrs. Goodall and Steven's enamel argentic paper to prevent entire disappointment. The room having been darkened, printing-frames were filled as usual in ordinary silver printing, and, a gas burner being lighted, exposures varying from one to two minutes were given at about four feet from the flame. The resulting pictures were all developed successfully with ferrous oxalate developer, and were greatly admired both for their vigorous depth and the purity of the whites obtained with this paper, the pictures somewhat resembling platinum prints highly glazed.

This simple printing process was much admired, and a vote of thanks was passed to Mr. Allison.

The Chairman handed round a splendid set of about thirty lantern slides, made by contact printing upon bromide plates. The quality of the slides, with perfectly clear glass in the high lights, showed that in careful and skilful hands alkaline pyrogallic development is equal to any other.

A vote of thanks having been passed to the Chairman, the meeting separated.

BERLIN ASSOCIATION FOR THE CULTIVATION OF PHOTOGRAPHY.

This Society met on the 18th January, when the chair was taken by Prof. H. W. Vogel, President, who intimated the death of Mr. J. H. Dallmeyer, and supplemented the intimation by a short account of Mr. Dallmeyer's life and of his services to optical science, dwelling particularly upon his improvement of the photographic lens. The memory of the deceased was honoured in the usual way by the members rising in their places.

In a letter from Milwaukee Dr. Vogel spoke of the photographing by Mr. Falk of the stage of a large theatre in New York by electric light.

In consequence of this Mr. Falk sent him several cabinet-sized copies of these pictures, inquiring, at the same time, whether Dr. Vogel's remark that "the electric light is better in Berlin than in New York" is to be taken to mean that such views can be better taken in Berlin.

The CHAIRMAN explained that he meant the electric lighting of streets, which is much better than in New York, but that they were not yet able to take views equal to Mr. Falk's.

A French correspondent wished for information regarding a newspaper notice he had seen of the directors of the Berlin National Gallery having allowed certain pictures to be reproduced by "photochromography."

Herr MILSTER remarked that what was meant was the lichtdrucks in the chromolithographic style of Herr Frisch, some of whose reproductions of water colours and pastel drawings are so beautiful that one might almost doubt whether the original or the copy was before him.

A provincial member, who intended to build a glass-house, and, owing to local circumstances, could only have a frontage to the east, so that in the forenoon the sun would shine directly into it, asked for advice how best to modify this disadvantage. He was recommended not to build such a studio; but

Herr HALWAS said that if he must build it fronting the east he had better glaze with matt glass. Other members, however, thought that would absorb too much light.

Herr JOOP suggested corrugated glass.

The CHAIRMAN thought that two sets of curtains—a white set to keep out the direct sunlight, and a darker set to regulate the light—might be used with good results. He (the Chairman) then showed a number of views, of whole-sheet size, of the mountains of Colorado and the Yellowstone district, by Mr. Jackson, of Denver, photographer to the American Government Geological Survey. He had taken a great number of 20 × 24-inch plates. He (the Chairman) then showed a number of new instantaneous photographs, by Muybridge—running horses, deer, cows, &c.

The only question in the question-box inquired how the addition of water at coating suitable for two emulsions, prepared with 6·7 per cent. of nitrate of silver and stored under alcohol one and three months respectively, could be determined. It was answered that no expressly-determined addition of water took place at this time, as there was only a question of expelling the superfluous alcohol by water, which could best be done by placing the emulsion in a muslin bag and suspending the bag for a few hours in running water; or, if a suitable washing-box were not to be had, water may be poured over it, and, after being well stirred amongst it, may be decanted off and the operation repeated six to eight times, and then let the bag be suspended to allow the water adhering from the muslin to drip. In this way the emulsion absorbs as much water as is required to give it the proper consistency.

This ended the business of the evening, and the meeting was shortly afterwards adjourned.

Correspondence.

THE LANTERN IN THE UNITED STATES.

To the EDITORS.

GENTLEMEN,—Replying to the inquiry of Mr. T. P. Hicks respecting America as a good field in which to work the optical lantern commercially, I am of opinion that there is a very great deal to be accomplished in that direction, and that large emoluments await any one who understands the business and enters into it energetically.

The prices of lanterns and their appliances are much higher in America than in England. As an example: plain uncoloured photographic lantern slides sell retail in England at one shilling and sixpence each. In a catalogue of American productions of similar class to which I have referred I find sixty cents. (half-a-crown) is given as the price. This does not apply alone to such pictures as those by York, Levy, and other European makers, which are subject to an import duty, but to those made in America.

Those who, like Mr. Hicks, know at what prices transparencies may be made or purchased wholesale, will readily conclude that the American price quoted leaves a very comfortable margin. Mr. York's slides—which, although not named as his in the American catalogue, but which I know to be his productions, or well-executed copies of them—also sell at the price mentioned, viz., sixty cents., uncoloured. Statuary slides, with the backgrounds stopped out, are charged a dollar and a-quarter, or five shillings and twopence-halfpenny each. This, too, is the price for comic slipping slides of good quality, lantern conundrums, microscopic enlargements, and subjects of a similar description.

Passing from pictures to appliances, the American prices are much in excess of those in England. For example: a four-inch mounted condenser, which in an American list is quoted at ten dollars (two pounds one and eightpence), has its counterpart in England quoted at twenty shillings. It is not easy just to know what is or what is not an American condenser. I remember, about a year ago, remarking to Mr. Muybridge that I thought, judging from the way his pictures of horses were projected on the screen, his condensers must be of a very inferior order; to which he replied that such could not possibly be the case, as they were made in the workshops and under the cognisance of Professor Henry Morton. The great optical ability of Professor Morton being well-known to me this was a "staggerer;" still, upon an examination of the condensers, I was impressed with their marked inferiority to what I had expected as emanating from such an acknowledged excellent source. This led to a strict investigation, when the reputed maker, the gentleman in charge of the optical department of the Stevens' Institute of Technology (of which Professor Morton is the President), upon taking them in his hands, pronounced them a very common French imitation of their lenses, although purchased from a reputed dealer in the genuine article. When I last saw Mr. Muybridge he had failed to obtain satisfaction from the unscrupulous vendor.

The knowledge of sharp practice of this kind introduces an element of difficulty in speaking of the comparative merits and prices of lanterns of the more pretentious class; but I think the relation between those of England and America, as regards prices, will prove to be somewhat similar to that shown to exist between those of slides, which are somewhat higher—in some cases double the price charged in London.

It is difficult to say *where* in America a lantern business could best be established; but for two reasons I would not advise New York as a suitable locality. First: the "New Yorkers" are an exceedingly busy race of people, and the lantern does not seem to have found a congenial home there yet, and hence it may prove uphill work to establish a business there. Secondly: there is a gentleman who, if I am rightly informed, was at one time associated with the Polytechnic Institute here, who has avowed his intention of trying the experiment of selling lanterns and lantern slides and appliances of English manufacture in New York at *English prices.* Philadelphia being a much more likely city in which to establish a good business with a reasonable prospect of success, I would suggest it as the place of all others in America in which to found a base of operations.

If Mr. Hicks, or any other active lantern manufacturer, will establish a business in Philadelphia on English lines he will confer a boon upon many photographers who would willingly invest in first-class lanterns in which to exhibit their pictorial productions were the high prices not prohibitory in a large degree.

Next to Philadelphia, Boston would offer the best field of operations; but it would be always inferior to the larger city as regards prices and demand.

Hoping this reply will prove satisfactory,—I am, yours, &c.,

Woodgreen, February 7, 1884. J. TRAILL TAYLOR.

CLEARING AND REDUCING NEGATIVES.

To the EDITORS.

GENTLEMEN,—Having read your leading article on *The Treatment of Negatives After Development*, and your concluding desire for a report of the results, I beg to say that for some time I have been using citric acid in the alum bath before fixing, and, as you say, the brilliant appearance is wonderful in comparison with using the alum without citric acid. This, to my mind, is the proper time to use the alum and citric acid, instead of after fixing, for clearing purposes, because the pyro. stain is not nearly removed until the negative has passed through the fixing bath. This you will readily notice by taking a developed and fixed negative by the usual method and having a decided pyro. stain upon it. If you put it into the alum and citric acid you will see an improvement, but not until it has been put into the *hypo.* does it completely vanish.

I have a pet mixture for reducing negatives which I have used for the last two years, and find it all that can be desired:—Take a one-ounce empty pyro. bottle, nearly fill it with Edwards's intensifier, and drop three biggish lumps of cyanide into it. When the cyanide has dissolved get another one-ounce pyro. bottle, half fill it with the above, and three parts fill the bottle with water. The negative to be reduced must first be put into the alum bath for a few minutes to prevent frilling, then washed and watched attentively while in the reducer, as a minute or two will be sufficient.

The reason more water is added to the mixture after the cyanide is dissolved is because it acts as an intensifier until some of the effect of the mercury and iodide is counteracted by dilution; so one can readily tell how much water to add, it being most wise to add a little at a time until it is found that it reduces as desired. When it has been got right it will reduce a number of negatives, and simply wants strengthening now and then from the strong solution.

Should any person, through carelessness, reduce it too much it can be very greatly strengthened by simply washing and leaving it in the hypo. bath for some time.—I am, yours, &c., ALFRED E. DIGHTON.

Sheffield, February 9, 1884.

RATIONAL DARK-ROOM ILLUMINATION.

To the EDITORS.

GENTLEMEN,—*Lucus a non lucendo* being the motto of all theorists on the above subject, permit me very humbly to emphasise one or two points very frequently lost sight of when "a safe light for the dark room" is considered.

The question is, at once, one of interception and transmission—of the maximum amount with the minimum activity of light. The total quantity of light must ever depend upon the *tint,* shade, or strength of the medium; and the quality—that is, the actinic or kinetic power—upon its *hue,* colour, or chemical peculiarities. Quantity and quality must ever be variable, both from external and internal causes—in the latter case the most important variations being dependent upon the different sensibilities shown by various salts to the same rays.

My principal object in thus troubling you is to suggest the great benefit to be derived, when dealing with this matter practically, from ever keeping in mind the *modus operandi* of Dame Nature in painting the flowers and in giving them their perfumes: the power, so to speak, of natural selection which organic and inorganic compounds exercise with regard to the solar rays, and the principles involved in absorption and rejection; and, lastly, though by no means least, the logical sequence of thought accruing to one who looks upon solar light not as composed of seven colours so much as of three. Notwithstanding my respect for the woundrous power of the number "7"—for the seven natural musical intervals, for the seven churches of Asia, for the seven champions of Christendom, and for the seven deadly sins—I do not think that my opinion that all questions relating to colour can thus be more clearly, comprehensively, and rationally grasped, should justify anyone in concluding that I have taken leave of my seven senses.

As the red, orange, yellow, green, blue, indigo, and violet hues in the solar spectrum have not hitherto been proved to be due to seven magical elements, and as the infra-red and ultra-violet rays seem in many respects to blend, so to speak, into a similar repeated series of invisible colours, let me briefly state—First: that all visible colours are either the primaries, red, yellow, and blue; the secondaries, orange, green, and purple; the tertiaries, citron, olive, and russet, or a mixture of these. Second: that red + yellow = orange, yellow + blue = green, red + blue = purple, orange + green = citron, green + purple = olive, and orange + purple = russet. Third: that, to any single colour, the complementary or most harmoniously-contrasting hue in any class is a mixture of the other two colours in that class, whether primary, secondary, or tertiary; and that, conversely, a mixture of any two colours in a given class will have as its complementary the remaining colour in that class. Fourth: that this holds true in an especial degree in all natural, visible colouring. Thus, the particular hue of green reflected to our eyes from (say) a cabbage of necessity depends upon the nature of the red absorbed. Furthermore: bromide of silver in gelatine is most affected (as the colour of a commercial dry plate would lead one to suppose) by diffracted solar light between the lines F and G, otherwise by the indigo-blue rays. Hence, here we deduce that the complementary colour will, above all others of equal brilliancy, tint, or strength, be the best wherewith to stop out or prevent the action of these rays; and, because indigo-blue tends to red, we find that the pure orange—which would be the complementary were the blue the pure primary blue, inclining neither to red nor yellow—must have a touch of green in it. *Cæteris paribus*, this may easily be tested as far as photography bears upon the action of sensitive salts. It should ever be remembered, also, that opacity of medium—that is, various thicknesses of "ruby," "orange," or "canary"—alters the *quantity* of light only, much in the same way that an aggregate mass of the straw-coloured and white (really pale blue) blood corpuscles appears crimson-red.

This extension and combination, rather than summary, of Sir David Brewster's and Sir John Herschel's theories will, hash though it be, derive confirmation from any experiments made upon the broad lines laid down by Kirchhoff, Angström, Lockyer, Abney, &c., the only difficulties being those inseparable from the imperfect state of our knowledge as regards the "scientific frontiers" of biology, kinetics, and chemistry when brought face to face with such empirical terms as "actinic rays."

In conclusion: I may confess to having purposely avoided all mention of such substances as sulphate of quinine as not directly touching the question, and as having a tendency to confuse. H. B.

Edinburgh, February 8, 1884.

Notes and Queries.

In reply to a query by I. K. T., in our issue of the 1st instant, the name of J. S. Brown, High-street, Bridgewater, may be added to those already mentioned as qualified to supply his requirements.

In reply to "Novice," a solution of shellac in methylated spirits of wine will form a better coating for his dish than paint. It should be made rather thin, and several coatings must be given, allowing the preceding one to become dry before another is applied.—George B. Fox.

Neither shellac nor paint, Mr. "Novice" (replying to a query in last Journal), is the correct thing for coating a wooden dish having a glass bottom; but an application of melted wax, and this made very hot indeed previous to application, will leave nothing to be desired.—S. S. R.

James Keeley writes:—"Will you kindly tell me if the chloride of lime is the ordinary or commercial chloride of lime given in formulæ."——In reply: The substance named and required is the popular "chloride of lime" of commerce, procurable everywhere. In strict nomenclature it, perhaps, ought to be designated "chlorinetted lime."

W. S. is desirous of knowing whether an old lens by a reputable maker who does not now advertise is a bargain or not at a certain price at which it has been offered to him.——We decline giving an answer to a query of this nature; but have no hesitation in saying that we have never known or heard of a bad lens by the maker named.

Can you or any of your readers inform me if there is a photographic society existing in Birmingham? I have looked in vain for an advertisement of it. If not, are there any insurmountable difficulties in the way of forming one? I see Manchester, Cheltenham, and other places have one, and why should not we?—One who Would Like to Join.——In reply: The matter rests in the hands of those more nearly concerned, namely, the photographers of Birmingham. Perhaps this hint may "wake them up."

Developing after M. Audra's manner I find very good when the solutions are new; but, when using it the other day, after leaving it for about three months, I found that when the iron was added to the oxalate a precipitate was formed, which appeared to me to be lime. The negative was only half developed, and nothing would move it from that state. I should feel much obliged if you would insert this among your *Notes and Queries*, as I should like to know if there be any remedy for it, and what is the cause of the same.—A. McKinnell, Jun.

In reply to "Broken Case:" I think the best thing a photographer can do is simply to ask liberty to display a photograph. Indeed common sense shows it is presumptious to do so without the permission of the individual, and when solicited to withdraw a card from his show-case it is certainly his duty to comply at once. His immediate non-compliance, however, does not justify the person in smashing the case, and such conduct *is taking the law into his own hands*, for which he is held amenable. Therefore get the broken frame repaired, and present the account for payment, and if he refuse to pay take out a county court summons for the same, and he will be obliged to pay with expenses.—Jno. Hicks.

Formula:—In the manufacture of bromo-argentic gelatine-emulsion plates with the addition of either ammonia or excess of bromide of ammonium or potass, or both combined, or excess of bromide in slightly acid condition (boiled or digested, and 120° Fahr.), to obtain the required speed. Also the plates coated in various ways.—Result: In the finished dry plate the bromide of silver is granular and has always stains and markings, which develope up with more intensity than other portions of the plate. If rubbed with the finger previous to using they present a polished, metallic appearance. If the emulsion be made with exact equivalents, &c., at 120° Fahr., cooled quickly, set, and washed, there is hardly any trace of the markings, and a *very fine* bromide. But the plates are too slow for portraiture. If you or any kind reader would inform me how rapidity may be gained with fine bromide of silver, and freedom from the above stains and markings, it would greatly oblige.—C. J. H.

Perhaps you will kindly give me the information I ask. I have a half-plate portrait lens, eight and a-half inches focus, and a half-plate square camera—an old-fashioned one—which I wish to use for enlarging purposes with a lantern similar to that of M. Hutinet's, which you have described in the Journal and Almanac. Are they suitable? And, if so, what size ought the lantern to be that is used with them? And how far should the negative be placed from the ground glass of the lantern? I shall esteem your answers a great favour.—John Robert Wilson.——In reply: The lens mentioned should answer the intended purpose quite well; so also will the camera, but only as a means of holding the plate and the lens rigidly fixed. Any size of lantern will answer that will prevent an escape of light. We should advise Mr. Wilson to discard the camera, and construct the various mechanical parts in accordance with the description of the Hutinet apparatus which we published. The negative must be placed at such a distance from the ground glass as to cause none of the granularity of the surface to be shown.

W. Reade inquires:—"1. What can be done with an over-dense negative? I have two or three which I have *over-intensified*, full of detail, and good otherwise.—2. Is there really the difference in lenses represented by the price; for instance, a certain lens by one maker seems obtainable for £2, whilst it would be £12 from another?—2. Could you give me the names of one or two of the best enlargers in London, regardless of everything—I mean *unfinished* enlargements? I am not particular what process, or what kind of paper. *Clearness* would be the *only* consideration with myself—no matter whether light or dark or what colour.—4. Are Hutinet's and Morgan's papers ready-sensitised? And in what way are they better than the ordinary paper, or, rather, I should say, are they better?"——In reply: 1. Apply a solution of ferric sulphate, by which the intensity will be reduced.—2. From the fact of such differences existing in price, corresponding difference in quality may reasonably be be inferred.—3. See the advertising pages of both our Almanac and Journal.—4. A few trials will establish the relative merits of special brands of sensitive paper. These our correspondent will have to make for himself.

Photograph Swindle.—At the Salford Police Court, on Tuesday last, the 12th inst., William Henry Bird, canvasser, was charged with obtaining money by false pretences. On the 12th January prisoner went to the shop of Emma Harrison, 17, Corporation-street, Salford, and represented that he was a photographic canvasser. He said he was from "Platt and Co.," 76, Market-street, Manchester, who were photographers in opposition to Banks, and were selling their "tickets" at a very low price. He added that that was the last day for selling the tickets. She gave him an order for two tickets, and handed him 2s. The tickets, however, did not arrive.—Another case was one where in a similar manner prisoner had obtained 3s. from Hannah Leigh Sayers, beerseller, 57, West Craven-street, Salford. Police-constable Sainsbury, of the city police, received the prisoner into custody in Manchester on the 2nd inst. from a son of the prosecutrix Harrison, who had been in search of the prisoner since they had found out the matter was a swindle. Prisoner, who had been convicted four times previously for fraud, was committed to the sessions for trial.

Charge of Fraud against a Nottingham Photographer.—On Wednesday, the 30th ult., at the Loughborough Police Court, George Daniells, of Nottingham, was charged on remand with obtaining two shillings by false pretences from Fanny Upton, at Loughborough, on the 10th of August.—Mr. Rowlatt appeared for the prosecution, and Mr. A. St. John Stevenson, of Nottingham, for the defence.—A few days previously defendant was brought up on two charges of a similar character, one of which was dismissed and the other withdrawn. The present charge was adjourned for the production of further evidence.—The evidence of the complainant, Mrs. Woolley, and Lucy Groocock, as given at the former hearing, was read over, the facts of which were that the defendant went to the residence of Mr. W. E. Woolley and asked to be allowed to take a photograph of the building for architectural purposes. Upon his representing that he had taken Garendon, Southfields, and other places in the neighbourhood, Mrs. Woolley allowed him to take the photograph, and he set up his apparatus as though he were doing so. He afterwards went to the servants and took a photograph of the complainant (Fanny Upton) and others. She ordered two copies of it, and paid defendant two shillings on the understanding that they should be sent on. About six weeks after the photographs should have arrived the complainant wrote for them, and received a post-card stating that they would be forwarded. She had not yet received them.—In defence, Mr. Stevenson submitted that upon the law there was no case against the defendant.—The Bench retired to consult, and on their return into court said they preferred to hear the evidence for the defence before deciding upon the point of law.—Mr. Stevenson pressed for a decision, contending that according to the law the false pretence must be a misstatement made at the time, and not a statement depending upon a future contingency, which he submitted was the nature of the alleged false pretence in this case. —After a consultation with their Clerk, the Bench said this was an important case, and they had made up their minds to hear the whole case before giving any decision.—Mr. Stevenson said until the Bench had decided whether there was a *primâ facie* case, and the defendant had been asked for his defence, he could not proceed; he was prevented by law from doing so. He had a duty to perform to his client, and he should discharge it fearlessly.—The Chairman ultimately announced that the Bench had made up their minds to commit for trial unless some evidence called for the defence caused them to alter their decision.—Mr. Stevenson still demurred, and the Clerk said that unless Mr. Stevenson went on with the case his client was now committed for trial.—Mr. Stevenson: Really I don't want to say anything discourteous, but I never heard anything like this before in my life in any court of justice. Mr. Rowlatt knows well this is irregular procedure. —The defendant was then cautioned, and in reply to the usual question said—"I decline to plead on the ground that the magistrates decline to decide upon a point of law raised by my solicitor."—Mr. Woolley: But they have given a decision.—Mr. Stevenson: Well, we say not; and that is the defendant's statement. I ask the magistrates do they still decline to rule?—The Chairman: We have committed him for trial.—Mr. Stevenson: Very well, we must get a mandamus.—Defendant was formally committed for trial at the next Quarter Sessions.—Mr. Stevenson asked that, considering the paltry nature of the charge, defendant might be admitted to bail on his own recognisance.—Mr. Rowlatt opposed the application, and the Bench decided to allow the same bail as before, namely, defendant in £50, and two sureties £25 each.—*Nottingham Evening Post.*

Exchange Column.

Wanted, *Aide Mémoire de Photographie pour* 1884, in exchange for THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for 1883 and 1881.—Address, E. EDWARDS, Silver-street, Bridgewater.

I will exchange a quantity of dry plates, any size, for a portrait or view lens by a good maker, or anything useful in photography.—Address, C. PARSONS, 36, Orbel-street, Battersea-park.

Wanted to exchange 250 gross of gem mats and preservers and fifty gross of gem trays for anything useful in photography or offers.—Address, F. WALTON, photographer, New Briggate, Leeds.

What offers for a splendid tea service of forty pieces, ground laid, raised enamel, and massively gilt, cost £4 10s.? Will take anything useful in photography.—Address, 30, Hope-street, Hanley, Staffs.

I will exchange a good 15 × 12 Kinnear camera and doublet lens, by Burr, London, two slides and case, for a good 10 × 8 size with lens complete.—Address, ARTIST, 18, Dennetts-road, Queen's-road, Peckham, London.

I will exchange the last twenty numbers of THE BRITISH JOURNAL OF PHOTOGRAPHY for ferro-prussiate paper or anything useful in photography.—Address, C. ESKELL, 2, Osborne-place, South Kensington, W.

I will exchange, mounted, water-colour paintings from nature by a first-class artist; number, sizes, and subjects on application. Wanted, Dallmeyer's 8 × 5 rapid rectilinear lens. Good camera and three double slides not objected to; also Dallmeyer's 1B lens, or offers.—Address, MAY, 2, Brunswick-terrace, Penrith.

What offers in exchange for a new cuckoo clock, made to stand on bracket in hall, a first prize from a draw, strikes hours and half-hours, value sixty shillings, photograph and size two stamps, also eleven volumes of THE BRITISH JOURNAL OF PHOTOGRAPHY from 1870 to 1880? Wanted, a dark tent or a good wide-angle lens for all kinds of outdoor work; must take pictures up to 10 × 8 or 12 × 10.—Address, W. BROOKE, 62, Town-lane, Shepton Mallet, Somerset.

I will exchange a cottage window, with folding sashes; a number of backgrounds, decorative and plain; a Cussons' posing chair, with movable arms; see-saw, nearly new, by Seavey; a Seavey plaque, frame, and background, nearly new; a patent turn-table for posing chair, by Marion, quite new; head-rests, by Harrison; Haddon Hall steps. Wanted: a powerful rolling-press, with plate about 24 × 18; must be in good condition.—Address, Mr. WINTER, Midland-road, Derby.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

A LONDONER.—Both the houses are highly respectable, and you may rely upon all the goods you purchase from them.

A. Z.—The gelatino-chloride process will suit your requirements best. Give with it a full exposure, and use a weak developer.

A. A. A. (Victoria-street).—The crystals of nitrate of silver being fifteen or twenty years' old, and slightly discoloured, will be no detriment to the salt. You may safely strengthen the bath with it, just the same as if it were quite new.

ALBUMEN.—You have been supplied with something which is certainly not kaolin, or it would not have precipitated the silver as you say it has. Better make up a fresh bath now, and procure some genuine kaolin for us when it requires decolourising.

S. S. S.—Mr. W. B. Woodbury will, no doubt, supply you with a suitable paper. If he cannot supply it himself, he will no doubt direct you to the right channel for obtaining it.

F. F.—We have read the letter, and returned it to you as desired. You will see our opinion of the affair in our answer to "C. C. B." last week. This we endorse, after reading his letter to you.

R. SMALLEY.—If the result forwarded be the best the lens can produce you will certainly be fully justified in returning it. We should imagine no objection will be made to exchanging it for another.

AMATEUR MECHANIC.—Yes; pine will do quite well for a camera; but, while you are about it, why not employ mahogany? It will not cost much more, and a less thickness will be required. It will also prove more durable.

H. SOLTER.—The negative arrived broken to fragments; but we can see that it is a decided case of green fog. Perhaps it arises from over-cooking, or, what is more likely, the gelatine you employed was unsuitable. Try another sample next time.

R. S. WARD.—We are not surprised that the druggist in your town cannot supply chrome alum. Few druggists keep the salt in stock, as they have little or no demand for it. Any operative chemist or photographic material dealer will supply your wants.

I. J. K.—You will find some designs for studios in the English translation of Liesegang's *Photography*, published, we think, by Sampson Low and Co. The light should not come nearer the floor than about ten feet six or so, according to the width of the studio.

P. J. BURT.—You had better get some carver and gilder in your neighbourhood to give you instruction in renovating old gold frames. We cannot undertake to do so in this column. We know nothing whatever of the "restorer" named, so cannot give you its composition.

AN ASPIRING OPERATOR.—If the examples forwarded are a fair specimen of your work we do not think you will be justified in expecting anything like the salary you mention. Operators capable of producing far more artistic work than yours are to be had for very much less.

F. T. DAWKINGS.—There is nothing at all extraordinary in a solution of gelatine remaining fluid and refusing to set. From some cause or other—probably from the solution being kept at a high temperature for too long a time—it has become decomposed. Better throw it aside now and prepare a fresh batch.

E. E. DAVIS.—Evidently the cyanide of potassim is of very inferior quality; otherwise such a large proportion would not be required to make a solution which will only fix collodion positives in from four to five minutes. If the salt were good, and used in the proportion named, we should expect it to fix the pictures in a few seconds.

H. BOISSONNAIS (Geneva).—The patent in this country for the Eastman coating machine has expired, therefore any person is at liberty to make one for himself. They are not articles of commerce. Possibly Mr. Eastman himself could supply you with one. His address is "Rochester, New York." We are not aware that any coating machines are made for sale in England.

A.B.—1, 2, 3. All will depend upon the amount of silver the emulsion contains in the first instance, and the thickness of the coating on the plates. When travelling on the continent we should quite expect the old fixing solution is not worth saving, with a view to the recovery of the silver it contains. If the silver be deposited on the trees in patches, we imagine the plates must be at fault.

RECEIVED.—John Harmer; W. T. Wilkinson. In our next.

PHOTOGRAPHIC CLUB.—At the forthcoming meeting of this Club, at Anderton's Hotel, Fleet-street, on Wednesday next, the 20th inst., the subject for discussion will be—*On the Best Methods of Obtaining Black and White Negatives on Dry Plates.*

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. STEWARD, Optician,
For two Weeks ending Ferruary 13, 1884.
THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

Jan.	Barometer.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max Shade Temp.	Min. Tem.	Remarks.
31	29·86	SW	50	50	—	53	45	Raining.
Feb. 1	29·44	W	47	46	—	52	46	Raining.
2	29·75	NE	41	40	—	42	40	Raining.
4	30·44	W	46	43	—	52	35	Hazy.
5	30·45	W	46	44	—	50	44	Raining.
6	30·29	SW	44	42	—	47	42	Overcast.
7	30·16	SW	39	38	—	45	36	Overcast.
8	29·99	SE	41	40	—	49	37	Foggy.
9	29·61	SW	49	47	—	50	40	Cloudy.
11	29·73	SW	40	39	—	48	37	Cloudy.
12	29·99	W	47	44	—	51	39	Bright & Clear.
13	29·97	SW	49	46	—	54	45	Bright & Clear.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1242. Vol. XXXI.—FEBRUARY 22, 1884.

THE PRACTICABILITY OF TONING AND FIXING IN ONE OPERATION.

Just now the subject of the permanence—or, rather, the want of permanence—in silver prints is once again engaging the attention of the photographic fraternity. At several of the societies of late (both in London and the provinces) the matter, in one form or other, has been brought under consideration; indeed, it is seldom that anything in connection with silver printing is mooted now without its cropping up. But, as on former occasions, no new light has been thrown upon the subject.

It has been at many times asserted by photographers of the old school that if we were to revert to the ancient process of toning, with our modern knowledge, a far greater degree of permanence would probably be secured. This remark is so frequently reiterated that it may not be amiss to inquire if the thing be really practicable nowadays; and, if it be, whether a greater degree of permanence can reasonably be expected to accrue. Now, as many photographers of the present day have had no practical experience with toning or fixing in one solution, and some have really no idea how it is accomplished, we shall here give the process in detail, and then make a few practical remarks on its bearing as applied to modern circumstances.

Here is a formula for a toning and fixing bath that we know was employed for several years in one of the largest London establishments, and the prints issued therefrom have proved to be as permanent as any that were produced at that period:—First, three-quarters of a pound of hyposulphite of soda was dissolved in sixteen ounces of water. Then a fifteen-grain bottle of chloride of gold was emptied into two ounces of water, dissolved, and added *very* gradually and with vigorous stirring to the hyposulphite solution. Next, two drachms of nitrate of silver in two ounces of water were added in a similar manner. After standing for twelve hours or so, during which time the sulphur liberated by the acidity of the gold and silver subsided, the bath on filtration was ready for use.

When the prints were taken from the frame they were washed in water to remove the free silver, but not to the same extent as is now done, prior to toning by the alkaline method. They were then immersed in the toning bath. The first change in colour was to a foxy red, similar to that observed when an untoned print is placed in a plain solution of hyposulphite of soda. After a time the print gradually assumed a brown tone, then a purple, and finally a black, more or less cold according to the time it was allowed to remain in the solution. The time occupied in toning varied considerably, according to the temperature and activity of the bath. It was no uncommon thing for the prints to take several hours in acquiring the desired tint. Sometimes, when the bath was very inactive, the prints used to be left in all night on the chance of their being finished by the morning. When the prints were deemed to be sufficiently toned they were removed from the bath and washed more or less perfectly, the same as at present.

Frequently, when the bath was new, although it then contained its maximum of gold, great difficulty was experienced in getting anything beyond a purple-brown tone. When this was the case it was customary with many operators to immerse the prints direct from the frames without previous washing; then the darker tones were the more easily obtained. As the solution became older black tones could be obtained more readily. The bath, when once made, was rarely discarded; for, when its bulk diminished, new solution was made up and added to the old. The bath would continue to yield rich black tones long after it must have become quite exhausted of its gold, the colour obtained in this case being, doubtless, due to a sulphuretting action alone. Indeed, it is more than probable that, at all times, some part of the toning action was really due to sulphur, inasmuch as, until the bath had been considerably used and had thereby acquired sulphuretting properties, black tones could rarely be obtained.

At a late period of the toning-and-fixing-in-one-operation era, the most careful printers made it a practice to immerse their prints, after the desired tones were obtained, in a fresh solution of plain hyposulphite of soda, but the custom was by no means general. It should be mentioned, in connection with this system of toning, that the pictures must be printed *very* much deeper than for the alkaline process. This, in detail, was the old process of toning, and it did undoubtedly yield a very large number of prints which, to all intents and purposes, are permanent. It is for this reason many persons infer that if we went back to the old plan, and at the same time took care that the bath always contained sufficient gold to ensure that being the toning agent and not sulphur, and also that the prints were afterwards fixed in fresh hypo. and then carefully washed, a greater permanence would result.

Now, let us look at the facts and see the altered conditions under which the old process would now have to be worked, if it were again adopted, and inquire if such permanent results as were at times produced could now be expected.

In the first place, the albumen with which the paper was then prepared was salted to the extent of fifteen to twenty grains to the ounce, the albumen itself being diluted with water to the extent of one-third or more; hence the chloride penetrated deeply into the paper. Then this highly-salted and slightly-albumenised paper was floated for several minutes on (according to modern ideas) a *very* strong silver bath—from sixty to ninety, or more, grains to the ounce of water. Hence it will be seen that a large proportion of the chloride of silver forming the image was actually in the body of the paper—not merely on the surface. It may be here mentioned that, as the fashion for a more highly-glazed surface was adopted, black tones were obtained with greater difficulty than before, and a longer time was necessary in the toning bath.

At the present time, instead of the albumen being diluted with water and highly salted, it is used as concentrated as possible (a second coating being sometimes applied); and it contains only about a third of the quantity of chloride formerly employed. The coating is also dried very rapidly to prevent its sinking into the paper, so as to preserve the highest possible gloss. It is sensitised on a very much weaker silver bath than of old, and everything is done at the present time to keep the image as much as possible on the surface of the paper. Added to this, the negatives formerly used were very dense;

indeed, it was no uncommon thing for them to take a whole day to print, even in a moderately-good light. When printed the image was frequently seen distinctly on the back of the paper if it happened to be a thin sample. Now the negatives are made very thin, and print quickly; consequently the image rarely extends much beyond the mere coating of albumen.

These altered conditions under which the old process would now have to be worked should be borne in mind by those who advocate a recurrence to the plan of toning and fixing in one operation as a means of securing a greater degree of permanence.

HOME-MADE DEVELOPING DISHES.

From various communications recently received we are of opinion that the manufacture of specific examples of developing trays is a branch of home industry being practised by not a few, more especially by those whose facilities for purchasing these articles ready made are circumscribed either by remoteness from commercial centres or by other considerations.

There are several methods by which developing dishes may be formed without involving much expenditure of time, money, or even any special constructive skill. Of these, it is probable that a sheet of paper, the margins of which are bent up, will form the easiest. It is rather surprising how effective this paper-developing tray may be made. We have tested its efficacy on a 10 × 8 plate and find it to answer very well. The way—or, more correctly, *one* way—by which to form a tray of this class is to select a sheet of tolerably stiff, thick paper, and cut it one and a-half inch larger than the plate, turning up the edges so as to leave the bottom just a trifle larger than the plate for which it is intended. These turned-up sides are bent at the corner so as to lie against one of the sides to which the overlaps are secured by means of sealing-wax. A mixture of equal parts of bees'-wax and paraffine having been provided, and rendered quite fluid by melting, is applied all over the paper tray by means of a soft brush. When in use this dish is placed upon a slab of wood, millboard, zinc, glass, or any flat substance a little larger than the plate. One of the covering boards of an old dilapidated atlas was employed by us as the means for supporting the 10 × 8 dish to which allusion has been made, and it answered the purpose admirably. Those who have not made a trial cannot adequately realise how much wear and tear one of these paper trays will stand.

But by an extension of the paper system, on the evolution principle, a tray may be made which will prove very much more than a makeshift. By rendering paper plastic by immersion in a hot solution of gelatine, and shaping it upon a wooden mould of the required dimensions and form to the extent of four or five layers—more or less according to the thickness of the paper employed—a tray may be formed which, when dry and finished, will prove light, rigid, and unaffected by the developing solution. After it has been removed from the mould and become thoroughly dry it is first trimmed round the upper edge by means of a sharp knife or file—for it becomes so hard as to be better acted upon by a file than anything else—after which it receives a coating of common lac varnish. This, when quite dry, would prove sufficient protection for most purposes; but we have always preferred to give the tray a final coating of a solution of bitumen. As we have not found any sensible difference in the results obtained from the employment for this purpose of a solution of bitumen in benzole on the one hand, and the common Brunswick black of commerce on the other, we do not apprehend that special nicety in the selection is necessary.

For the tourist, home-made dishes of this description will prove very useful, inasmuch as they may be moulded to any form and made to nest inside each other; while in hot climates they will bear a very high temperature, having in this respect an advantage over either wax-coated wood or gutta-percha. The final touch in the manufacture of these *papier maché* trays is given by placing them in the kitchen oven until thoroughly hard.

A piece of thick, spongy millboard, of a kind sometimes employed in forming boxes and the covers of very cheaply-bound books, if steeped for some time in hot water, becomes softened to such an extent as to be readily moulded into the form of a tray. To this end the softening must be carried so far as to render it quite flaccid. In our last attempt at moulding a tray from this material the corners, owing to the brittleness and bad quality of the board, could not be got into form, so we slit them and overlapped the edges round the corners of the mould, applying strong flour paste to keep them in shape until the tray had become sufficiently hard to warrant its being knocked off the mould. This was then trimmed with a pair of sharp scissors and placed in a current of air until dry, after which it received as many coatings of asphaltum varnish as it could absorb, the services of the kitchen oven having been brought into requisition to aid in the drying of the varnish. From a critical examination of a French-made tray of great excellence which we had many years in use, we have arrived at the conclusion that it was made of like materials and in a manner similar to that which has just been described.

For travelling, and also for occasional home use, a tray devised by Mr. James A. Harrison, some years ago, will prove of great value. It consists of a light wooden frame, of dimensions to suit the size of plate used, hinged together at three of the junctions in such a manner as to open and pinch between the ends of the slabs a piece of waterproof of flexible material, such as thin india-rubber cloth, the fourth and open junction of the frame being afterwards fastened by a hasp or clasp of any suitable kind. When the corners of the rubber cloth are thus tucked up this makes a very convenient tray, the material of which may be changed to suit special requirements. For example: desirous of developing a paper photograph, we formed it into a tray by pinching the corners in the frame and then pouring in sufficient developing solution to serve the purpose. A few years ago we made an improvement upon this portable tray by rendering the laths expansible in the longitudinal direction, so that one frame served the purpose of forming dishes including a variety of sizes.

Gutta-percha, which was deservedly deposed from a position it once held as a recipient for the silver bath, answers well as a material out of which to form developing dishes. The facility with which a sheet can be moulded into a tray renders a description unnecessary.

Japanned tin is said to be much employed in the United States for developing dishes, but, from some observations made by a speaker at the Indianapolis Convention of the Photographers' Association of America, we imagine this class of tray does not meet with universal approval.

THE USE OF SULPHITE OF SODA.

While offering an excellent proof of the usefulness to photographers of our *Notes and Queries* column, an article by Mr. B. J. Edwards in our issue for the 8th instant raises a very important question in regard to the use of sulphite of soda in the developing solution, which valuable suggestion of Mr. H. B. Berkeley's has had so widespread an adoption that any tendency to prove that its use involves a grave defect must be examined with the utmost care.

The gravity of Mr. Edwards's charge is contained in the following words. Speaking of gradation of tone in dry plates, he says "your correspondent points out that this gradation depends to a great extent upon the plate. It is perhaps not generally known to what extent this is true of different makes of dry plates (which vary as much in their capabilities of giving true gradation as wet collodion at its best and at its worse); but, even with the most perfect plates, it is precisely in this respect that the sulphite developer has failed in my hands to give satisfactory results. It seems to cut off a little at either end of the scale. With normal exposure a little of the detail in the deepest shadows is lost, while, if the exposure be slightly increased, and the development pushed to obtain the required density, the delicate half-tones next the high lights are sacrificed."

Now, it is unquestionable that if Mr. Edwards's opinion be warranted by facts obtained from the experience of other workers, the use of this salt will be given up—at anyrate, by those who require the highest class of effect in portraiture. Mr. Edwards states that "already many of our best and ablest workers have discontinued its use, chiefly for the reasons stated above." We have from the earliest been such consistent supporters of the usefulness of the sulphite addition to the pyro. developer that we cannot receive Mr. Edwards's *dictum* without further proof, greatly as we esteem his knowledge and ability. In view of the importance of the question we earnestly express the hope that those of our readers who are in a position to do so will give their carefully-weighed opinion as to whether the use of sulphite does or does not restrict the range of gradation that any given plate is capable of showing. The answer will be of most value from those whose work lies with portraits more than in landscapes, for minute variations in gradation are unquestionably more readily observable in the former than in the latter.

We have ourselves a very strong opinion that Mr. Edwards's contention will not hold good; still, the point not hitherto having had special attention drawn to it, this opinion is subject to revision, and we propose making definite experiments to test the qualities of the sulphite of soda in this particular direction.

It will not suffice alone to show good pictures obtained by the employment of this salt. The record must be both comparative and continuous, and the question will evidently be one of considerable nicety, requiring both knowledge and discrimination on the part of an experimentalist before a judgment of value can be recorded.

It will be observed that Mr. S. Fry's experience offers a distinct negative to Mr. Edwards's; and, both manufacturers having had a long experience in professional portraiture, this conflict of opinion must naturally be most confusing to comparative outsiders.

Leaving now this phase of the subject with the again-expressed hope of contributions from our readers to aid in its complete elucidation, we may turn to the minor points raised in our correspondents' communications. Mr. Edwards considers that the advantage claimed for the sulphite is the absence of the usual non-actinic colour of the deposit; and, secondly, the facility of obtaining clear glass in the shadows.

We have to ask, with regard to the latter, where Mr. Edwards will find such a claim made? We have ourselves devoted more space than anyone to show the advantage of sulphite; but we have made no such claim, nor do we remember anyone having done so, and we do not think the facts would bear it out. As to the first point, though we may be accused of playing with words, we would say that the "non-actinic colour" is not in "the deposit," as Mr. Edwards writes it, but, instead, consists of a staining of the film. It would be quite possible to produce a similar colour in an oxalate developed negative subjected, after fixing, to the action of a bath of alkaline pyro.

Mr. Edwards's communication concludes by alluding to the preservative action of the sulphite upon pyro. solution, which, he states, is equalled by the use of glycerine and alcohol, or a trace of acid in the aqueous solution. It is true that Mr. Berkeley pointed out its preservative action in the pyro. solution, but that is the least part of the matter. Spirit and glycerine appreciably increase the cost of the pyro. If keeping the solution free from discolouration alone were in question nothing could surpass the effects of adding acid, as first suggested by Mr. A. Cowan, though, as was pointed out in our columns, a far smaller quantity than he recommended would answer the purpose. The function of the sulphite, we take it, is primarily, as often explained by us, to keep the negative from taking on the unpleasant yellow colour characteristic of pyro.-developed plates; and secondarily—and almost consequently—to keep the solution from becoming so muddy and dark-coloured during use as to make it actually inconvenient to work with.

Mr. Fry points out, in his communication last week, several incidental advantages which decidedly add to the value of the above-described qualities, such as saving of valuable time through non-stained negatives printing more quickly, and assisting the retouching, the image more closely approaching the lead-pencil colour.

Finally: we would say that to our knowledge there are still many expert photographers who have not adopted the use of sulphite, and it would be unfortunate for any intending experimentalists to be deterred from essaying a discovery of its merits. It is surprising that, after the continued praise the salt has received, it should not have been tried by almost everyone; yet such is not the case, and it occurs to us that a possible explanation in some cases may be found in the photographer having been supplied by the local purveyor with some other salt in lieu of the sulphite, which is by no means a common preparation on the shelves of even first-class chemists, to whom the photographer always turns when he requires some rare or little-used preparation. In substantiation of this view we may mention an instance that was recently brought to our notice. A photographer had informed a pupil of the advantage of the use of the salt, and the latter forthwith went to the nearest chemist to obtain a supply. On the next "lesson day" the pupil informed his master of his ill-luck in developing. Upon further inquiry it was discovered that the chemist had told him he had made an error. "It could not be sulphite but hyposulphite that was required," and he weighed a quarter of a pound out, which the pupil religiously dissolved and mixed into a one-ounce bottle of pyro.!

We do not suppose that our readers are likely to be so treated; still, to those who yet intend to try the use of sulphite the incident may possess some value.

Dr. Liesegang is publishing the eighth German edition of his *Handbuch der Photographie*, which is to appear in five volumes, treating—1st, the photographic apparatus; 2nd, the collodion processes, wet and dry; 3rd, the gelatine emulsion process; 4th, silver printing and enlarging; and, 5th, the carbon process—in all about 900 pages, with several hundred woodcuts.

We have received from Dr. Liesegang samples of gelatinised paper which, if introduced into this country, would, we think, prove useful in several ways. The paper, which is prepared for use with collodio-chloride, is of two kinds, one of which has a soluble, the other an insoluble, coating of gelatine, both presenting the surface and high glaze of a glass plate. In addition to its legitimate application in connection with the transfer of collodio-chloride prints to glass or porcelain, we see no reason why the soluble form should not recommend itself as a substitute for glass for negative purposes when travelling, the picture being subsequently transferred to glass as its final support. The surface presents all the advantages of glass for the application of either a collodion or a gelatine emulsion, and after development the transfer of the image would be easy. We hope to report upon this application shortly.

There seem to be now two separate "rings" in America, the purpose of which is to keep up the prices of dry plates and "freeze-out" competition. From a circular issued by one of these, we find that "in the opinion of this committee 'concert of action between manufacturers of dry plates and photographic merchants is essential to the maintenance of the established schedule of prices, and to the development and preservation of that friendly feeling the existence of which is so desirable among the *members of our trade*.'" The italics are ours. Meanwhile the hint thus broadly given may be taken by consumers of dry plates as distinguished from the "members of our trade" that it behoves them to look after *their* interests themselves. No wonder there is just now such an exodus of skilled and experienced dry-plate makers from this country; and, further, it will be little wonder if—seeing that even with the lower prices prevailing in this country many consumers find it to their interest to be their own manufacturers—the effect of the "ring" will be to decrease rather than increase their trade.

According to a provincial contemporary, "the printing world is much disturbed by the discovery of a new process which enables any number of copies to be taken of the oldest book without setting a line of type. A compound has been discovered which may be spread upon a page without in the slightest way injuring the paper, and which refuses to rest upon ink. It can easily be removed to a stone, and there becomes the matrix for stereotype (?), or can be used for printing from at once. You hand your best beloved Aldine to the inventor of this new process, and he will return it to you without a stain or a mark, uninjured and only cleaned, and he will give you along with it an exact *facsimile*; letter for letter and broken stop for broken stop, of the volume which he has had in his possession for only a few days. Mr. Quaritch, the second-hand bookseller, is said to be thirsting for the blood of this too-clever inventor; but practical printers are already moving to see whether they cannot save the cost of resetting old editions, and, if certain practical difficulties are got over, we shall see a change not only in the productions of *facsimiles* of old books, but in the reproduction of modern books. It will no longer be necessary to keep type standing. A proof will be as good as a stereotyped plate. No book will ever really be 'out of print' so long as a copy of it remains. It will be nearly as cheap to reproduce a volume as to print an extra copy of a volume passing through the printing machine. Certainly we are progressing. Already water-colour drawings can be so well lithographed as to deceive the very artists. The time is not far distant when we shall photograph colours. And now that a book may be reprinted from itself, we may reasonably hope to find a method whereby oil colours may be multiplied from their own canvasses." Alas! for poor photography, that one of its most valued services should be thus rendered useless! No more old editions to be photographed as *facsimile*—no old engraving to be reproduced by photography, so that its owner cannot detect copy from original. We have only to wait "till certain practical difficulties are got over," and this, we daresay, will occur about the same time that colours are produced by photography, as indicated in the article we quote. The only comfort to be obtained is from the positive manner in which this latter assertion is made.

WHEN one door shuts another opens, however, and we therefore bring before our readers an account of the latest field that has been opened for photographic operations. A correspondent in a trade journal devoted to the interest of the chemists' business says:—"I see in your August number of the *Chemist and Druggist* you treat on photography. I enclose a few labels which I have always used for small phials. I print them from overplus sensitised paper at the time of printing orders for photographs. I simply write out what is wanted about ten or twenty times larger than what is required and photograph it, covering the remainder of the plate with yellow paper, shifting the sensitised paper as required or when sufficiently printed; I print in sheets of six or eight. I have now somewhere about 100 different plates. The pill-box top with the portrait is done by double printing.—Yours truly, F. T. MOORE, Waipawa, H.B., N. Z."—The editor of the paper replies:—"The specimens sent by Mr. Moore are very neat and attractive. The pill-box top bears his own portrait, and the other labels show considerable skill in penmanship. A 'superfine malt vinegar' label bears a photograph of what looks like a spirit still."

Is there not more than meets the eye in Mr. Moore's proposition? What splendid opportunities for the unsuspected introduction of contraband portraits! When Angelina lay sick on her couch through grief at the banishment of Mr. Lively Cashless, the very mention of whose name had been forbidden by stern parents, who would think of looking on the lid of a pill-box to find a "counterfeit presentment" of the hopeful lover, introduced through confederation with the chemist's boy? How fortunate photography did not exist a few hundred years ago, or one of Shakespeare's grandest works might never have been written! Romeo might have sought the apothecary on other thoughts intent than the purchase of injurious distillations. He might have sent by means of the surreptitious pill-box or the guileless phial enough of portraits of himself in the various costumes of the period to satisfy Juliet's longings till happier times arose. But portrait labels existed not in the days when *Romeo and Juliet* was written.

ACCORDING to *Cosmos les Mondes*, a waterproof paper and pasteboard can be produced by treating the surface of ordinary paper with an ammoniacal solution of copper, so as to partially dissolve the surface, and then allowing it to dry. Paper thus prepared is said to be equal to parchment. Our readers who have taken an interest in the discussion at the meeting of the South London Photographic Society upon Willesden paper will not fail to see the resemblance of the two methods. We cannot avoid thinking that if all the promises as to the qualities of the Willesden paper are carried out in its performance the material should be capable of a wide sphere of usefulness in photographic operations.

EVERY one is familiar with the widespread employment of paper in Japan, and a new era seems springing up in Europe. We have heard of its adaptation to the construction of water-pipes, drain-pipes, railway carriage wheels, and many other remarkable articles; so that cameras and slides, or camera stands, made from it would cause us no surprise.

THE other day *The Times* gave an account, which came from Consul Jade, of Christiana, of still another new paper-making material—white moss, found in Norway and Sweden, which grows, dies, and accumulates in vast beds, gradually becoming so disintegrated as to be prepared by Nature herself for immediate use. It is stated that paper and pasteboard—even to a thickness of three-quarters of an inch—made of the material have been shown. Either of them is as hard as wood and can be easily painted and polished, and has all the good qualities, but none of the defects, of wood, as it neither cracks nor warps. Between this new material and the Willesden paper it will be surprising if some exceedingly useful photographic product be not the outcome.

THERE is even asbestos millboard advertised for use in the laboratory as the best material for placing over Bunsen's burners, "being cheaper, more durable, and less liable to crack the vessels than wire gauze." It ought to be useful for such purposes, and, as the cost is not twopence for a piece four inches square, the price should form no impediment to its acquisition.

THERE is no subject in photography which young photographers, or those who have not made a special study of it, are apt to misconceive in a greater degree than halation. Notwithstanding the innumerable definitions of the term and illustrations of the subject that have appeared in this Journal at intervals during the past twenty years, there are still some who imagine halation to be a reflection from the back of the dark slide, and some who, like Mr. Geddes, of Arbroath, feel aggrieved at space not having been found either in the ALMANAC or JOURNAL for the enunciation of their sentiments respecting this phenomenon, forgetting that we may have taken this step from the very kindliest of motives. Halation proper cannot be remedied, as alleged, by the mere placing of a piece of blackened cardboard behind the plate. The particular evil, whatever it might have been, that was said to be remedied by this treatment, was certainly not halation, for which (as we and numerous other writers have pointed out) *optical* contact in contradistinction to mere mechanical contact between the light-absorbing backing and the glass is a *sine quâ non.* We do not like to discourage ardent investigators, but much less do we like to see anyone placed in a false position when we can prevent it. We may embrace an early opportunity of saying something on a few of the phases of internal reflection of light which inpinges upon the surface atoms of the silver haloids.

PHOTOGRAPHIC LENSES FOR BEGINNERS.

AMONGST the questions which I have been asked by those who intend to take up the practice of photography there is none so common as "what lens would you recommend me to purchase to begin work with," or, "what lenses." It is a question not very easy to answer, and the answer to be given is now a very different one from what it would have been a few years ago.

In the days of collodion there could be little doubt as to the best lens for an amateur who, as in the case of most amateurs, aspired to do everything—portraiture, landscape work, and architecture included. We should then have had little hesitation in recommending an instrument of the group or universal type. It was possible with such to do portraits either in a studio or out of doors, and in fact at times, with all circumstances favourable, even in an ordinary room, the exposure being, of course, somewhat protracted. It was an excellent instrument for instantaneous work; and as such work usually requires the inclusion of but a narrow angle, the lens could be used for a plate small in relation to its focal length, and with full, or nearly full, aperture. With a wet plate and a universal lens and full aperture, the same actinic impression will be approximately produced as with a symmetrical lens on a rapid gelatine plate with a similar exposure. The apertures bear the relative area of about twelve or fourteen to one. The universal or group lens does not distort; it is, therefore, useful for architectural purposes, and when used with a small stop makes an excellent landscape lens.

It is to be observed that in using this lens for general landscape work it is usually necessary to make several extra stops smaller than those provided by the makers. I do not know why it should be the case, but certainly it is usual with a group lens to send out no stop with aperture smaller than about $\frac{f}{15}$ or $\frac{f}{20}$. It should be borne in mind that if this lens is to be used for landscape work it is necessary to have a set of stops bearing exactly the same relation to the focal length that the stops of a landscape lens of the same focus would be provided with; that is to say, we should have stops as small, at anyrate, as $\frac{f}{40}$. Possibly there is some idea in the minds of the makers of the lenses that there would be something ludicrous in the issuing of a lens of the portrait type about three inches diameter with stops as small as, perhaps, a quarter or three-eighths of an inch diameter. This is necessary, however, and I believe the want of success sometimes met with by those who attempt landscape work with such instruments arises from the fact that they do not understand the necessity there is to use stops as small as would be used with the ordinary landscape lenses of the same focal length for the purpose of gaining depth of focus.

I am, however, not now considering the lenses best for collodion work, and in remarking thus on the group lens I am wandering from my subject. The question on which I would say a few words is—first, what is the best lens for an amateur to purchase who can afford but one? The answer which will come to the lips of most without hesitation will be—"a lens of the rapid landscape type;" and certainly there is much to be said for this instrument.

With such a lens it is possible, under favourable circumstances, to take portraits even in an ordinary room, and this especially if the diaphragm cell which has been fixed by the maker be enlarged so as to give the full diameter of the lens, or very nearly so. In such a case we may work with an aperture of $\frac{f}{8}$ or $\frac{f}{6}$, and will get certainly as good definition as is required for portraiture; that is to say, if the instrument be by a good maker. The exposures in bright light will probably vary between ten and twenty seconds. Out-of-door portraits can, of course, be taken with such lenses easily, and with a very brief exposure.

For instantaneous work these lenses are excellent, although it is to be observed that in the case of such work the attempt should not be made to cover a plate whose length is more than a small proportion of the focal length of the lens. I consider that for instantaneous work it is seldom desirable, with a rapid landscape lens, to attempt to cover a plate whose length is much more than about half the focal length of the lens. Thus, for a half-plate we should use a lens of at least twelve inches focus; or, rather, as having but one lens we must take that as the starting-point, if we have a lens of twelve inches focal length we should not endeavour to cover, in instantaneous work, a plate larger than $6\frac{1}{2} \times 4\frac{3}{4}$.

It is needless to say that the rapid landscape lenses do well for architectural work when required to include no very large angle, and also for ordinary landscape work. In fact, the rapid symmetrical, or rapid rectilinear or euryscope, lens will, perhaps, bear the palm when only one lens is to be used. The last of those mentioned has one very great advantage for an amateur who attempts portraiture: it has a very considerably larger open aperture than either of the others. In fact it will work up to somewhere about $\frac{f}{7}$, at which it is just about twice as rapid as the other lenses mentioned, when these are used with the fixed stop as issued by the maker. It is quite true that at this aperture its defining capabilities, as examined under a high-power eyepiece, fall very far short of those of the English lenses referred to, and that, even stopped down to the diameter of their maximum aperture, it still gives somewhat less perfect definition. Nevertheless, the definition given with full aperture is quite as good as is requisite for portraits; at anyrate for such as are not to be enlarged. Altogether, where large plates are to be worked, the rapid landscape lens is, I think, the best for an amateur to purchase; but I would point out that for small-sized plates it certainly has a powerful rival in the cheapest and most ordinary of all lenses—the single landscape lens.

The single lens has more good points than it generally receives credit for, and this especially where it is not necessary to cover large plates or to include a very wide angle. There is a general tendency in the present day to perceive that we have been making too much use of the properties given in wide-angle lenses, and to restrict ourselves to the use of those of comparative long focal length with relation to the size of plates used. This gives the single lens a better chance than it has had for many a year, and there can be little doubt that it is coming to the front again.

The aperture at which a single lens of moderate focal length can be worked when only a narrow angle is to be included is considerable. In setting the limit of size at $\frac{f}{12}$ I am certainly not overstepping the mark. The definition given by some single lenses through an angle of about 30° with such an aperture is excellent. This aperture is, there is little need to remark, quite sufficiently great to enable instantaneous work to be performed with rapid plates.

Then there is to be considered, in the case of the single lens, the advantage of having but two reflecting surfaces instead of four. This advantage is greater than is commonly supposed, and is more felt in the case of dry plates than in the case of wet. The effect of reflection from several surfaces (besides the occasional production of ghost images or flare spots) is to introduce a certain amount of diffused light into the camera, with the effect of bringing about an effect closely allied to that of slight pre-exposure. Pre-exposure, as is well known, and, as was first pointed out by my friend Mr. J. Traill Taylor, is, in many cases, of advantage with wet plates, but with dry plates it is very seldom so.

Those who compare the image produced by a single lens and by a double combination lens, equal exposures and apertures being used, will perceive, especially with certain subjects, a decidedly greater amount of brilliancy in the image produced by the single than by the double combination lens. This quality of the single lens has sometimes been designated "penetration." Of course there is the drawback, in the case of the single lens, that a certain amount of distortion is produced. This distortion is, however, much less in extent than is generally supposed, and diminishes very greatly as the angle does; for all practical purposes it disappears entirely when we come to those angles which, as a matter of fact, give the most artistic results, namely, those of about 25° to 30°.

Nor is it to be imagined that to find all those good qualities it is necessary to obtain one of the very most modern makes of instruments. Some little time ago I tried one of the old-fashioned A. Ross's single lenses of twelve inches focus against one (of precisely the same focal length) of the most modern construction, which is sold under the name of "wide-angle." I found that the former would work at a somewhat larger aperture than the latter, and that when the stop was approached to the lens, and a small aperture was used, it would cover the same-sized plate with quite as good marginal definition.

If it come to a question of the *two* best lenses I should have no hesitation in recommending—first, a single lens of focal length somewhat longer than the plate; and, second, a rapid landscape lens of focal length as nearly as may be *double* the length of the plate. It is true that with neither of these can a very wide angle be included; but if the amateur be restricted in the number of lenses which he can purchase he must simply avoid attempting such subjects as include a wide angle, remembering that, at the best, they generally give poor results. W. K. Burton.

DARK-ROOM ILLUMINATION.—ACTINISM *VERSUS* WAVE-LENGTHS.

Dark-Room Illumination.

I now reply to Mr. G. D. Macdougald's comments on my statement that I was struck with the rapid falling off of the actinic power the further the plate was placed from the lamp, compared with the loss of luminous power, because I found that by exposing a rapid plate fifteen inches from the lamp I got a deposit in one minute, whereas with a plate coated with the same emulsion and developed with the same developer I could not get any impression in fifteen minutes, when exposed at a distance of twenty-seven inches. Mr. Macdougald says this is "impossible," because light diminishes inversely as the square of the distance from the source. The eye judges the amount of the luminous power of the light in a room by the general appearance of the various articles in it, and not by the photometric value of the light from any one point or colour.

I stated at a meeting of the London and Provincial Association that I thought to obtain an equal deposit on a film from a reflected as from a transmitted light—that we could have in the former case nearly fifty times more light in the room to work by than in the latter, supposing that the same burner was used in each case; but Mr. A. Cowan has proved that there must be far more luminous light than that. He found that by transmitted light he could obtain a deposit in five seconds; but with a reflected light, with more apparent light to the eye, he could not obtain a deposit in 180 times that period of time. Such being the fact, surely it was not surprising that I was struck with the rapid falling off of actinic compared with the apparent loss of luminous light.

Is there no explanation for this without the well-established law of inverse squares having to terminate its day of usefulness? To obtain a practically-safe transmitted light for the development of a rapid plate we have so to diminish the amount of light that, on looking at the lamp, we find towards the edges of the lamp there is a great falling off in the amount of light. This shows that the angles of incidence are sufficiently wide to refract the light back into the lamp instead of transmitting it; so that, if a plate be stood at a few inches in front of the lamp, nearly the whole of the light, both actinic and luminous, coming out of it will be received on the plate, and all around will be in darkness. But, when using the same burner in a reflecting-lamp, the light, instead of passing concentrated from its source to the plate, is first distributed all over the interior of the box, and the only light falling on the plate is that reflected from one small spot in the interior of the box, the remainder of the light, both actinic and luminous, being reflected in all directions into the room. Of course it does not matter how much actinic force there may be in the light reflected into the room, so that it does not fall on the plate; and as with the reflecting lamp light is equally distributed in all directions, the amount of actinic force reflected from any point in the box cannot exceed $\frac{1}{180}$th part of what it is when transmitted from the same-sized point of the flame.

There is another point we must not overlook, and that is that the film on a gelatine plate is white, and it is wonderful what a small amount of luminous light is required to see the details during development. The strain to the eyes, I am convinced, is due rather to trying to see points on the dark slide when putting in the plates, and in groping about for bottles, &c. With the weakest artificial light I have ever worked with I have never had any trouble in seeing the plate or in discovering which was the film side; but for everything else I had to trust wholly to touch.

I think where the greatest injury to the eyes is caused is in trying to see the marks on the graduated glasses. It would be a great improvement if we made our solutions to a certain equal standard, and used spoons or small ladles, by keeping the solutions in well-covered jars—one for pyro, one for ammonia, and another for bromide—with a glass or earthenware spoon in each. Each spoon should measure a drachm, or less. All one would have to do, when developing, would be to pour a certain quantity of water into the developing-glass, and for normal development take a spoonful from each of the three jars and pour in. An extra spoonful, or less, of either could instantly be added during development without any of the excitement or anxiety as to the fate of the plate that there is when trying to see the marks on the graduated measure, and without the difficulty there is to pour in only sufficient to come up to the mark, because in the dim light of the dark room one cannot see the amount of liquid coming down the neck of the bottle. By using spoons or ladles there would be no strain to the eyes, the developer could be prepared in one-quarter of the time, and we should get the exact quantity of solution we require without any difficulty.

Referring to Mr. Macdougald's other questions: if he will let me know his address I will send him a chart prepared by the Autotype Company, together with a paper read by Mr. J. R. Sawyer, at a meeting of the Photographic Society of Great Britain, and he will there find a thorough corroboration of my statements.

Actinism *versus* Wave-Lengths.

I will endeavour to explain more fully the meaning of the terms which I used in my articles on the subject.

In replying to Mr. W. H. Kirkby I used the same term that he did, namely, "actinism," as being synonymous with the term I had previously employed, viz., "actinic force." By these terms I mean that power in light which acts on the particles of silver bromide or other salt contained in the film. In speaking of the density of any transparent substance compared with that of the prism I did not, of course, mean that the two were actually of the same thickness or material; but that the resistance of any substance which transmits and changes the nature of the white light passing through it into a certain coloured ray must have exactly the same power of resisting as the prism at the angle of refraction which produces the same ray of colour, because the wave-lengths of both are equal. We know every coloured ray of the spectrum has a different wave-length after passing through the prism or other substance, and that the wave-length of each colour has a certain control over actinic force. This is shown by the different effects on a sensitive film. It occurred to me from the first that it was a somewhat singular fact that the sensitiveness of the gelatine film to the various colours was in an inverse ratio to their wave-lengths and the varying wave-lengths of the different colours. I thought I saw a counter or opposing force to that power (whatever may be its new baptismal name) which influences or acts upon the particles of silver haloid in the film. What I wished to show in my article was that there must be two distinct forces in light, and which is the stronger of the two depends on the colour of the substance which reflects or transmit it.

I will mention a few experiments to prove more clearly what I mean. In place of the coloured glass of the dark-room lamp let us first place a piece of ordinary transparent white glass, afterwards a piece of violet, then a piece of ruby glass, and expose a sensitive plate to each. On development we shall find that the first had allowed actinic force—that is, the power which had acted on the particles—to pass unchecked. We also know that all the rays constituting white light have passed through it. In the second case: we find that actinic force has passed through violet glass; but we know that the violet rays passing to the plate with this force have the shortest wave-lengths of any. And now comes the question —What has become of the other and longer wave-lengths? Old theory says they are absorbed in the glass; if so, is not this the only case known to science in which a substance absorbs anything without showing some result, such as expansion, chemical change, &c.? Is it not far more probable that the other rays of the spectrum, instead of being absorbed by the violet glass, are equalised by it and brought to the same wave-lengths as the violet, and the effect of white light passing through violet glass is the same as if the whole of the white light had passed through the prism at the same angle of refraction that the violet rays do? In the third case: with the red glass we find that the long wave-lengths have prevented the actinic force getting to the plate, or, at anyrate, in a very weak and slow manner. It might be objected that this was caused by a different substance being used in the manufacture of the red glass to that in the violet. But let us expose a plate to light passing through a prism which is one substance throughout, and here we find the effect on the plate the same at the two ends of the spectrum as with the two coloured glasses; or, in other words, that some counter-force in the light has been set free by the part of the prism where the red rays passed through which has prevented actinic force getting to that part of the plate, and at the violet end this counter-force has but little power. Herbert S. Starnes.

A METHOD OF INTENSIFICATION FOR GELATINE NEGATIVES.

There are, probably, not many photographers of the present day who would not admit the superiority of gelatine dry plates over wet plates for ordinary work. In spite of the difficulties and drawbacks attached to the introduction of a new process, involving the adoption of a new groove for working in, and the consequent additions to, and alterations of, plant and dark room and other arrangements, gelatine plates have now obtained a firm foothold in most studios, even to the extent, in some cases, of causing the total abolition of the silver bath for any purpose. There are times, however, which will occur to most of us, when we are apt to compare the old process with the new, and to think that the change is not an unalloyed blessing.

A distinctive difference between the development of wet and dry plates is that, with the former, it was not generally expected that full density would be obtained by the application of the developer alone, but intensification was so simple and easy, and so thoroughly under control, that it was hardly looked upon as a trouble. With dry plates it is far different; it is desirable always to obtain the requisite density with the developer. This, however, it is not always possible to do, owing not only to defects in the plate itself and errors in exposure, but also to errors of judgment caused by the deceptive appearance of the plate in the dim light of the dark room. Even when exposure and development have been fairly well judged it will frequently happen that upon examination the plate is found to need just a slight increase of density—just a little piling up of the high lights—to make it produce a brilliant picture. With a wet plate this would be accomplished almost before there was time to bestow a second thought on the matter; but intensification with a gelatine plate, and especially a very slight intensification, is not a task to be entered upon so lightly.

The methods generally employed are, as a rule, modifications of those used for wet plates; but owing to the deposit, in the one case, being upon the film and thus easily got at, and, in the other, being embedded in a mass of gelatine—itself a troublesome substance to deal with, requiring long washing to free it from soluble salts held within its pores and terribly liable to stain—a successful result is by no means equally easy of attainment. The acid pyro. and silver and acid iron and silver methods appear to be successful in some hands only; and those methods in which the deposit is first bleached by the action of a mercury salt and then blackened by the subsequent application of some other solution are open to this objection, if to no other—that it is very difficult indeed to judge how far to carry the bleaching action so as to secure exactly the amount of intensity required.

The method of working which I am about to describe I have found from experience to successfully cope with the difficulties ordinarily met with in portrait work, and, doubtless, would be applicable to work of any kind. The directions may, perhaps, make it appear that it is complicated; but in practice it will be found that the operations follow one on the other in very easy sequence—perhaps even, taking one negative with another, there is a little gain in point of time.

The negative, having been developed with alkaline pyro. and fixed, is taken out of the hypo. bath. Before washing, a judgment is formed as to whether it is too dense, dense enough, or too thin. In the first case it is washed and reduced by any approved method. In the other cases it is immersed in a bath of—

Protosulphate of iron	3 ounces.
Chrome alum	½ ounce.
Water	20 ounces.

Here it may remain a considerable time without injury; but the action will be complete in a very few minutes, and will be found to be similar to that of the acid and alum bath generally used for decolorising and clearing the film, with this important difference—that the deposit will have gained, instead of lost, density. It may happen that it is now too dense; but this is a difficulty very easily overcome by flowing over or immersing it in a weak acid solution. I use hydrochloric acid—about six drops to the ounce of water. At this strength it will be well under control, and yet be a sufficiently-active reducer.

If the negative should not have gained sufficient density in the iron bath it will, after a thorough washing, be in a more favourable condition for being acted upon by any method of intensification that I have yet experimented with than if the iron treatment had been omitted; but I have nearly always found it quite sufficient to treat it with a simple solution of bichloride of mercury in water. It is advisable to use this very weak to start with, especially if only a slight increase of density be desired. The resulting negative will have exactly the colour and appearance of a wet-plate negative intensified with pyro. and silver. If it require still more density it may be blackened with a solution of cyanide of silver, as in Dr. Monckhoven's method; but this will rarely be required.

The iron solution, if used over and over again, will, of course, in time contain a considerable quantity of fixing solution; but I do not find this affects its action in any way. The iron solution should not be allowed to come in contact with the film until the developer has been washed out of it, or an inky stain will result. The fixing bath, however, seems to secure this, either by simple washing or by some chemical action.

With regard to the permanency of the negatives thus treated with mercury I am not able to say much. It is only rarely that I have to proceed so far, and the oldest negatives I have so treated were made about a year ago. These appear up to the present time quite unchanged.

I make no claim to having introduced any novelties. The addition of protosulphate of iron to the fixing bath for the purpose of blackening and intensifying the deposit was recommended by Mr. R. Kennett in 1879. Shortly afterwards I found that the same effect could be produced if the negative were treated with a solution of this salt before the hypo. was washed from the film. The discovery of the strong intensifying action of bichloride of mercury on a film so treated followed as a natural sequence.

Alexander Mackie.

"ACTINISM AND WAVE-LENGTHS."

Mr. H. S. Starnes has far misjudged me when he thinks I credit him with arrogance and self-conceit; on the contrary, I ascribe to him qualities of a very different nature. Fertility, ingenuity, and resource are qualities which Mr. Starnes undoubtedly possesses. All the more dangerous is he when he gets on the wrong track, as he is at present.

I endorse all that Mr. Starnes has to say on theories—their birth and development. Will Mr. Starnes believe that I am not a crusty theorist, sticking to text-book law "up hill and down dale?" I am willing to accept his theory, or anybody's theory, that will explain a greater number of facts, or even an equal number, in a more intelligible way. But this is exactly what Mr. Starnes' theory does not do, as I shall endeavour to show.

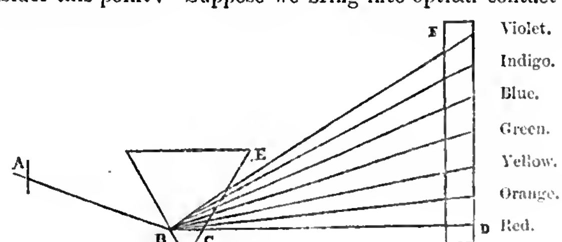
In the first place, Mr. Starnes is apparently not quite conversant with what is the generally-accepted theory. He has evidently got Brewster's ideas, or a theory very similar, and says that this holding has never been questioned from the time of its propagation. Now this is not the case. The theory that asserts that the prism is capable of splitting up white light into actinic, luminous, and heat spectrums has long ago been abandoned as quite untenable, and another, simpler and better in every way, put in its place. It is now held that the properties of refrangibility, actinicity, luminous intensity, and colour (the latter two being objective properties) are not each the results of a separate set of vibrations of the light-carrying medium, but are inherent properties of one set of vibrations of that medium.

Taking one point on the spectrum—say the yellow light of the double sodium line: the *refrangibility* is due to a disturbance produced at the surface of a new medium (prism), combined with the difference of the rate of propagation of the new set of waves set up in the new medium. This is crudely illustrated if we imagine a battalion of soldiers, which had previously been marching over a plain, to encounter a very dense forest. If the line of front be exactly parallel to the first row of trees the battalion marches through the wood in the same line as that on the plain. But if the line of front be not in the same plane, then the trees will begin to interfere with the progress of one part of the line of soldiers before it affects the other part; consequently a new line of front will be formed and a new line of march maintained through the forest different to that on the plain.

Again: the measure of *actinicity* of the sodium light is not caused by another class of waves, but is simply a property which it possesses along with the other properties of luminosity and colour—terms which go to express the effect on the retina of this particular wave-length. Example: sugar is translucent; at the same time it is sweet to the taste, and, not only so, but it is soluble in water. In like manner a particular light vibration, such as the sodium light, turns to one side on meeting certain surfaces at certain angles; it also affects a chemical preparation, disturbing its atomic or molecular arrangement. Thirdly: it at the same time produces an impression of a definite character on the retina, all these properties belonging to one class of vibrations.

Mr. Starnes' theory, so far as I have made out, is that light possesses actinicity in proportion as it is robbed or filtered free from another force—a *counter-actinic* force. Thus, red light has little action on a plate in consequence of the presence of this counter-force. Violet and blue are active because the counter-force is absent, or not present in such proportion. Mr. Starnes explains how this counter-force is eliminated in the prism. Those rays emerging to form the blue end of the spectrum have to pass through a greater thickness of glass, and are thus filtered out.

Now, taking the same diagram as used by Mr. Starnes, although it is faulty as regards the direction of the lines, I wish him seriously to consider this point:—Suppose we bring into optical contact with



the surface of the prism a perfectly-flat piece of glass, so as only to intercept the red ray, the glass to be of such a thickness as to make B C equal in thickness to B E. This piece of glass, according to known optical law, will in no way alter the direction of the ray or interfere with it otherwise. If Mr. Starnes' theory be true the red will be changed to indigo or violet; but it will be found not to change, although ten times the amount of glass be applied. Red it will always remain, which proves that its redness and want of actinicity is something else than a property conferred by passage through a certain small thickness of glass.

The fallacy of Mr. Starnes' theory may be shown in another way; but this may suffice meantime, and may cause second thoughts.

I was sorry to think that Mr. Starnes imagined he was being treated unfairly. He must give up the idea that scientific men are yet in the days of prejudice and the philosopher's stone.

He may take for granted that the fall of a theory will be no slow process, nowadays, if it fail to fulfil conditions. By the way, how would Mr. Starnes explain Nobili's and Newton's rings by his theory? G. D. Macdougald.

PHOTOGRAPHIC RESIDUES, AND THE RECOVERY OF THE VALUABLE METAL THEREFROM.*

[A communication to the London and Provincial Photographic Association.]

In selecting the subject for the lecture you did me the honour to request me to deliver before this Society this evening, I have chosen one to which I have given considerable attention for the past thirty years; so, without further preface, I enter into practical working.

Furnaces and Appliances.

When possible, it is best to construct a fire-brick furnace. This is not a difficult matter. Dig a pit about six feet by three feet, and three feet deep. Lay a foundation of brick three feet by two feet at one end; on this form the ashpit of the fire, twelve inches wide, fourteen inches from back to front, and four bricks high laid on their sides. This, with the fireclay luting or cement, makes it about eleven inches high, of course open in the front. Over the front lay a plate of iron five and a-half inches wide, twenty-one inches long, and three-eighths of an inch thick. Lay across the pit, at back, an inch bar three-eighths of an inch thick. You will now have an opening of twelve inches between the iron edges; on these the loose fire-bars are to rest. Now build up the furnace, twelve inches by fourteen inches, to the level of the top of the pit, putting an iron bar five inches by three-eighths of an inch across the pit at the top of the furnace, and also another bar, two inches above the level of the fire-bars, as stays to the front of furnace.

For the chimney remove some earth behind the body of the furnace, twelve inches deep from top, fourteen inches wide, and eighteen inches long; in this excavation form the throat of the chimney of fire-brick four and a-half inches square, the top being four and a-half inches below the top surface of the furnace. At the end raise a chimney nine inches square inside for two or three feet, where insert a damper-plate, then contract gradually to a height of twelve or fifteen feet. The upper portion of six feet may be a stout four-inch flue-pipe. Next fill in the sides and back with pieces of common brick and dry earth; and, with an iron cover in two parts and a grating over the pit, your furnace is complete at a cost of about £3. Other furnaces are built on the floor level, as my own, with a hood for carrying off fumes from chemical operations; then there are portable furnaces of fire-brick cased in iron, and, lastly, the extreme of portability is reached in the gas furnace. These latter are very convenient for trial reductions of small quantities, but when using a No. 6 clay crucible, which is a very moderate size for reductions, the pit furnace will be found the cheapest form of all; next to that the iron-cased fire-brick. Such an one also forms an excellent appliance for keeping the workroom warm. Their cost is from £4 to £6 to take a No. 6 pot. For fuel use gas coke. Select the dense light-coloured grey-looking; reject all the spongy, black pieces and all dust. Break the hard, dense pieces into such sizes as will pass readily between the pot and sides of the furnace. To prepare the furnace for use:—Place in the centre of the bars a fireclay stand or piece of fire-brick about two and a-half inches thick; on this, for special precaution till experience in firing is gained, place a skittle-pot stand easily fitting the bottom of the crucible. This will protect the bottom against currents of air through hollow places in the fire near the grate Now place plenty of wood all round the stand, also a light sprinkling of coals and some of the softer coke; light it and let it burn up gradually. Let the skittle-pot stand, crucible, and cover, in the meantime, be placed, mouth downwards, over the cover of the furnace, a little apart, to allow the hot gases to gradually dry and heat up the pot and stand. By this time the fire will need attention. Put on a three-inch layer of broken coke, on that put the skittle-pot stand, still mouth downwards, the crucible on the top of that, and cover up the furnace. They will now advance gradually to a low, red heat. Shift the crucible to one corner of the furnace, and the stand to the opposite corner. The tongs must always be heated up before touching the crucible. Clear away the ignited fuel from over the solid stand and place the open stand on it, in it the crucible, now mouth upwards, and place on the cover. Consolidate the fire with the poker and fill up all round with fresh coke, ramming with the poker as you proceed till it be level with the top of the crucible. Partially close the damper so as only to keep the fire at a bright red heat. The crucible is now ready for its charge after glazing. To do this throw in a few lumps of borax; when this has swollen up to a spongy mass take the iron stirrer (never use the poker) kept solely for the crucible use, and rub it all over inside of the red-hot crucible. We will now leave this and retrace our steps, and consider the collection and preparation of chloride of silver.

Chloride of Silver.

The precipitation and collection at the present time is mainly from the print-washing waters. These are best precipitated with commercial hydrochloric acid; this in a weak solution has no solvent power over the chloride of silver, nor does it add materially to gravity. Common salt, as usually employed, is objectionable on both grounds: the precipitate does not subside so readily when it is employed, and, being a cheap substance, unthinking operators usually add ten or twenty times more than is needed for the purpose, and thus increase both evils. For the receptacles of the washing waters conical jars in stoneware, with the greater diameter at the bottom, are to be preferred to all others.

After each addition of washing water and acid it is vigorously stirred and left to subside. Then, on clearing, a glass, developing cup, or measure is dipped in to obtain a sample, a drop of hydrochloric acid added, and if there be no opalescence produced the clear solution can be decanted by tipping the jar, or syphoning off; or an upward filter syphon may be employed, such as I introduced about 1863, a description of which will be found in the journals of the time.

This goes on till a considerable deposit is collected at the bottom. The jar should now be filled up with clean water to take up any foreign salt or excess of acid, and when clear pour or draw off as close as possible; pour the residue on to a shallow dish, and place in a warm, suitable place to dry off, if it be intended for furnace reduction.

Methods of Reduction, Wet and Dry.

The wet is as follows:—Instead of pouring the thick residue from the jar into a shallow dish, let it be placed in an open-mouthed jar, into which place a small porous pot such as is used for voltaic batteries; or, in the absence of a porous pot, procure a bladder, and fill it with weak acid solution, into which is inserted a plate of zinc with a copper wire attached. To the other end of the wire attach a plate of silver (an old spoon will do), and leave it undisturbed for twenty-four hours. By this time the chloride will have been reduced to the metallic state. The zinc remaining, porous septum and plate of silver is removed, and adhering particles of silver washed off. The silver is now transferred to a larger vessel, and repeatedly washed till a sample of the clear solution gives no precipitate or cloudiness on the addition of a solution of carbonate of soda. The liquid can now be finally drained off, and the precipitate dried for sale or use. If for sale, it had better be put into a borax-glazed crucible, with about five per cent. mixture of dry carbonate of soda and nitrate of potash, melted, and poured into the ingot mould.

The Dry or Furnace Operation on Chloride of Silver.

Process A.—The thoroughly-dried chloride of silver is mixed with powdered resin in the proportion of two parts of the chloride to one of resin, passed through the fine sieve two or three times, then well packed in the crucible, and submitted to a low red heat. In the decomposition of the resin, its hydrogen in immediate contact with the chloride of silver reduces the latter to the metallic state, the hydric chloride passing off quietly, leaving the silver mixed with some carbon. The whole is then turned out on to an iron plate to cool, the crucible immediately returned to the furnace, and a mixture made of two parts dry carbonate of soda, one part nitrate of potash, and one part dried borax. To these add sixteen parts of the silver and carbon mixture, passing all through the 36-hole sieve to thoroughly mix. The crucible should now be of a bright red heat; ladle in and allow each ladleful to deflagrate and partially fuse, and so continue until the whole is added. Now see that the fire is well poked down, the coke close in all round the crucible, and the furnace filled up to the level of the top of the crucible. Put on the cover and gradually increase the heat of the furnace to the yellow-white heat. After five to ten minutes of the strong heat remove the cover, stir up the contents of the crucible, and on withdrawing the stirrer gather up on its end a portion of the flux floating on the surface and examine it. If it be speckled with small beads of metal give it a gentle stir round, and allow it to subside a few minutes longer; then gather up a fresh portion on the end of the stirrer. This time it will most likely be practically free from beads of the metal. Check the draught of the furnace. With the hot tongs grip the crucible on the opposite side to the lip; then steadily pour out the contents into the ingot mould, which must be perfectly dry and warm, and rubbed over with chalk. Have ready to hand a light wire hook to scrape out the crucible if necessary. The pot can now be put on one side, as it is not worth risking another reduction therein.

Process B.—The chloride must be quite dry, and the crucible prepared as before directed. Take three parts dry carbonate of soda, four parts dry carbonate potash, three parts carbonate of calcium, and a-quarter of a part of fine white sand. All these must be very dry and intimately mixed by passing through the sieve two or three times. Take an equal weight of this mixed flux and the chloride, pass them through the sieve for thorough mixing, and then place in a bowl by the side of the furnace. The crucible should now be of a bright, cherry red heat. Introduce a small ladleful into the pot, and allow all effervescence to pass off before introducing a further quantity, and so on until the crucible is about two-thirds full of a semi-fused magma. Now cover the furnace, and allow the heat to rise to the yellow, occasionally looking in the furnace to see that the fire has no open channels through it, and that the contents of the crucible are in quiet fusion. On stirring it the contents should feel very limpid, and on withdrawing the stirrer it should have a thin coating of flux, not showing the slightest bead of metal. The contents may now be poured out as in the A process.

Sensitive Paper Cuttings.

The best receptacle for these is a basket; if any are put in wet or damp they will dry. Let this not be a place to throw in all kinds of rubbish, as every pound weight of such will cost you at least half-a-crown in firing, flux, and time. It is not at all unusual to discover in the ashes sent to the smelter burnt nails and screws, portions of scissors, parts of brass hinges, zinc, and lead. Of course this more than useless rubbish makes up a weighty parcel: but rest assured that you cannot have that separated from the silver except at considerable cost. Having collected a batch of silver paper it is better to reduce it to ashes periodically, in case of accident from fire when stored in large quantities. One pound weight of dry cuttings yields about one ounce of ashes of a light drab colour. If burnt in thick, compressed portions, or with insufficient air for combustion, the ash will be more or less black; the blacker it is the more flux will have to be used, and, consequently, larger pots, more fuel, and expenditure of time. For small parcels of cuttings an old iron tray (or sheet of iron) may be used. Place a row of bricks round on edge, and lay some iron rods across to make an *extempore* grating. Select a place to burn without strong currents of air. Under a wide open chimney is best, or in the open air on a calm day. Lay the cuttings lightly on the rods, and continue to supply gradually. Collect the ashes to one side occasionally as they cease to show any ignited portion, then press them down tightly. I will now suppose that one pound in weight has been obtained. Mix with that quantity six ounces nitrate of potash or soda, eight ounces dry carbonate of soda, and six ounces dry carbonate of potash. Grind the whole together in a mortar, which will greatly reduce the bulk of the mixture, and if it be a sample of ash free from rubbish the quantities will give a fluid flux with a moderate yellow heat. If useless waste paper, cards, kaolin, &c., have been burnt with the cuttings proper, it may take double that amount of flux to produce a sufficiently fluid state to allow the fine particles of silver to subside; hence the necessity for keeping your residues as clean as possible. Having consolidated your mixture of ash and flux pass it through a fine sieve. Portions of pins, nails, &c., however few, should be thrown on one side; for bear in mind the value of the metal recovered will be according to its freedom from alloy. The crucibles prepared as before, and of a dull red heat, is now filled up to within an inch to the top; keep the fire about the same red heat until you have got in the full charge. The mixture commences to scintillate quietly, the oxygen of the nitrate combining with the carbon, and traces of common metal escaping the sieve. When this sparkling has discontinued press the now doughy mass down with the stirrer and fill up the crucible again, not allowing the temperature of the fire to rise. Repeat the operation for the third time. The crucible contents, after the third pressing down, may be about half full; raise the heat gradually, occasionally stirring the contents of the crucible, and be very careful as it liquefies that no fuel falls into the molten flux, or it will most likely boil over. Always have an inch iron cold bar at hand to plunge into the flux, so as to reduce the temperature in case of a sudden boil up. The heat is to be kept up till the contents of the pot settles down to quiet fusion, and until a sample of the flux brought out on the stirrer shows no signs of beads as large as a pin's head. Then shut on the cover of the furnace and get up the heat to full yellow for ten to fifteen minutes, when it will be ready to pour as before directed.

Hypo. Fixings.

Precipitating Method.—Use a jar such as has been described for washing of prints and other nitrate solutions. Prepare a stock of concentrated solution of crude potassium sulphide (liver of sulphur) in a stoppered Winchester. Have a small cup of about an ounce capacity, and add one measure to (say) three gallons of fixing solution; stir up the solution vigorously, and the precipitate will most likely have a medium brown colour. Let it subside a few hours; then take a dip of the clear solution in the cup, and, dipping a glass rod into the concentrated sulphide, let one drop fall into the cup. If a thick, dense brown precipitate falls add another measure of sulphide to the bulk; stir again, and allow to subside. If on again testing the clear solution you only obtain a clear brown stain the metal is all but thrown down; add only a drachm of sulphide, and test again. After an interval for clearing, the precipitate will now exhibit a brownish-black colour, and the clear solution will be limpid like water; if yellow, it would be a proof of excess of sulphide, which is to be avoided—gold being partially soluble in such a solution. Having proceeded in this way, there will be no unpleasant smell; and if the fixing be conducted on the system I have indicated elsewhere the quantity of sulphide can be put in at once, and only one testing needed.

The clear solution is decanted or syphoned off, as in the case of the chloride, when sufficient precipitate is collected at the bottom to make it advisable to clear out on to a shallow pan after the washing away of soluble salts. The precipitate is then dried off in an oven or on the top of the furnace at a strong heat, and preserved till a convenient time for reducing. There are other processes, but they are far inferior. One is to keep scraps of zinc in the fixing solution vessels; the metal is a long time going down, and is complicated with zinc. The fixing solution containing silver can also be reduced to the metallic state by electro-chemical action, but, after so many years' experience, none of the many methods proposed from time to time give so little trouble, nor do they work so perfectly, as the sulphide precipitation. When properly carried out as indicated above there is no annoyance whatever from unpleasant smells. If any sulphur have been deposited from the addition of acid to the hypo. or from long exposure to the air, the sulphide of silver will have in admixture free sulphur. It will then be advisable to expose such mixture on a roasting dish—a shallow fireclay saucer—at a low red heat, the furnace top being brought off so that the air has access. The free sulphur will then burn off with its characteristic blue flame. Now take (say) one pound of the roasted sulphide of silver; add about seven ounces nitrate of soda, four ounces dried borax, six ounces dry carbonate of potash, and half-an-ounce of fine sand. Mix in the mortar, and pass through the sieve once or twice; put it into a bowl, and place near the furnace so as to be convenient to ladle into a red-hot crucible, a small portion at a time, allowing deflagration to subside before adding further portions. Finally: raise the heat gradually to the yellow stage, stirring occasionally, and, when calm, fusion has set in; cover the furnace and keep up a strong heat for fifteen to twenty minutes. Make examination of the flux for beads, and if free from such, and the flux on breaking exhibits a glassy fracture, the contents may be poured into the ingot mould. This metal (if from gold-toned prints) contains gold, and should therefore be kept separate for parting assay, otherwise it is best to combine the separate ingots from the pot into one bar for single silver assay.

Spent Gold Toning Baths.

Collect these in conical glass vessels—precipitating jars. Such vessels are obtainable holding about nine pints, or as small as assay flasks of one or two ounces. First acidify the solution with sulphuric acid, then add about half-an-ounce of hydrochloric acid to the gallon. Next prepare a saturated solution of sulphate of iron; add gradually, stirring with a light, smooth rod of wood until no further cloudiness is observed on looking through the glass. Allow the solution to stand at least twenty-four hours, then add a drop or two of iron solution to the now bright solution, and note if it produce any cloudiness. If so, add more sulphate of iron solution, stir up, and allow to subside again. As the precipitate is very valuable it may stand for two or three days to collect the finer particles from this high-gravity solution. When so subsided decant very carefully, and then fill up the vessel with water rendered acid with sulphuric acid; a few hours will now be sufficient for subsidence. Decant again and repeat three or four times, reducing the quantity of acid each time, the last being plain water. Collect the precipitate in a porcelain dish or crucible, and dry off in an oven; the result is a mixture of metallic gold and chloride of silver. Melt in a small smooth crucible, called "assay gold pots," with a portion of the flux recommended for the reduction of chloride in process B. Do not neglect to first glaze the pot with borax. Leave the button of metal in the pot till cold, then break off the button to obtain it; clean and weigh. Now take three times its weight of metallic silver from your other reduction, melt together in a plumbago pot, and pour the melted metal, as soon as liquid, into a pail of water; collect the granulated metal, and wash with distilled water. Then dissolve in dilute nitric acid by the aid of heat; the gold will be left as a rich brown powder, which has to be washed after decanting the acid nitrate of silver solution. It is then boiled with a fresh portion of nitric acid, and again well washed, testing the washing to see if any silver be contained therein. Finally, dry for sale or use.

Gelatine Emulsion Residues.

I have r[illegible]d two methods for extracting the silver from gelatine solutions. I[illegible] [illegible]king on batches of six to ten gallons contained in chemical stoneware pans the solution is made strongly acid with hydrochloric acid, and zinc plates placed therein. I now pass into the mixture steam at about twenty pounds' pressure to boil up rapidly, and continue the boiling for at least twenty minutes; the bromide of silver is thereby converted into metallic silver, which is allowed to subside. For small quantities I warm up the solution, dilute considerably with water, and add some hydrate of soda solution, then hyposulphite of soda to dissolve the bromide, and so obtain a clear solution. The silver is now precipitated with sulphide of potassium, and collected as directed under hypo. fixings above described. F. W. Hart, F.C.S.

A FEW NOTES ON CANARY MEDIUM.

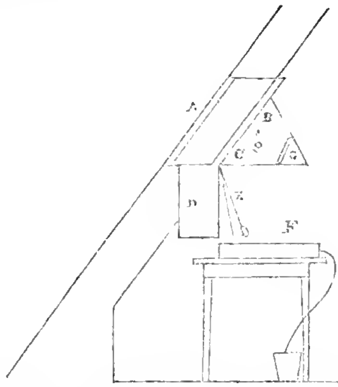
[A communication to the Edinburgh Photographic Society.]

Some time ago your Secretary gave me some of the canary medium, and asked me if I would try it and give him the results at which I arrived.

The sketch I show you will explain the kind of room and light with which I have to work. It is a small room, twelve feet by nine feet, lighted from the ceiling, which at one side slopes from near the floor. The window is two feet six inches by one foot six inches, and I fitted a box below it open on the top, and faced with the canary medium to give me a light directly in front when developing. This box has a shutter of brown paper stretched on a frame to cut off as much light as is wished. The window has also a frame fitted to it, which is put up with four buttons, and it also has a brown paper shutter to regulate the light.

As my window faces the east these shutters are necessary when the sun is bright I put on the frame (B) three thicknesses of the canary medium; these I oiled in the same way as was usual with the ruby paper. The flood of light was very great—so much so that your Secretary, when he came into the room, made the remark—"What white light!"

By drawing the cord to the shutter (C) I can make the room as dark as I please. After closing this shutter I selected two plates—one a Fry, the other a Bennett—and proceeded to make transparencies from two negatives selected.



A Window, two feet by one foot six inches. B Screen, canary medium. C Brown-paper shutter, movable at will. D Box to throw down light in front of developing tray. E Brown paper, movable at will. F Washing trough. G Printing-frame exposed.

I then let the shutter (C) drop right down, so that the full flood of light came upon the plate. The light at this time was so strong I could see a pin on the floor nine feet from the window. These two plates I now show you. They are *quite free from fog.* The developing dish was on the table two feet six inches below the window, and the plates were frequently lifted for examination. I then proceeded to make another transparency from a rather thin negative, placed it at a distance of ten inches from the frame with the same light as before, and exposed it for five minutes, the result being a pretty fair picture. From this it was clear that, however well a plate might be developed at a distance of two feet six inches from the window, the light was far from being a safe one to trust too much. I then removed the oiled paper and substituted two sheets of the paper unoiled, and exposed another plate for five minutes, the result being a *very faint* outline of the portrait. I then oiled one of these sheets of paper and exposed another plate for five minutes in the same way as before, and in this case got much more detail. From this it would appear that two sheets of paper is the quantity required for a light directly in front; while one sheet oiled and one unoiled, if the direct light be cut off by the shutters, as I use them, give a very pleasant and safe light to work by. I found even the two thicknesses of the canary medium gave a much more comfortable light to work by than the old ruby, which was so very trying to the eyes. I intended going over these again, giving an exposure of three minutes, but the weather being dull I had to give it up, though I hope to have another opportunity before long. THOS. H. W. KNOLLES.

SHORTCOMINGS OF PHOTOGRAPHY.

[A communication to the Dundee and East of Scotland Photographic Association.]

IN photography, where so much depends upon manipulations and processes, technicalities require, and do actually receive, great attention. The vast majority of papers read and discussions held at photographic society meetings are upon technical matters; and while a great deal has to be done yet before our formulæ can be considered perfect, or apparatus all that could be wished for, I think the time would be well spent were we to leave these well-worn grooves occasionally, and, taking a broader view of the situation, consider in what precise direction improvement is most urgently required. This idea was forced upon me the other day when, having the opportunity of comparing a photographic landscape with an engraving taken from the very same spot, I had to confess that the photograph lacked in a woeful degree the breadth and fine pictorial quality of the engraving. Nor was this due to any liberties which the artist has taken to improve his picture at the expense of truth, as could easily be seen by referring to the photograph. What, then, constituted the difference? and why was there a fine breadth of effect in the engraving, and a particular absence of it in the photograph, when, in both cases, the very same subject had been chosen?

In the following remarks I shall give what appear to me to be the principal shortcomings in a photographic picture; and as the subject is both wide and difficult, I make no pretenson to do more than skim the surface. To be concise, and at the same time intelligible, I will consider the subject—1st, as to outline; 2nd, as to light and shade; and 3rd, as to colour.

1st, as to outline: A design, whatever it may be, is forcible in proportion as it is simple. An artist secures breadth by seizing the salient points and presenting them unbroken by paltry detail. For this reason the photographic outline is too complex to be effective. It must be remembered that, while it is so far a copy of nature, it is a very diminutive copy, and will not bear the same elaboration as the original. Besides, seeing that objects in very different planes have to be adequately represented on the flat as being at different distances, some plan must be devised to do this. One of the most important aids in this direction is the surpressing of outline here and there, and the simplification of it where it cannot be surpressed. In this way a foreground may be made to come forward, while the distance seems to retire. Of course the camera has no such modifying power, and although we often see in the photographic picture an outline which would be better softened, or another accentuated, we have no way of photographically effecting it.

This equally intricate outline over the whole length and breadth of the picture not only destroys distance but it is not a correct representation of what we see; for it will be found, if the eye be fixed upon a certain object, that the outline grows less and less intricate as it nears the margin of our view. Looking along an avenue of trees, for instance, with our eyes fixed upon a certain point, although we have a vague, general impression of the trees immediately on our right-hand and our left, we do not distinguish every little leaf and every little spray as the photographic lens reproduces them. If the eye were in focus at one and the same time upon an object a few feet in advance, and upon another half-a-mile away, our perception of distance would not be nearly so perfect as it is, and yet depth of focus in a lens is considered a very important feature.

It may be asked, then, if our pictures ought to be blunt or blurred towards the margin? By no means. The impression which the eye receives of objects not precisely at the point of sight is not a blurred image. The general impression of outline is perfectly sharp, but the eye cannot follow it in all its little tortuosities. If an artist would be successful in conveying the impression which a certain scene had upon him, he must manage to bring the eye to rest upon his canvas precisely where his own rested when the original impression was produced. He does this by carefully working up from simple forms at the margin to the most complex at the point of sight. In this way the eye is carried forward to the focus of the picture, and finally chooses as a centre the very spot which was the centre of his own impression. I cannot see how the photographic outline, which is as pointed and precise at the margin as in the very eye of the picture, can lead one on into the distance; rather, I should say, is the attention arrested and fixed by what should have been only a stepping-stone. The point of maximum interest is never at the margins of my field of vision, and yet I have frequently seen it here in photographs. Vignettes have always been considered the most artistic of photographic productions, and this, I am convinced, simply because their margins are robbed of their undue importance. To recapitulate, then, I consider that the photographic outline, being equally intricate throughout, by scattering the interest robs the picture of the charm and force of one common centre.

With regard to light and shade: I consider they are not true to nature rendered by photography. Examine even the very best photograph, compare it with what you see in nature, and you must confess that the amount of black in it is far in excess of what you ever see in broad, beautiful daylight. Cast your eye over a landscape and note that three-fourths of the whole is in half-tone, the other fourth divided between high light and deep shadow. Photograph the same landscape, and you will find a very different proportion. A tree trunk or a large boulder, innocent of black so far as the eye could see, comes out with shadows "tartarian" in their depth. Let the light fall off so little that the eye can scarcely appreciate the shade at all, the sensitive plate will render it fourfold. The camera and the eye do not value light by the same standard at all; we judge by its luminosity, the camera by its actinic force—hence the confusion. Here we have a soft, delicate shadow, apparently only a little less intense than the high light; unfortunately, being reflected light, it has not actinic force in proportion to its apparent luminosity, and is rendered in the photograph as being many times blacker than it seems to the eye. But not only in individual parts does this hold good, for the whole general tone of the photograph is lowered from the same cause. Those who practice landscape photography must have noticed how equally luminous the landscape and sky at times would appear to be. A photograph of the scene, however, represents the earth as many times blacker than the sky, and, whereas in nature the distant hills melted imperceptibly into the clouds, there was in the photograph a line of demarcation painfully plain.

To recapitulate, then: since we judge of light and shade by degrees of luminosity and the sensitive plate by actinic value, and since shades are often luminous without being chemically active, I consider that light and shade as we see it is so far not correctly rendered in a photograph.

But photography has still another important shortcoming. I refer to the erroneous colour values which it gives us. I have already suggested that, as a mere matter of light and shade, the falling off of actinic force, even in feeble shadows, is out of all proportion to the falling off of its apparent luminosity. I have now to go a step further, and remind you that, in the matter of colour, of two tints the brighter to the eye may be rendered the darker, and the darker to the eye come out the brighter. This is an entire reversal of our sensations, and I need scarcely point out how serious a fault this is. To be utterly false to nature is bad enough; but were we left the same range of contrasts, even if they were erroneous, our pictures might still be beautiful, as witness many charming effects in portraiture where, although the various tints of the subject are erroneously given, the error is as often on the side of heightening contrast as reducing it. In landscape work we are less fortunate, for the prevailing colours in a landscape being various tints of yellow, brown, or green, all of about the same actinic value, we entirely lose the beautiful contrast which we see with our eyes.

Not only does the picture suffer in artistic effect from this, but should it happen that two objects of about the same actinic value lie side by side, no matter that one is orange and the other a dark olive green, they will be run together, and probably in many parts be indistinguishable from each other, thus introducing an element of great confusion. I was very much struck by this some time ago, photographing at the Gannseley, near Breebin. To look up the water from the bridge the scene was beautiful. A few large boulders at the edge of the stream were the darkest objects, then the wet banks only a little lighter, then the dry earth above in still lighter tints of red and brown, above that dry grass strewn with withered leaves, and, last, the trees —everything from light yellow to deep sombre olive-green. I was considerably disappointed, on printing from this negative, to find that to distinguish this tree from that, or to discover where rocks terminated and banks began, I had to hold the print within four inches of the eye. There were no beautiful contrasts—indeed, a few feet away it was difficult to make out the nature of the subject; beyond that there was a sky, and something white (water perhaps) running down the centre of the picture.

Having gone over what appears to me to be some of the principal shortcomings of photography, I may, perhaps, be allowed a few words as to how these faults are to be expurgated.

In the first place, I am convinced myself that "gelatino-bromide" has done nothing for us artistically; on the contrary, I am quite sure that the various shade and colour values were more correctly given by collodion. I would not for this reason resort to collodion, but would rather hope that very soon we may be able to prepare plates exceeding gelatino in rapidity and collodion in quality.

Certainly *the* improvement which we stand most in need of, as far as the chemical department is concerned, is the introduction of a plate giving us colours rendered correctly in black and white according to their visual values.

With regard to the excessive amount of detail: I would obliterate much or little of it, according to circumstances, by printing upon paper with a proportionately rough surface. Small pictures to be viewed in the hand, since breadth is not of so much importance, could be printed upon a moderately-smooth surface; while large photographs, intended for the decoration of walls, requiring breadth and force, and where detail to an excessive amount would be out of place, would be better printed upon rougher surfaces.

With regard to the intensely-black shadows: I would obviate that by using a printing process capable of printing only to a certain depth.

I need scarcely say that this would exclude albumenised paper. A determined effort should be made to throw off the trammels of the vitiated taste brought about by albumenised paper pictures. We have been so long used to the pure high lights and deep black shadows that a picture with less spice in it (so to speak) is apt to strike one as wanting in contrast, or to have a washed-out appearance. This impression would very soon wear off, and I have no doubt but that then we would recognise how violent an effect is produced by printing upon such a surface. With regard to the fine contrasts which we lose from non-actinic colours in nature: I see no other way than to add them by hand.

I saw it mentioned in the photographic journals, not long ago, that on the continent, in copying works of art, correct colour values were added by skilled artists. Of course if it be necessary to do so in copying paintings, it is just as necessary in photographing from nature. I have tried the plan of covering the back of the negative with tracing-paper, and working upon that with a pencil and stump. So far I have not been successful, the parts added being distinguishable in the print. More recently I have produced enlarged negatives from small transparencies, using "gelatino-bromide" paper. There are more successful and most effective alterations which can be made either with colour or pencil. The negative, even after it is waxed, is not not nearly so transparent as glass, and the shadows do not print to such a pitchy black, giving thereby a truer effect. The very slight grain of the paper is rather an improvement than otherwise, especially in large pictures.

J. K. Tulloch, M.D.

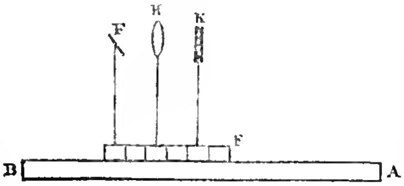
MISCELLANEOUS SUBJECTS.

Photomicrography in Lucerne.

Dr. Stierlin-Hauser, of Lucerne—an accomplished Swiss chemist and man of science, and the landlord of the largest mountain hotel in this country, the celebrated Rigi-Scheideck—is also an expert at photography, and well read in the English and foreign literature of the subject. Some time ago he was public analyst to the city of Lucerne. The manifold functions just stated are characteristic of Switzerland, in which your hotel landlord may be a doctor of philosophy and one of the local magistrates, professional and other kinds of life being here very much "mixed," and open to everyone provided he be but properly qualified. The affix of "Hauser" to Dr. Stierlin's name is the maiden name of his wife, according to a somewhat prevalent custom in Switzerland, in which the individuality of the wife is not so completely publicly lost in that of the husband as in England.

Much of Dr. Stierlin-Hauser's attention has been devoted to microscopic photography, and the following is his plan of operations:—A, B, *fig* 1, is a thick piece of board about a foot long, with a slot in its upper surface in which rectangular blocks of wood slide, and can be fixed anywhere along the slot. Brass stems to carry lenses, reflectors, and so on fit into holes in the movable rectangular blocks, and the necessary firmness is given where desired by means of thumb-screws.

FIG. 1.



On one of those days of unbroken sunshine which are so numerous here—far from the sea, and south of the champagne-producing districts of France—the board is placed outside the window, and the rays of the sun are reflected by the mirror F through the lens H, and the piece of cobalt-blue glass K. Thus a powerful beam of blue light is available for use in the operating-room, the rays being brought to a focus on the object by the selected position of the lens, or rendered more or less parallel at will. By means of the blue light any optical trouble as to non-achromatism is abolished sufficiently for practical purposes.

Inside the room the blue beam is received upon a mirror a few inches from any transparent object to be photographed, and thrown obliquely upon it, to get the best effects of light and shade. The object is then photographed in the ordinary way, a microscopic objective being used in place of the ordinary camera lens. Much depends upon the quality of this lens, for it must be aplanatic, and it is not every maker who can turn out good microscopic objectives of this class. Dr. Stierlin-Hauser has six objectives no good for the purpose; those two of his which answer admirably were made by Herr C. Zeiss, of Vienna.

When an opaque object has to be photographed it is placed horizontally, and the objective directed downwards upon it. By means of a prism above the objective the image is deflected at right angles, and falls, as before, upon the plate in the camera. All the parts between the objective and the plate are enclosed, so that no diffused light can enter the camera.

The difficulty mentioned in the last British Journal Photographic Almanac, about obtaining equal sharpness for those parts of an object which are at different distances from the lens, Dr. Stierlin-Hauser largely overcomes by giving about $\frac{1}{30}$ of a turn to the screw of the objective during the exposure of the plate, so that the lens is slightly moved during the operation. With sunlight and a slow plate, Dr. Stierlin-Hauser finds the maximum time of exposure to be seven or eight seconds. With low powers the minimum exposure is a second and a-half. By this system the operations are much like those of ordinary photography, and the operator works with comfort in full daylight.

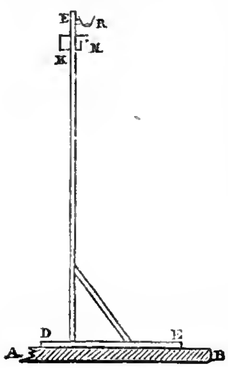
A photographer published, some time ago, that at recent photographic exhibitions there was more apparent halation in enlargements than was probably due to reflection from the back surfaces of the plates, and suggested the future use of lenses better corrected for the chemical foci. If light filtered through cobalt-blue glass were to be employed with ordinary enlarging lenses, and Professor Stebbing's film were used instead of plates, I suggest that there would be a great improvement in the quality of enlargements. I have been trying experiments with those films (and hope to publish the results shortly) upon test objects in which halation exists where not suspected when plates are used, and found the films to give a correction to the error unobtainable by the backing used for plates; but I wish to give the results of trials of the films as a whole, and to avoid premature publication.

Photography by the Magnesium Light.

Some experiments have been recently published on the use of bottles of oxygen in which to burn fragments of magnesium riband, to take portraits by the magnesium light. An objection is the trouble and cost of making the oxygen, and that means have to be adopted to to diffuse the light near its source. The objection to burning the riband in air is that the exposure is longer, and the burnt ash has a tendency to drop off and put out the light before the selected length of metal is consumed.

Some years ago I had occasion to use the magnesium light by night, and overcame the difficulties by the adoption of one part of the principle of Larkin's magnesium lamp. The method may be explained by the aid of *fig.* 2, in which A B is the top of a firm and solid table, on which was placed the base-board D E, supporting the wooden upright F D, which was some seven or eight feet long, consequently reached nearly to the ceiling of the room. R was a kind of little brass funnel with no neck, and a large opening where the neck should be. This brass-inverted cone was no larger than an egg-cup, and its lower opening was about as large as a fourpenny piece. K is a tin spirit lamp, with a horizontal neck and flame at N, so that anything falling through the funnel must pass through the flame, yet just miss touching the wick. The combustible substance was magnesium powder mixed with sand. One thimbleful of the powder, for instance, is mixed with two of sand with a spoon or bit of wood on a sheet of paper; then, the sitter being in position and all being ready, the mixture is poured all at once into the funnel. A long sheet of flame of one or two seconds' duration is the result. If the picture prove over-exposed the proportion of sand has to be increased in the next trial, and that of the magnesium powder correspondingly diminished. When once the right proportions are known portrait after portrait can be produced, properly exposed with dead certainty. No cap is necessary to the lens, provided a candle only be used for the normal illumination of the room, and it be not placed so that an image of it can be thrown by the lens into the camera. The proportion of magnesium powder regulates the proper exposure.

FIG. 2.



At first there was a difficulty, and one only, with this simple apparatus, and that was that the aqueous vapour from the flame condensed on the lower parts of the brass cone, and the powder stuck to the neck of the wet funnel, sometimes blocking it and arresting the flow of illuminating material altogether. The neck of the funnel was therefore cut off, and the lower opening of the cone made rather large. It would be an improvement to use something on which aqueous vapour has less tendency to condense than upon cold brass. The brass, however, was subsequently kept hot by fixing the spirit lamp nearer to it than in the first experiments.

The larger the proportion of magnesium in relation to the sand the longer the flame and the shorter its duration. With a very rich proportion I once had a flame seven or eight feet long, reaching the baseboard and burning its surface. The long flames give the necessary diffusion of light, and a white sheet on the opposite side of the sitter improves the shadows. The finest artistic effects of light and shade on the countenance of the sitter can be obtained by this method when the tall wooden lamp is placed in the proper position.

The sitter need not be fatigued with focussing operations; a candle placed where his face will come will do to focus upon. In fact, it is a capital method for the comfort of the sitter, who must not look in the direction of the coming flame, lest his eyes be dazzled by its magnificent flash, which, however, lasts but a second or two.

W. H. HARRISON.

RECENT PATENTS.

PATENTS APPLIED FOR.

No. 2,913.—"Gas-Bag Pressure-Boards for Dissolving-View and other Optical Apparatus." J. A. DALEN.—*Dated February* 7, 1884.

No. 3,510.—"Portable Legs, Supports, or Standards for the Stands for Cameras, Stereoscopes, Telescopes, or other purposes." H. B. SHARP.—*Dated February* 18, 1884.

No. 3,531.—"Improvements in Nature Printing." THOMAS HONYWOOD, Horsham, Sussex.—*Dated February* 18, 1884.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
February 26....	Bolton Club....................	Studio of the Club, Chancery-lane.
,, 27....	Bristol Amateur................	Studio, Portland-st., Kingsdown.
,, 27....	Photographic Club	Anderton's Hotel, Fleet-street.
,, 28....	London and Provincial	Mason's Hall, Basinghall-street.
,, 28....	Liverpool Amateur	Free Library and Museum.
,, 28....	Oldham.........................	Hare and Hounds, Yorkshire-st.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AT the meeting of this Society, held on the 16th inst., the chair was occupied by Mr. A. Haddon.

The evening was the monthly one on which a "lecturette" is given, and on the present occasion Mr. F. W. Hart discoursed upon the subject of *Residues* [see page 120], and illustrated his remarks by experiments and demonstrations. At the conclusion of the lecture,

Mr. W. M. AYRES asked whether it was not better to use engineers' coke rather than the ordinary gas coke, and whether it was not better when treating sulphide to burn off acid with nitrate of potash.

Mr. F. YORK said that he had been in the habit of reducing his residues himself, and of recovering fifty per cent. of the metal used. In order to test the matter he had recently divided a bulk of residue into three portions—one of which he had reduced himself, the other two having been sent to different refining houses—and compared the result. He found that the result was about the same in money value in all three cases, but on examining the flux left there was evidently silver contained in it; indeed, it proved to be worth about ten shillings per pound. The danger of not effectually and thoroughly performing the reduction was one which those who were not engaged in it as a business should guard carefully against, or they would lose rather than gain after all their trouble. The average value of dry chloride of silver or of paper-ash well burned he found to be one troy ounce of metallic silver from three avoirdupois ounces of residue. Sulphide of silver yielded rather more than one-quarter its weight of metal. For the precipitation of the chloride from print washings he kept two paraffine tubs, with taps about half-way down. When one was filled the other was taken into use, and before that was filled No. 1 would have settled down clear, and the liquid could be poured away. He would ask whether there was any advantage in using borax when fluxing. Like Mr. Ayres, he thought it much better to use steam coke, and did so accordingly.

Mr. A. COWAN inquired whether there was any advantage in using salt in flux.

The CHAIRMAN said that he used coke of both kinds. When the residue was very refractory and contained much alumina he used oven coke.

A Member suggested the use of hard carbon for getting greater heat.

Mr. HART, in replying to the various questions that had been asked and remarks that had been made, said that if hard carbon were used sixty feet of chimney might be required to get draught enough. As for the amount of saving possible to effect by systematic economy and careful reducing, he thought it quite practicable to get as much heat as eighty or eighty-five per cent. Nitrate of soda was sometimes used for fluxing because it was cheaper than nitrate of potash. Soda ash and not common carbonate of soda should be used, as the latter contained so much nitrate of crystallisation that it would spark in the crucible. For precipitation he preferred hydrochloric acid to salt, which took much longer to complete its work. When treating sulphides he did burn off with nitrate of potash. When he suspected foreign matter he used borax. Borax and boracic acid have great affinity for foreign matter. The flux after the completion of the reduction should have a vitreous apppearance. If it have a dull appearance a good deal of metal is left in it. A gentleman called upon him one evening telling him that he had had a residue reduced whilst waiting at the refiner's. Having picked up a small piece of the flux he showed it to him (the lecturer), who saw at once that the action had not been complete, and on putting it into the furnace, he extracted four shillings' worth of gold from that small piece of flux. The object of using sand was that when one is reducing, and has a quantity of alkaline flux left for some time in the pot, the crucible might be attacked; the loose sand was then acted on instead of the crucible. Common salt was principally used in making assays of minerals when litharge had been added; the lead then went down in a shower.

The CHAIRMAN proposed a vote of thanks to the lecturer, which was warmly accorded.

It was announced that on the 28th inst. Messrs. C. and F. Darker would give some demonstration of, and experiments in, polarisation of light.

EDINBURGH PHOTOGRAPHIC SOCIETY.

THE ordinary meeting of this Society was held in 5, St. Andrew-square, on Wednesday evening, the 6th instant,—Mr. William Neilson, President, in the chair.

The following gentlemen were elected ordinary members:—Messrs. Daniel Finlayson, F.R.P.S., Andrew Forbes, Edward Debenham, Julius Peike, W. S. Anderson, and Hunter Muir.

Mr. T. D. POPE gave a demonstration of his mode of producing gelatino-bromide enlargements on paper. Two very successful enlargements were produced, of good colour—brilliant, yet soft. In the course of the demonstration he (Mr. Pope) said it was imperative that every attention should be paid to cleanliness and careful washing between development and fixing in order to avoid stains. While the paper is dry it is very liable to receive stains from damp fingers. He particularly recommended that the developer be poured into the dish, and the exposed paper, previously soaked in water, floated thereon face down, as the plan usually recommended of pouring the developer on the print, in his hands, tended to produce unevenness and stains. When the image was fairly visible, then it should be turned face up. In practice, he had a piece of white cardboard nailed on the wall of his operating room with the various sizes marked upon it. The image thrown on the desired space from a lantern was duly focussed to the required size; the light then being turned down, a piece of dry argentic paper was tacked on the space and the exposure proceeded with. He (Mr. Pope) preferred negatives of moderate density—not too thin, but with clear shadows. The time of exposure could only be learned by experience, the quality of negative and power of light being the chief factors. The following were the formulæ employed:—

No. 1.

Oxalate of potash	6	ounces.
Boiling water	30	,,

No. 2.

Protosulphate of iron	2	ounces.
Water	10	,,

No. 3.

Citric acid	3 ounces.
Water	10 ,,
For use, take of No. 1	8 ,,
,, No. 2	2 ,,
,, No. 3	½ ounce.
Fixing:—Hypo.	12 ounces.
Water	40 ,,

Fix twenty minutes.

Hardening bath:—Alum	2 ounces.
Water	20 ,,

Mr. Samuel Tamkin said his experience fully supported that of Mr. Pope's, in so far that greater freedom from defects resulted from floating the paper in development, and also advised that dishes only a very little larger than the paper should be employed. He handed round a large number of bromo-argentic paper prints with duplicate on ordinary albumenised paper. It was noticed that in some cases the bromide prints were the most suitable expression of the subject. In reply to questions, he (Mr. Tamkin) said that the difference in tone was due to the modifications in the developer. The cold, bluish-green tone was got by the use of that generally employed, viz:—Saturated solution of oxalate of potash, three ounces; saturated solution of protosulphate of iron, one ounce. He understood that an excess of iron caused yellowness; he, therefore, increased the proportion of oxalate, and gave a much longer exposure. By this means the prints developed as quickly as well-exposed dry plates, the colour was better, and the whites were remarkably pure. He found it of great importance to time the exposure correctly; for, though a great deal is said about the latitude allowable in this as in the working of gelatine plates, in neither should the best results be looked for unless the exposure has been correctly timed. It was in this that a thorough knowledge of the proper qualities of a negative became of value, because with such knowledge an operator might produce dozens in succession without a failure. It was always advisable to immerse or float the wetted paper face down in the developing dish, as mentioned by Mr. Pope. When small work was attempted great care was necessary in the mounting and finishing, as the surface was much more liable to injury than albumenised paper. He had found prints lose brilliancy by being burnished.

Mr. M'Kean thought the ordinary sciopticon unsuited for that work, and believed a six-inch condenser ought to be employed.

Mr. J. M. Turnbull said no advantage would be gained by a six-inch condenser for *carte* work. In fact, such a size would be a positive disadvantage.

A vote of thanks to Mr. Pope, proposed by Mr. Craig-Christie, was carried by acclamation.

A discussion on *Canary Medium* then took place, initiated by Mr. Knolles. [See page 121.]

Mr. R. H. Bow said he had found the ruby lamp too trying, and he was endeavouring to devise a substitute. The result of his experiments he hoped to embody in a paper, which he promised to bring before the Society at an early date.

Mr. Tamkin had tried the "canary," and was not satisfied with it. He found three thicknesses of pale yellow tissue paper was really better. His window was not under the influence of direct sunlight.

Mr. W. T. Bashford said that by the courtesy of Mr. Scorah, of Bradford, he had been enabled to distribute samples of canary medium to several members, and laid pieces on the table for others who might care to experiment with it. He thought that the opacity of the paper played an important part in its usefulness, as, according to Mr. Knolles, the medium was unsafe if oiled. There was no doubt, however, that the illumination was most pleasant, and with two thicknesses Mr. Knolles had shown it was quite safe, the negatives and transparencies produced being entirely free from fog. He drew the attention of experimentalists to a statement by Mr. Henderson that, though the light when examined by a spectroscope might exhibit a decided green, yet it might be quite safe for the dark room. He also noticed that some experimentalists had endeavoured to arrive at a solution of the difficulty by taking negatives of surfaces covered by various pigments. They thought that the least actinic pigment ought to indicate the safest colour, and be a guide to judge of the sensitiveness of plates. He thought experiments in that direction were likely to be misleading, and believed that pigments ought not to be compared with the colours as seen in nature; their action on sensitive surfaces was entirely different. He considered it an easy matter to produce the most contradictory evidence when the pigments of the artists' colourman were employed; but the photographer generally had to go direct to nature, and it was only by experimenting with nature's colours or their equivalents that the photographer would be materially benefited.

Mr. Turnbull exhibited a modification of Mr. Macdougald's lantern carrier, in which the parallel sides were made of metal instead of wood, thus allowing this ingenious contrivance to be sufficiently reduced in width so as to render it applicable to the sciopticon. He also exhibited Cadett's new exposure shutter.

Mr. Wardale presented the Society with a non-actinic lantern of new design for use in demonstrations.

The thanks of the Society were presented to Mr. Wardale, also to Mr. Knolles for his carefully-conducted experiments, and the meeting terminated.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

A popular evening of the Association was held in the Christian Institute, 70, Bothwell-street, on Wednesday, the 6th instant,—Mr. John Parker, Vice-President, in the absence of Councillor Robertson, in the chair. The feature of the evening was a magic lantern exhibition arranged and manipulated by Mr. Thomas Swan.

A very fine series of twenty transparencies from one negative, showing the multitude of pleasing tones which may be got in transparencies, by Mr. Alex. Cowan, of London, was very much admired.

Mr. L. Dixon, of Colne, exhibited some collodio-chloride transparencies printed by contact, most of which were very fine.

The other contributors were Messrs. York, Woodbury, England, Wilson, Lang, &c.

There was a very large attendance of members and friends, and the meeting terminated with votes of thanks to the contributors of transparencies and to Mr. Swan.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.

The usual ordinary meeting of this Association was held on Tuesday evening, the 12th instant, in the College of Physical Science, Newcastle,—Mr. A. L. Steavenson, J.P., of Tynemouth, in the chair.

Mr. E. Dodds read a paper entitled *Notes on Ruby Light*. He said that he had confined his attention principally to the testing of various coloured media suggested in the photographic journals, &c., and had decided in favour of ruby glass. He, however, showed in a lantern, brought for the purpose, several variously-coloured glasses and papers, some of which were highly suitable, the best of them being Mr. W. E. Debenham's cathedral green, combined with rag yellow paper, and a stained red glass combined with a saffron-coloured parchment paper.

Mr. J. P. Gibson observed that he used cherry fabric, but always with artificial light.

Professor Herschel said that he had nothing to offer from experience regarding the relative values of the different kinds of non-actinic colours which had been exhibited to them that evening for dark-room illumination. The non-actinic property depended so much upon the nature of the chemicals used, as well as of the light tested, that it must be in great measure a subject for experiment with different sensitive plates. But the exact measurements to which Mr. Dodds had submitted them showed very clearly that for manipulations of ordinary dry plates there was a large choice of very different-looking colours, of which several were almost equally harmless and inactive. Regarding the fatiguing effect of ruby-glass light upon the eyes: the complaint against it was, probably, in some degree well founded, as its low refrangibility must lengthen the visual focal distances of objects examined by it, so as to make it necessary either to hold such objects at a greater distance than usual from the eyes, or else to strain the adapting muscles of the eye to bring to a distinct focus on the retina the image of such objects when they are held close at hand; and especially when they are so closely examined and inspected as we are accustomed to do by holding them very near the face, in ordinary light, for minute discrimination. Short-sighted persons have a natural advantage over those whose usual sight is either normal or long-focussed in the power of minute observation; and in ruby light such persons would feel at home, or would at least be on a level of scrutinising aptitude and ability with ordinary-sighted persons in ordinary light. Normal-sighted persons, on the other hand, would feel as if the long-sighted infirmity natural to old age had overtaken them before its time, obliging them either to forgo the advantages of close inspection or to strain the focussing muscles of the eye fatiguingly to re-acquire the faculty of distinctness of sharp-focussed definition stolen from their vision by the light when attempting to enlarge the view of an object in the usual way by looking at it closely. The young generation of normal-sighted photographers will, no doubt, be led, by a prevailing use of ruby glass, to give the focussing muscles of the eye exceptional exercise in one particular direction. This will either (if over practised) tend to make them short-sighted for ordinary light, or, if only exercised enough to extend and not to displace the range of muscular efficiency, will furnish easy early training in a useful means of mitigating the usual tendency to deterioration of the eyesight; and it will prepare eyes so exercised in youth to combat more successfully than untried eyes could do the infirmity of vision natural to old age, and the defect of long-sightedness which normal eyes acquire sensibly even in the advancing years of mature life, without making it necessary then to hold a page of print at arm's length in order to see its letters clearly. A moderate use of ruby light, although somewhat fatiguing to normal eyes, must, accordingly, be rather likely to have a wholesome and invigorating than a deleterious and injurious effect upon the sight. It would be a useless light, however, for colour-blind persons; and the sense of red colour in normally-constituted eyes, it may be conjectured, would be quickened and heightened at the same time, without disadvantage, with the extended power of focus-adaptation. But a great range of other colours not ranking nearly so low in refrangibility as ruby red, it has been clearly shown by Mr. Dodds' illustrations and experiments, is open to selection and to adoption in a dark room with perfect safety by those who may be averse to suffering the feeling of inconvenience sometimes occasioned by the bright red, even if its trying effect on the eyes should be clearly proved to be not only harmless but, in reasonable limits of exposure to it, of useful service and ultimate benefit to their efficiency.

The Chairman proposed a vote of thanks to Mr. Dodds for his paper, which was carried with acclamation.

The Secretary exhibited and described a camera, sent for that purpose, by Mr. McKellen, of Manchester.

Some fine transparencies were shown by Messrs. Mawson and Swan, taken on gelatino-chloride plates of their own manufacture.

Mr. Dodds proposed a vote of thanks to the Chairman, who, in reply, expressed the pleasure it had given him to be present on that occasion. He regretted that he could not come oftener to the meetings, which, he said, were always instructive.

The second annual dinner of the above Association was held in the County Hotel, Neville-street, Newcastle, on Friday last, the 15th instant. Professor Herschel presided, and was supported by Mr. Way, Mr. Payne, Mr. Pike, and others. Mr. Garland occupied the vice-chair, and was supported by Mr. Ross and other members of the Association.

The CHAIRMAN proposed the usual loyal toasts, which were drunk with enthusiasm.

Mr. WAY gave the toast of "Photographic Art and Societies," and spoke of the value of an art education.

Mr. GIBSON responded.

The VICE-CHAIRMAN proposed "The Newcastle and Northern Counties' Photographic Association." He deprecated the art jealousies which seemed to exist among even our great men. He thought that there should be more generosity of disposition shown towards students by those who had made a life study of art. A different spirit prevailed among continental artists, from whom our native painters had derived a good deal of their knowledge of art. He trusted their Association would tend to break down the spirit of exclusiveness which prevailed, and the fear, so to speak, that their ideas or knowledge of art might be acquired by anybody else. Our countrymen in the past had experienced no such narrowness or jealousy from the old masters, and Englishmen should be more willing than they were to hand down to those who aspired to follow them all the knowledge of the art they could for the benefit of posterity.

The CHAIRMAN responded.

Mr. ROSS, in a few well-chosen remarks, proposed the toast of "The Officers and Committee of the Newcastle and Northern Counties' Photographic Association," which was responded to by Mr. Laws, Mr. Pike, and Mr. Sawyer.

Other toasts followed, and the proceedings were pleasantly interspersed with songs and pianoforte and violin solos, the instrumental music being contributed by Mr. A. de Pelsenaire and Mr. H. Sawyer.

GLASGOW AND WEST OF SCOTLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

A MEETING of this Association was held on the evening of Tuesday, the 12th instant,—Mr. Hugh Reid, President, occupying the chair.

After the reading of the minutes of last meeting, the following gentlemen were elected ordinary members:—Messrs. J. R. Downie, Mr. Bischoffhousen, G. Chalmers, W. Millar, James Garroway, and James Barr.

The CHAIRMAN proposed that the Association purchase a quantity of trays, measures, a lamp, and other apparatus to be used at meetings where practical demonstrations were given, and the Council were instructed to carry out the proposal.

Mr. T. W. ARMSTRONG then read papers *On Mounting Prints on Glass* and *On Transparency Printing*. For mounting on glass he used starch, first coating the glass and then the damp print, and squeegeeing the two together. He found the use of the squeegee much facilitated by coating the back of the print with starch, which acted as a lubricant and prevented the prints being torn. He had tried gelatine, but found the starch method more simple and quite as satisfactory in result. After Mr. Armstrong had given a successful demonstration of the process,

Mr. J. Y. MCLELLAN suggested that the addition of ox-gall to the starch would make it take more kindly to the polished surface of the glass.

Mr. FALCONER inquired if a mixture of starch and gelatine had been tried.

Mr. JOHN PARKER said he had used the gelatine process for a number of years and was quite satisfied with it, preferring it to the starch process demonstrated by Mr. Armstrong. He found no difficulty in the gelatine setting too rapidly, as during the operation of mounting he kept the glass over a tin tray of boiling water, the steam from which prevented the setting of the gelatine. He thought there was greater transparency in gelatine, and that it was less liable to decay than starch. Further, there was the advantage that, if desired, the gelatine could be rendered insoluble by brushing the back of the print with a solution of chrome alum. He used a weak solution of gelatine, and, instead of applying it with a brush, immersed the print entirely in the solution.

Mr. ARMSTRONG said he had tried a mixture of starch and gelatine, but found no advantage over pure starch. He thought starch was less liable to decay than gelatine, especially in cases where the print might be subjected to damp.

Mr. ARMSTRONG then gave a demonstration of transparency printing by contact and through the camera, using gelatino-chloride and bromide plates.

After a hearty vote of thanks had been accorded to Mr. Armstrong, the meeting adjourned.

LEEDS PHOTOGRAPHIC SOCIETY.

THE usual monthly meeting of this Society was held on Thursday, the 6th instant,—Dr. Thorpe in the chair.

Mr. J. W. REFFITT introduced the subject of *Photographic Enlarging, with a Demonstration of Direct Enlarging on Gelatino-Bromide Paper*. In introducing his subject, Mr. Reffitt said that he thought a short outline of the various enlarging processes would be of interest to the members, especially those who had recently taken up photography. Daguerreotype, or photography on a polished silver surface, was introduced in the year 1839. In the same year Mr. Fox Talbot brought out his invention of making paper negatives, from which any number of positive copies could be obtained. This paper was very sensitive to light. In 1851 Mr. Scott Archer published the collodion process, by which the photographic image was produced on glass, and from this time photographers began to exercise their ingenuity in finding out the best means of enlarging photographs in consequence of the many difficulties and drawbacks in taking large photographs direct. Having photographs on glass by the collodion process, and Fox Talbot's process of preparing very sensitive paper by means of iodide of silver, it needed but little ingenuity to adapt the well-known magic lantern to the production of enlarged photographs. [Mr. Reffitt here illustrated his remarks by going through in form the various processes of taking a small quarter-plate portrait, developing and enlarging the same by means of the lantern to life-size.]. One of the means employed in addition to the lantern was the solar camera or lantern as introduced by Woodward. It was not extensively used in this country on account of the small amount of actual sunshine. Paper enlargements thus produced were very permanent. Mr. Harrison, a well-known Leeds photographer, had exhibited two such enlargements in his window exposed to the direct rays of the sun for twenty-five years, and they showed little if any trace of fading. Enlargements on iodide of silver paper or Talbotype were largely employed for enlarged portraits to be finished in crayon, water-colours, or oil. Messrs. Winter Brothers, Vienna, use a similar process for enlarging on calico, and do a large business, employing the lime light as an illuminant. Another process was to make an enlarged negative from a small albumenised paper print, or from a print by the platinotype process, the latter (specimen exhibited) showing little or no effect of the grain of the small paper photograph. Sometimes it was advisable to make a transparency by contact from the negative, and then to make the enlarged negative to the size required, using some such process as the dry collodion or gelatino-bromide or chloride plates; or by making the transparency on carbon tissue, which, in his opinion, gave transparencies comprising the full scale of tones in the negative. Mr. Reffitt then exhibited a copying camera, and described the various arrangements for enlarging, such as the "horizontal window arrangement," the "vertical skylight, with window underneath," &c., &c. An enlargement could also be made by making an enlarged transparency on glass or paper to size required which could be touched up to improve as much as possible, and then a copy made by contact on dry collodion. The gelatine or carbon method, which was extensively practised amongst those who did a trade in club portraits, was to clean a plate of glass thoroughly, which, after dusting with talc or French chalk, was collodionised, sensitised in the silver bath, exposed with a small negative in the copying camera, and developed to a less degree than a lantern slide; a plain sheet of paper was then coated with gelatine and squeegeeed upon the film. After drying, the picture was stripped from the glass and mounted. Messrs. A. and G. Taylor, of Forest Hill, do a very large business in this class of enlargements—employing twenty-four copying cameras, fitted with twenty-four of Dallmeyer's No. 1 B lenses. Mr. Reffitt mentioned that he had a letter from the late Mr. Dallmeyer in which that gentleman recommended the B series of lenses as the most suitable for enlarging, and he also suggested that four diameters was the extent to which enlargement should be carried. Enlargements on gelatino-bromide paper were easy to make, and its introduction by Messrs. Morgan and Kidd, M. Hutinet, and others would do much to make enlarging popular with amateurs. The paper being very sensitive, enlargements could be easily made at night with a lantern and paraffine lamp. Mr. Reffitt then demonstrated the processes of enlarging on gelatino-bromide paper, using an optical lantern and a four-wick lamp, and, with three minutes' exposure, succeeded in producing a very fine enlargement from a quarter-plate negative, sixe 23 × 18 inches. Mr. Reffitt's paper was fully illustrated by means of diagrams, apparatus, and specimens of enlarging and enlarged negatives by all the processes mentioned.

Messrs. Teasdale, Thorpe, Holmes, and Thornton took part in the discussion that followed.

The following articles we re-exhibited:—A small pocket camera and plate-box combined for thirteen plates, by Mr. Watson; an instantaneous shutter, by Mr. Bradford; an instantaneous shutter, by Mr. Branson; adaptable carrier for unmounted lantern slides, by Mr. Teasdale; gelatino-bromide enlargements, by Mr. Rodwell; and a very fine carbon enlargement, by Mr. Ramsden.

The next meeting, which will be held on Thursday, March 6th, will be an open lantern night. Members wishing to send slides for exhibition must send particulars of their slides, process by which they were taken, &c., to the Secretary, 22, Carr-road, Leeds, not later than March 4th.

BOLTON PHOTOGRAPHIC SOCIETY.

A MEETING of this Society was held at the Baths, on Thursday, the 7th instant,—Mr. E. N. Ashworth in the chair. The minutes of the previous meeting having been read and confirmed,

Mr. MCKELLEN, of Manchester, explained the principles and details of his new camera. There can be no doubt that the inventer has overcome many of the difficulties and inconveniences of the old style of camera, and has secured lightness and compactness without sacrificing rigidity.

Mr. JOHN TAYLOR gave a very instructive explanation of the different modes of enamelling silver prints, and showed the process from the cleaning of the plates to the stripping of the finished prints.

Mr. C. K. DALTON gave the paper on *Platinotype Printing* which he had promised for the previous meeting. He (Mr. Dalton) is a very able manipulator, and his demonstration was one of the best of the season. His method and neatness were very conspicuous, and showed at their best the beauties and simplicity of the process.

Mr. R. Harwood had promised to give a lantern exhibition, but, being unavoidably detained from the meeting, Mr. T. Parkinson very kindly officiated.

The Platinotype Company kindly lent for the purposes of the evening a number of examples of their work, which afforded another enjoyable element in a very successful meeting.

In consequence of the lateness of the hour the further business was postponed, and the proceedings brought to a close by a cordial vote of thanks to all who had assisted in securing one of the best-attended meetings the Society ever had.

Correspondence.

DEFECTIVE GLASS IN DRY PLATES.

To the EDITORS.

GENTLEMEN,—I shall esteem it a favour if you will allow me a small space in your valuable Journal to give vent to a grumble.

The introduction of dry-plate photography has, to a large extent, removed the bulk of the work from the hands of the amateur to that of the professional photographer. The room required and the care and expense necessary for preparing one's own plates have made it impossible for many of us to do the work ourselves. It is a true saying that "if you want a thing done well do it yourself;" and I am sorry to say that it applies to photography as well as to everything else.

I do not wish to find fault with the film of dry plates—that, in many instances, is all that could be desired—but the glass upon which the film is put is horrible. I have tried the plates of nearly all the well known makers, and have found the glass, in many instances, to be exceedingly bad. The plates are not the size stated on the box containing them; they differ in size and thickness, the surface is not smooth, and in many cases they are full of air-bubbles.

I may mention that I only use quarter-plates for my work (photomicrography), so that I cannot speak of other sizes. I have tried nearly all makes with a view of finding the most suitable one for my purpose, and I have finally selected the one which does my work most satisfactorily; but three plates out of every dozen are too large to go into my dark slide, and some of the others are so small that they fall out. Not having all the necessary tools for cutting plates I am obliged to break off the edges until they are the right size, and every time I handle the negatives afterwards I run a serious risk of cutting my hands, besides spoiling half the plates I so deal with.

The gelatino-chloride plates are just the same. I purchased three dozen a few weeks ago, but have only used two dozen as yet, so that my knowledge of them is very small; but out of these I can say with certainty that not one was of the proper size ($3\frac{1}{4} \times 3\frac{1}{4}$); the edges of them were rough, and the surface was anything but smooth—indeed, a few of them would disgrace any firm (I shall be pleased to send you them if you would like to see them).

Plates prepared for lantern slides, if not on good glass of the proper size, are useless. The glass should be as thin as possible, so that when they are mounted they will take up as little room and be as light as possible. I am quite sure that enough profit is made out of dry plates of all sorts to allow of their being manufactured on better glass. Glass is very cheap, and in the end I am sure that it will pay all makers to select the best they can find. The gelatino-chloride plates, especially, should be on good glass, or none will give up the collodion process in favour of them. On comparing some of them with the glass I formerly used with the collodion process I find they are half as thick again; and, not only are they not square, but they are smaller than them. I hope these few words will cause some of the makers to use better glass in their own interests.

I was pleased to see the letter in your last issue from "One Who Would Like to Join," in reference to the forming of a photographic society in Birmingham. I have often wondered that there is not one, seeing the number of photographers there are in the town. Only a short time ago I contemplated writing to the daily papers to propose that one should be formed. I hope this may stir up some of the lovers of the art, and cause them to think the matter over.

Apologising for taking up so much of your valuable space,—I am, yours, &c., JOHN HALL-EDWARDS.

Queen's College, Birmingham,
February 19, 1884.

A NEW EMULSION.

To the EDITORS.

GENTLEMEN,—I send you details of a new emulsion which has never been published:—Take—

No. 1.

Saturated solution of camphor in alcohol	1 ounce.
Bromide of ammonium	60 grains.

No. 2.

Alcohol	1 ounce.
Nitrate silver	90 grains.

Dissolve the silver in a small quantity of distilled water by boiling in a small flask, and when dissolved add the hot alcohol. Add the hot silver a little at a time to the camphor and bromide solution, shaking briskly, and then pour into water in a one-pint glass measure.

Take the precipitated pure bromide and camphor out of the water carefully, place on blotting-paper, laying on a plate on a hot sand or water bath to dissipate the camphor by evaporation. I have had a little experience with it, but I have no time and cannot try it again.—I am, yours, &c.,

February 18, 1884. CAMPHOR.

"AJAX'S" EMULSION FORMULA.

To the EDITORS.

GENTLEMEN,—I enclose you two or three plates showing negatives and transparencies made by myself from the formula I gave some short time since. The transparency is not so clear as I could wish, but with a different developer (the carbonate of soda and pyro. turns brown so soon) I have no doubt they would be as clear as the chloride plates.

The negatives were exposed about two seconds a few days since, so are fairly sensitive. The emulsion was made last September and kept in one part of glycerine, one part of alcohol, and five grains of thymol to each ounce of the mixture.

The plates were developed in—

Carbonate soda	4 ounces.
Common alum	½ ounce.
Bromide of ammonium	¼ ,,
Common water	1 pint.

I have very little time for experimenting, but I am quite convinced that it is only the want of a developer, and any fairly sensitive plates would be absolutely instantaneous. These plates are only trial plates, and one is defective from an air-bubble. I should be glad to see your criticisms in this week's Journal.—I am, yours, &c., AJAX.

[The pictures accompanying the above letter are, technically, among the best we have seen produced by the soda developer. There is an entire absence of the objectionable yellow colour so frequently complained of, while the vigour and gradations are all that can be desired. The want of absolute clearness mentioned may no doubt be remedied by the use of sulphite of soda, or sulphurous acid.—EDS.]

SOUTH LONDON PHOTOGRAPHIC SOCIETY.—ARTISTIC COMPETITION.

To the EDITORS.

GENTLEMEN,—The following have been selected as the subjects for competition during the present year, viz., *Figure:*—The Shepherd, Afflicted, Happiness, Unearthing a Treasure, Indecision, Mother and Child, Wrath, Rustics, Gone, and Age and Youth. *Landscape:*—A Shady Nook, A Country View (including Church with Ivy), A Study of Leaves, Clouds and Trees, A River Scene, Haymaking, The Harvest Field, A Roadside Inn, Summer, and A Village. All pictures to be forwarded to the House of the Society of Arts, John-street, Adelphi, London, W.C., addressed to my care, between the 1st and 4th of December next.

I shall feel obliged if you will kindly insert this in your next issue, as the list published in your impression of the 15th instant contains several inaccuracies. F. A. BRIDGE,
Hon. Sec and Treasurer.

9, *Norfolk-road, Dalston-lane,*
Feb. 16, 1884.

Notes and Queries.

WHICH is the cheapest and most easily-worked lamp for night portraiture for ferrotypes?—NIGHT-LIGHT.

I WOULD like to know if the process for applying photographic printing to pottery is a secret, or if it has been described in the Journal. Also, why cabinet photographs warp after burnishing. The drying of the print after mounting draws or contracts it, but I cannot succeed in getting them flat after burnishing.—PINXIT.

WILL some of your readers kindly say where I could get microphotographs taken of objects which I have? Also where I could get the magnifying-glasses behind which the microphotographs are placed? I refer to those which are put in pencil-cases, pen-holders, and fancy articles. I have tried many large photographers, but cannot get them.—VANNIN.

I SHALL feel much obliged if you can inform me whether varnishing a paper print with plain collodion affects its permanence? And, if so, to what extent? Some time ago an article on copying recommended to varnish with collodion to get rid of the asperities of the paper. I should not like to do this, however, if it caused the photograph to fade, as your article on enamelling would almost make it appear. I hope, however, it is not so, as the process is convenient.—C. P.——We should like to have the experience of others on this question.

WE should be glad of the following information through the Journal:—We are requiring a coating machine for gelatine emulsion plates. We should be glad of any information you can give us, and also the addresses of makers of such machines.—A.O.Z.——In reply: See in our "Answers to Correspondents" column in last week's issue the information on this subject given to "H. Boissonnas." Eastman's machine is now open to the world of photographers—at anyrate to those who reside in this country. The specification, with the drawings, may be procured for a few pence.

A. R. A. writes:—"Being about to devote much of my time to the taking of groups, I should esteem it a favour to receive a few hints as to the best means of photographing them so that the nearest and farthest in the party, arranged so as not to occupy one plane, shall be equally sharp. As for the artistic arrangement of a group, that is a matter which will give me no trouble whatever, as my acquaintance with both the canons and practice of artistic composition far transcend my powers of giving photographic expression to my artistic ideas. Now, I have just posed a small group three tiers deep, and find that when the farthest tier is sharp the nearest one is altogether out of focus, and *vice versâ.* A hint or two in the pages of the Journal, or a reference to any work in which this peculiar difficulty is treated on, will be esteemed by me."——In reply: The difficulties encountered by A. R. A. may be got over *(a)* partially by removing the camera to a greater distance from the group, and employing a lens of longer focus, so as to secure larger dimensions, which would be sacrificed by the withdrawal of the camera. But by adopting the following method *(b)* a perfect preventive of the evil complained of will be secured:—Employ a camera having a swing back, and, after focussing so as to have the most distant figures sharp—these being assumed to be near the centre of the ground glass—then swing the back so as to cause the upper portion to fall away from the lens, and the foreground figures, or nearest tier of figures, will speedily be rendered as sharp as those situated at the greatest distance.

WILL you kindly give me through your *Notes and Queries* the number of the Journal in which the instructions appeared to *make and work the boiling saturated acid solution of sodic sulphite*, as mentioned by Mr. Samuel Fry in last week's Journal.—L. VERNON, Pontypool.——In reply: By turning to page 78 of our ALMANAC for the present year an article on *Successful Development* will be found, in which are given the instructions desired.

ARE there any pantascopic cameras still manufactured? I have looked over the advertising pages of the Almanacs and Journals of the past year without seeing any allusion to it, and I have not been able, either, to find it mentioned as amongst the articles issued by several manufacturers who publish catalogues. There are many beautiful scenes here in Natal which would make charming photographs; but I cannot get sufficient subject introduced by my lens and camera to do even approximate justice to the scenery.—(Rev.) J. B. DICKSON.——In reply: It is now many years since any cameras of the class mentioned have been made. They are occasionally to be met with at second-hand establishments or sale-rooms, but they are not often procurable. An advertisement stating your requirements would prove the best means of having the want supplied.

G. V. says:—"For the past four weeks my negatives have been so intense as to cause considerable difficulty in getting prints during this dull weather. I have steeped one in a strong solution of cyanide of potassium without its becoming evenly reduced; and, acting under the advice of a friend, I have applied a solution of iodine in the cyanide, but only to find the image become dissolved out entirely. Can you inform me of any means of reducing the density without destroying the relative intensities of the several gradations?"——In reply: Let our correspondent make a solution of "ozone bleach" by diluting the commercial article in the proportion of a pint of water to four ounces of the bleach, and immerse in this his over-dense negatives. He will find that they will become reduced with a degree of evenness altogether impossible to obtain with cyanide, either alone or with iodine.

Exchange Column.

I will exchange a tripod and lens for a background.—Address, THOMAS RAYMENT, Queen's-road, Egham, Surrey.

Wanted, microscope or scientific apparatus. Cash or offers for Lancaster's half-plate lens, stand, and home-made camera, double back.—Address, C. L. CHAMBERS, 8, Gordon road, West-hill, Hastings.

What offers in ferrotype plates, mounts, silver, collodion, or other photographic material, for a camera and lens taking four Victorias or midgets on a quarter-plate?—Address, PHOTO., 1, Cotton-buildings, Exeter.

I will exchange an excellent *carte* lens, in perfect condition, by a good maker, for an enlarging lantern and lens, which must be good and in working order.—Address, G. ARTHUR, care of Mr. W. H. Fenton, Mount Pleasant, Mirfield, Yorks.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

IN OUR NEXT. Stannotype No. IV.

EXCHANGES.—David M. Linley; Horace Rutley; S.; Sulphite. In our next.

D. N. HUTCHINGS (Iowa).—See answer to "A. O. T.," under the heading *Notes and Queries.*

THOS. DEAN.—Plain papers, of almost any tint, may be procured at any paper-hanging manufactory. They are sold, we believe, under the designation of "grounds."

J. A. (Leeds).—Decidedly you have added too much acid, and that is, doubtless, the cause of the films splitting off in the bath. Neutralise it with a little of oxide of silver.

J. G. ROBB.—As a substratum in the collodion process nothing is better than dilute albumen. The white of one egg in thirty or forty ounces of water is a good proportion to use.

A. B. C. (Yorks).—If you carefully read the articles which have already appeared on the stannotype process you will have no occasion to put such questions. They are already answered.

G. A. TOOMEY.—Make a varnish by dissolving gum and arnica in benzole; you can have nothing better to dry without heat. This is what used to be employed for the old glass positives, and is probably what you are inquiring about.

S. A. G. J.—The pictures are very fair, and we think you might probably obtain an appointment as assistant operator. It is quite possible, however, that you may experience some little difficulty in obtaining the salary mentioned.

G. R. CARD.—You will find it convenient in working in a studio such as shown in your sketch to have a double set of curtains, so as to work each way, particularly if the sun fall on the light A B during business hours. That form of studio requires more skill, to work it successfully, than one of the ridge-roof or "lean-to" form.

J. R.—1. Neither of the gelatines you employ have a tendency to give a matt surface.—2. You ought not to get the greenish tint with the developer you employ. The ferrous oxalate developer yields more of a wet-plate character than the pyrogallic acid.—3. Opinions are divided as to which kind of surface gives the best results.

A. WILLING.—No wonder the gloss is not preserved if you mount the pictures in the way you state. The mount must be attached to the print while it is still on the glass and before it has become dry. You had better follow the instructions you have received, notwithstanding that they may entail somewhat more trouble than is agreeable.

S. S. G.—A formula for the old toning and fixing bath is given in a leading article in the present number.

AMATEUR, who writes on a post-card, has not conformed to our rule by sending his name and address; hence his query remains unanswered.

MEXICO.—The best lens for your purpose will be one of the "universal" or "group series." Next to one of these will be a lens of the "rapid" type. It will be better, in practice, to select one of such a focus that it will cover a plate a size or two larger than you require, as then it can be employed with the full opening, which you will find advantageous.

WARDEN.—The lens, as you infer, may be an inferior one; but you must bear in mind that it is impossible to make large portrait lenses of five or six inches in diameter and of short focus with the same degree of perfection as smaller ones. If you expect the same qualities in a large instrument as you get in a *carte* lens you will certainly meet with disappointment. Keep this fact before you when criticising large portrait lenses.

A DEVONIAN.—1. The lime in the water will, practically, do no harm to the pictures.—2. Ruby glass is not necessary for the window of the room in which you are going to sensitise the paper; one thickness of orange is quite sufficient.—3. Messrs. Marion and Co.—4. The "universal" will be better than the "rapid symmetrical" for your purpose.—5. Better have the light from the north; it is easier to manage.

RECEIVED.—K. Ogawa (Boston, U.S.); R. S. Redfield (Photographic Society of Philadelphia); W. H. Wane (Franklin Institute); C. F. Richardson (Leominster, Mass., U.S.A.). Thanks.

IN TYPE.—Communications from Col. Stuart Wortley, J. Nicol, Ph.D., J. Harmer, W. H. Harrison, and "Free Lance." We hope to include these in our next issue.

PHOTOGRAPHIC CLUB.—At the forthcoming meeting of this Club, at Anderton's Hotel, Fleet-street, on Wednesday next, the 27th inst., the subject for discussion will be—*On the Preparation of Lantern Slides.* As this will be a lantern evening, members and visitors are invited to bring slides.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—The next monthly technical meeting of this Society will take place on Tuesday next, the 26th instant, at 8 p.m., at the Gallery, 5A, Pall Mall East, when the evening will be devoted to an examination of transparencies, &c., by the Society's oil lantern.

ROYAL INSTITUTION OF GREAT BRITAIN.—The following is the syllabus of a course of six lectures on *Photographic Action Considered as the Work of Radiation*, to be delivered by Captain Abney, R.E., F.R.S., on the following days, at three o'clock:—Lecture I.—Saturday, March 1st. *Molecules and Atoms—Effect of Radiation on Matter—Examples of the Chemical Effect of Radiation.* Lecture II.—Saturday, March 8. *Rapidity of the Effect of Radiation—Physical Development of the Molecular Changes.* Lectures III. and IV.—Saturday, March 15th and 22nd. *Absorption of the Energy of Radiation, and the work performed by it—Analysis of Photographic Action by Means of the Spectroscope—The Visible and Invisible Regions of the Spectrum.* Lecture V.—Saturday, March 29th. *The Behaviour of Photographic Compounds in the Spectrum, and the Conclusions to be Derived from the Results.* Lecture VI.—Saturday, April 5th. *The Comparison of Thermal Effects with the Chemical Effects Produced by Radiation.*

SUICIDE BY CYANIDE OF POTASSIUM.—Dr. Wynn Westcott held an inquest on Monday last, the 18th instant, at the Hampstead Workhouse, into the death of Alfred Pierpont Chambers, 59, an artist, who had lived at 211, Clapham-road.—The evidence of his brother-in-law and of Elizabeth Patterson, servant to the deceased gentleman, was to the effect that since the death of his wife, in November, 1882, he had been very strange in his manner. On Wednesday evening he left home shortly before eight o'clock, and never returned.—William Fletcher, gravedigger at the Hampstead Cemetery, stated that on Thursday morning, as he was going from one part of the cemetery to another, he saw a man lying face downwards on the grave of Mrs. Chambers. He found life extinct, and he at once called assistance, and the body was then removed to the police station.—Dr. Gresvenor said the gentleman had evidently been dead ten or twelve hours when he saw him. He had made a *post-mortem* examination, and found that death was due to poison taken in the form of cyanide of potassium, which must have been swallowed a few minutes before death.—The jury returned a verdict of suicide while of unsound mind.

LONDON GAZETTE, *Tuesday, February* 19, 1884.

RECEIVING ORDER AND DATE OF PUBLIC EXAMINATION.

DUNCAN JOSEPH GRANT, 53, Llewellyn-street, Pentre Ystradyfodwg, near Pontypridd, artist, picture-frame maker, and photographer. Pontypridd Court, March 14th, at noon.—First meeting February 29th, at three p.m., at the Official Receiver's Office, Merthyr Tydfil.

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1243. Vol. XXXI.—FEBRUARY 29, 1884.

THE PERMANENCE OF PHOTOGRAPHS MOUNTED IN OPTICAL CONTACT WITH GLASS.

Whatever may be said with reference to the artistic merit of photographs either enamelled or mounted in optical contact with glass, one thing is certain, namely, that such pictures do undoubtedly meet with considerable favour on the part of the general public. Therefore, so long as the public taste runs in this particular direction so long will such pictures continue to be supplied. At the last meeting of the Glasgow and West of Scotland Amateur Photographic Association the subject of mounting prints in optical contact with glass appears to have been one of the topics discussed. Some of the members advocated the employment of starch and some gelatine, while others suggested a mixture of the two. The object of the present article is to direct particular attention to the fact that it is of primary importance the mountant, whatever it is, should be one which will have no deleterious action on the picture—a matter too often overlooked.

Our attention has been called of late to the large number of faded photographs, mounted on glass, which are to be seen in the shop windows of many fancy stationers in the metropolis. This has caused us to observe them more closely than we perhaps otherwise should have done, with the result that, in almost every instance, when a picture of this class has faded it has been one of those "scraps" of which such large numbers are produced—many of them on the continent, and at an exceedingly cheap rate. It is the public exhibition of such considerable numbers of faded and fading specimens of these pictures in the shop windows which has, doubtless, given rise to the idea that prints mounted in contact with glass fade more rapidly than those on cardboard. Now, if anything can conduce to the permanence of the photographic image, one would think it should be the hermetically sealing it between two impervious surfaces, as then it must be perfectly protected from all atmospheric influences. But experience teaches us that there are instances where such is not the case; in fact, this treatment, on the contrary, sometimes appears to hasten decay rather than prevent it.

Only a few weeks back a fancy stationer (who keeps a somewhat large stock of these "scrap subjects," mounted on glass, with the usual black margin and gilt metal rim) showed us a considerable number which had faded badly; indeed, they were quite unsaleable, although they had only been in his possession for a few months. He remarked at the time that he had received many complaints of fading from customers to whom he had supplied them. On inquiry we found that the pictures in question were supplied wholesale at such a very low price that it could not reasonably be expected that any great care had been bestowed on their production.

In our last volume (page 199) we devoted an article to the consideration of the question whether prints "enamelled" with gelatine were likely to prove more or less permanent than corresponding prints not so treated. We then pointed out that, under certain conditions, the enamelling would prove no protection against, but, on the contrary, might possibly conduce to, fading. What was then said in reference to enamelled prints applies equally well to prints mounted in contact with a glass plate.

It is clear that if a print have been but imperfectly fixed and washed, and, consequently, contains within itself the elements of destruction, rendering it impervious to the atmosphere will afford it little or no protection. If, at the same time, the material with which it is rendered impervious contain acid or oxidising properties, it is easy to conceive that the fading may be considerably hastened by the treatment. Again: even if the print have received every care in the fixing and washing, and it be afterwards impregnated with an acid sample of gelatine, no additional permanence can reasonably be expected to result therefrom; on the contrary, it must act injuriously rather than otherwise.

Now, after what has been said, it is not difficult to surmise the reason why so many of those cheap productions to which allusion has been made fade so rapidly. They, doubtless, received but little attention in the fixing and washing operations, and were afterwards mounted with an acid sample of gelatine. Nearly all foreign gelatines, it may be mentioned, are acid, and these are the kinds most generally used for enamelling or mounting on glass, by reason of their freedom from colour and their transparency. The more colourless and transparent the sample the more acid it will generally be found; therefore, in no case should a gelatine be employed—either for enamelling silver prints or mounting them on glass—without previously neutralising the free acid. But it will be far better to avoid using such gelatines altogether for the purpose, and employ only those which are neutral in the first instance, like those of Messrs. Nelson, Dale and Co., or of most other English manufacturers. They may not be quite so colourless or transparent as foreign gelatines; but in the extremely thin films which are here employed no difference between the two can be distinguished in the finished picture.

What was said a fortnight since, when giving our experience of the increased permanence conferred by enamelling, applies equally well to photographs cemented in optical contact with glass. In our hands they have always proved more permanent than ordinary prints. But the prints upon which we have based our experience have been in each case both carefully fixed and washed before being mounted on the glass or enamelled, and the mounting or enamelling has always been effected with the finest kinds of English gelatine, for the reason already mentioned.

It has been suggested that a small proportion of chrome alum should be added to the solution of gelatine used for mounting the prints on the glass with a view to rendering it insoluble, and, therefore, less absorbent of moisture; but we prefer to employ the plain gelatine. If, however, it be desired to render the paper itself impervious, it is better to coat the back of it with collodion containing castor oil; but we consider this quite unnecessary.

PIRATING LANTERN SLIDES.

Bearing in mind what we said a few weeks since, with regard to the duplicating of negatives under circumstances in connection with which a high degree of success was achieved, it will readily be understood that the same law of reproduction applies to transparencies, and a correct inference will be deduced from this that manufacturers of transparencies are, beyond all other photographers, liable to have their works pirated.

But the low prices at which the genuine productions of such manufacturers can be readily procured in this country, together with the possible fact that any one, or all, of them may be copyright, have hitherto acted as deterring agents in their fraudulent multiplication. These influences are, however, only operative in Great Britain and Ireland. In countries where there is a large or even moderately-large demand for such productions, where the prices are four times in excess of ours, and where there is no legal restraint upon the copying of English slides, it is scarcely to be wondered at if the temptation to become pirates is too great to be successfully withstood. In a letter having a bearing on this subject, from Mr. J. T. Taylor, in our issue of the 15th instant, he dimly hints at the possibility of the copying, by American dealers in and manufacturers of lantern slides and appliances, of York's slides, and presumably others which are of English manufacture. But another correspondent, whose communication will be found on page 143 of this number, is less reticent; for he says that when residing in the United States he, as a photographic operator, was often called upon to copy English productions for commercial purposes. It was quite well understood by him that such copies were to be sold as "imported" productions at the prices charged for plain imported slides, namely, five shillings and twopence each. So long as there is no international copyright law—to which we may also add that so long as there is such a high protective import duty on photographic transparencies—just so long will English makers have to submit to the risk of having their works copied.

An extensive manufacturer of lantern slides, who procured the services of skilled draftsmen to make delicate outline sketches which were afterwards photographed and coloured, once told us that he could immediately detect any piratical reproduction of his designs. Having obtained his permission to make an attempt we, in the course of a fortnight, handed him a nicely-executed painted lantern slide, showing a view of the rocky temples in Petra. He observed—"That is the same slide you purchased the week before last." "No," we replied, "it is only a copy of it." Applying a magnifier, he said "It is genuine," and pointed out certain marks which were considered as tests; but by showing him the original and the copy side by side we soon convinced him that inexorable photography made short work of his private test marks. But reproduction or duplicating of lantern slides does not necessarily mean piracy, although the one is so frequently a concomitant of the other. If an exact reproduction be required no better or simpler means can be adopted for doing so than by superposition; but this is only suitable when the dry process is to be employed throughout.

It will be found preferable, especially if a number of copies are required, to make an enlarged negative from the transparency, the degree of amplification being about two diameters. When this negative is finished it may, in some cases, be found advisable to subject it to the operation of a skilful retoucher, because many landscape subjects have the foliage much heavier than is thought desirable, and this, together with similar defects, may be easily remedied by stopping out and imparting to the lights and shades the requisite degree of harmony. The negative, when thus improved, is made use of for printing transparencies by wet collodion and the camera, the degree of reduction and amount of subject included being now entirely under control, which could not possibly be the case were the other method adopted.

We have spoken so frequently of the manipulations to be employed when making transparencies by wet collodion that we do not feel it necessary to recapitulate them here. It may, however, be needful to say that a transparency produced from another by the system described is not necessarily inferior in any respect to the original from which it was obtained, but it *may* be much superior in every quality except sharpness. We have had a three-inch transparency, produced in the manner described, projected on a thirty-foot screen with a marked advantage over the original when projected under similar circumstances.

COLLECTING RESIDUES.

Mr. F. W. Hart's lecture, given in full in our last issue, will serve as an excellent reminder of the large amount of the precious metals employed by the photographer which can, with due care and the aid of suitable appliances, be collected from the so-called "waste solutions." The time is gone by when it was necessary to be continually insisting upon the desirability of this collection—when few photographers took any care even of the washings from the prints before toning; yet, strange to say, proof is continually reaching us that the saving of hypo. solutions is still, comparatively speaking, an unusual occurrence. It would be difficult to say why this should be so, were it not that the care of residues too often falls into the hands of assistants who have had no experience in treating such residues, and whose chemical attainments are at too low an ebb to enable them to initiate any such process themselves.

Mr. Hart did well in bringing before his hearers a great variety of important facts, as well as a very complete system of treating all waste likely to accumulate on a photographer's premises, and his communication was full of practical working details. It was, however, treated in a manner calculated to be far more valuable to the photographer in a large way of business than to the artist in a smaller way or to the amateur, and a little annotation of his remarks will help to show the latter that the preparations for dealing with valuable solutions are by no means such a complicated matter as the tyro, upon reading the lecture, might imagine. For such, of course, it was not intended.

In the first place, the question which may most particularly be considered is—whether to reduce the accumulation of residues at home or sent to the refiner's. Mr. F. York stated that his own experience led him to believe that between the two methods there was little to choose. He had tried both, and obtained about the same money value from each. When the attempt to make the reduction is undertaken by the photographer himself he should most carefully keep in mind Mr. York's dictum—that "the danger of not effectually and thoroughly performing the reduction was one which those who were not engaged in it as a business should carefully guard against, or they would lose rather than gain by their trouble." He narrated an experience of his own where he found that the flux left after the reduction contained silver to the extent of ten shillings' worth per pound—a waste or loss far in excess of what the refiner would charge for performing the reduction himself, after taking all risk, and allowing the full value of the metal contained.

When the quantity is at all large the refiner's charge is not likely to exceed five per cent. of the total value of the metal present, and perhaps decidedly less. Out of this has to be paid labour, fuel, crucibles, wear and tear of furnace, &c. When the photographer employs a refiner of standing to reduce his work we very much question whether he is not a gainer, and does not get more value than he who spends a good portion of a day in treating a batch of his own residues.

There are, however, many photographers who like to perform operations of this kind on their own premises for the mere interest taken in the work, and without regard to the relative economy of the two modes of dealing with the material. To them we would say that they can work upon fairly large quantities of residues without going to any expense in furnace building, or even purchasing a gas furnace, which is more practical with small than with large quantities. With careful treatment it is quite an easy matter to reduce (say) half-a-pound of chloride on an ordinary blacksmith's forge, the formula for mixing the flux for which has been given in our pages; or one of those given in the paper we are discussing may be chosen, they being little different.

One fact must be borne in mind: it is that the carbonate of soda mentioned in most formulæ is not the white powder often called the "sesquicarbonate," but that represented by the common washing soda or by soda ash, the latter not now being a salt commonly met with. Further: there will be no loss if the precipitate of chloride be collected and dried without spending time upon any preliminary washing.

The experience of a practical man like Mr. York, who is accustomed to deal with large quantities, should outweigh any theoretical considerations; but we feel bound to say we do not understand the result he obtains, namely, a troy ounce of silver from three avoirdupois ounces of chloride, and one-fourth of the weight in metallic silver from sulphides. In our experiments we have obtained—what theory would indicate—far larger proportions, and sulphide certainly should be richer than chloride. This proportion, however, could be readily accounted for by the supposition that the printing hands are not careful in keeping the precipitates free from foreign matter.

The idea of using a paraffine oil cask is a decidedly good one, where space is no object; but as there should always be two receptacles for each kind of residue (chloride and sulphide), four such casks would occupy no small space. We would also place the taps nearer the bottom than was mentioned at the meeting to which we have referred. Six or eight inches would be quite sufficient, and would entail less frequent drawing off of the liquid. These casks are readily cleaned with boiling water, as they are coated inside with a thin film of glue to aid in rendering them oil-tight.

The stoneware vessels with conical side are very good, as also are the wooden vessels made in a similar form, as described many years ago by one of our contributors. Hydrochloric acid—or "spirits of salt," as the crude acid is commonly designated—is far preferable to salt for precipitating the chloride. It is then certain that the whole of the precipitant is in solution instead of, as is often the case, at the bottom of the cask, a lump of salt being usually thrown in, and perhaps one stir given to the water without the salt ever reaching the top. When both first and second washings from the prints are preserved the precipitate in a large vessel will take far longer to subside than the two hours Mr. Hart named. Perhaps as good a method as any of adding the acid is to throw a certain quantity into the bottom of the jar or cask each time the supernatant fluid has been drawn off. It will then need no great amount of stirring when the vessel is full to ensure thorough admixture of the precipitant. One point in this connection should not be forgotten: many photographers now use ready-sensitised paper made by blotting off and treating with citric acid. The photographer here must not expect much value from his washing waters when such paper is used.

With regard to hypo. precipitates: we again call attention to the great value of precious metal that spent hypo. solution contains, and point out, as has been done for many years past in these pages, that it can be obtained quite as readily as chlorides from print washings, and with very little annoyance. It is only the experienced manipulator who can throw down sulphides so as to cause no disagreeable odours in the room; but, if care be taken not to add too much at once, the smell will be reduced to a minimum and will quickly pass away. When too much sulphide has been added a scum very quickly forms upon the surface of the solution, and a workman of average intelligence would quickly learn, by observing this point alone, how to apportion the quantity of sulphide to add. When this scum is present there will always be a foul smell from the solution, and especially so when drawing it off.

Another source of failure to those who are trying this plan for the first time is the liability of the sulphide to become spoiled by keeping. It is always covered with a useless crust, and this crust gradually deepens by exposure to air till the whole piece is useless for the purpose. When broken into pieces its quality can be ascertained, the unaltered material being of a rich, glassy, liver colour, while the useless part is a dull, opaque greenish- or yellowish-grey. We are inclined to think that this proneness to change in the sulphide may account for a great deal of the indifference to hypo. residues which, there can be no manner of doubt, widely prevails.

We trust that our hints may lead to a greater economy in photographic processes, which, in these days of competition, is a matter of far greater importance than ever it was; and in conclusion we may say that we give it as our well-matured opinion that in the long run it will, in most cases, pay the photographer better to send to the refiner the precipitates his care has brought together, rather than risk wasting and losing a considerable proportion by indulging in unpractised reducing experiments.

In speaking of the comparative permanence of negatives intensified with mercury, Dr. Nicol is not alone in ignoring the difference between collodion and gelatine negatives. We have over and over again expressed the opinion that, by giving a proper amount of washing after each operation in the process, mercurial intensification—in some of its forms, at least—is as much to be trusted as any other. But how is one, now-a-days, to define what constitutes a sufficient washing? What will suffice with some gelatine films may prove wholly inadequate with others, and hence the uncertainty. With collodion films, however, the salts are readily enough removed, and, consequently, collodion negatives intensified with mercury have proved more lasting than gelatine ones. This fact may prove that "the fault lies in the method and not in the material;" but it does not remove the uncertainty which attaches to mercurially-intensified gelatine negatives.

The Northampton Photographic Society—or, rather, the photographic section of the Museum—have decided to hold an international exhibition next December, preliminary details of which are given in our advertising columns. With the liberal prize list announced, and the assistance of so able an Hon. Secretary as Mr. Harry Manfield, there is little fear as to its ultimate success. We shall have more particulars to give in a future number.

As will be seen by an announcement in another column the Postal Photographic Society is about to lose the services of its indefatigable Honorary Secretary, Mr. H. H. Cunningham, to whose energy and perseverance so much of the success of the Society is due. While regretting Mr. Cunningham's departure from the scene of his photographic labours, we cannot but congratulate him on his appointment to the important position he is about to occupy, and we hope he may long be spared to dispense justice to the colonials, and, when time permits, to send us some account of his photographic experiences in a hot climate.

The microscopists have seized and adopted many photographic processes, not the least interesting adaptation being emulsion preparations, even down to "pellicle." The only difference is that the emulsions are used by the microscopist for injecting prepared tissues and not for development, though some of the emulsions so used are prepared by development. Thus, a mixture is made of five ounces of gelatine, three ounces of common salt, and a pint of water; and also a solution of nitrate of silver, three ounces in half-a-pint, the former being slowly poured into the latter whilst stirring. After cooling and squeezing through a net into vermicelli-like threads this mixture is added, in daylight, to a mixture of a pint and a-half of saturated solution of oxalate of potassium and half-a-pint of saturated solution of sulphate of iron. This is for a black emulsion. It will thus be seen that the working photographer would be the most likely person to be found who could compound the mixture with advantage.

It may be noted, further, that the emulsions are made into dried pellicles by warming till fluid and then pouring on to sheets of parchment (*query:* parchment paper?) saturated with paraffine, from which it can easily be separated, dried, and cut into slips.

The question of stoves, fire-places, or hot-water pipes is one of perennial interest and to the photographer as much as anyone, and we note a very interesting fact in connection with the subject which recently was incidentally alluded to at a meeting of the Physical Society when a topic of high abstruse interest was under discussion. When a current of air is produced by the impinging of cold air upon heated surfaces a peculiar motion of the molecules is brought about, and, as a consequence, Professor Forbes stated that Aitken shows that a room heated by a stove will have dustier walls than one heated by a fire, owing to the air being hotter than the walls. Emulsion workers may take a note of this fact.

The interest excited by Mr. W. Crookes's radiometer will not readily be forgotten by photographers. They may also remember that the instrument was quickly copied on the continent, and "light-mills" made there and sold in this country in large quantities. It appears that several philosophers have been working in a parallel line with Mr. Crookes's investigation, and engaged in devising a sound-mill—that is, a mill moved by the agency of sound instead of light. They have been successful, and a variety of forms of the instrument is illustrated in a recent number of *Nature.*

On the 19th of March next the Council of the Meteorological Society have arranged to hold an exhibition of thermometers, and the committee will be glad to show any new meteorological apparatus invented or first constructed since March last, as well as photographs and drawings possessing meteorological interest.

There should be no lack of photographs; for, as our columns have testified, many very interesting representations of meteorological phenomena have lately been taken. Few such pictures could be more interesting than that of the lightning flashes lately alluded to by us, and which, *en passant,* we may say are almost equalled in interest by a series of photographs of the electric spark, taken instantaneously. They are reproduced in our contemporary *La Nature,* printed by a process of heliogravure.

Then, again, in the same journal there is an illustration, also from a photograph (taken by M. Ch. Mossette) of a display of the strange after-glow, or "crepuscular light," as that periodical terms the display in language far more precise than the accustomed "remarkable sunsets" of the English papers. The picture is a valuable contribution to the records of the phenomena, and represents an appearance which we do not remember having seen described in any of the accounts of the phenomena yet published. There is a distinct view of the open country with a very low horizon, the camera having been fixed so as to obtain as much sky as possible. Immediately over the horizon line lie a few clouds, while the whole space overhead is marked out by a huge parallelogram (grey upon a darker ground) crossed with light streamers, while at one end of the figure a further series of upright lines about equal in width to the lines of the figure is seen, and give the impression of a number of the forms lying one behind another. The whole effect is most striking, and the photographer is to be congratulated upon his successful rendering of a phenomena most interesting to everybody at the present time.

The great explosion at Victoria Station was only prevented from becoming a dire catastrophe by the difference of a few minutes of time. As it is, not a life was lost and scarcely any injury sustained by the explosion itself. A very wise step has been taken in securing photographs of the scene of the disaster. Nothing was allowed to be touched or removed till half-a-dozen photographs had been secured. The aid of photography has been utilised times innumerable in recording the results, and even the very act, of dynamite and other explosions; but no photographs—not even those of the heaving mountains of water thrown high up by the firing of submarine mines photographed by the authorities at Woolwich—suggest anything so appalling as the possible results that might have followed the dastardly act that is now creating such excitement in the metropolis.

It is not every amateur photographer who receives a gold medal from the Royal Astronomical Society, yet we are sure our readers will be ready to join in congratulating Mr. A. A. Common upon the honour recently bestowed upon him. It will also be encouraging to all patient, careful workers to learn that the President stated the Council has been less influenced in awarding medals by "originality in the methods adopted, than by the great practical success which has attended Mr. Common's efforts in a most important and interesting field of astronomical research."

Mr. Common was engaged in astronomical photography so far back as ten years ago, his experiments being made with a five and a-half-inch reflector. He then, after abandoning the idea of making a reflector himself, although he had purchased the discs of glass for the purpose, obtained an eighteen-inch reflector by Carver, which he had mounted under his personal supervision from his own designs. This he was able to work with in 1877. Next he had a far more powerful instrument, and in 1879 he started work with a thirty-six-inch mirror. This instrument, though in use for other work, has been mainly devoted to photography. Mr. Common's first attempt at the object now so inseparably connected with his name—the nebula of Orion—was on January 20, 1880, and resulted in failure. With the aid of gelatine plates, and by continual improvements of the driving-clock, he was able to obtain what was perhaps the earliest successful photograph of a comet, on January 24, 1881. A photograph of the nebula was, at last, obtained on March 7, 1882, and received great praise. Further improvements were made, and on January 30, last year, the celebrated photograph exhibited at Pall Mall was secured. Mr. Common has still continued his experiments in many directions, and he has found that the ability to give so much as ninety minutes' exposure—which the perfection to which he has brought his instrument allows him to do—enables him to produce many results unattainable by other means.

It is not given to every great poet to reach straight to the heart of men as did Longfellow in so many of his poems. Among every English-speaking community in the world the lines he wrote are as "household words," and when he went from among us he left a void difficult to fill. His songs remain, and will remain. In years to come many a sad soul held by a worn, tired frame will be cheered by them; and his words "Let us then be up and doing, with a heart for every fate," will at once encourage and offer hope. It will be gratifying to photographers to learn that their art has been instrumental in enabling England to pay her tribute of respect to his memory. Every one will be familiar with the grand head of the poet which has been so artistically treated by the photographer—notably one picture (by Sarony, we believe), taken about twenty years ago, which was almost the finest photograph ever produced up to that time. These pictures have now been sufficient, placed in the hands of a clever sculptor, to enable him to obtain an excellent likeness in marble. A three-quarter length figure, produced with no other aid in securing the likeness than photography, has been executed by Mr. Brock, and will be placed in Poet's Corner, Westminster Abbey, tomorrow.

THE LIVERPOOL ASTRONOMICAL SOCIETY AND STELLAR PHOTOGRAPHY.

We are glad to see that the question of stellar photography is being taken up by the Liverpool Astronomical Society. We have already noticed in these pages some of the results already obtained. The last one we recorded was the photographing of the comet Pons-Brooks by the Rev. T. E. Espin. At the meeting of the Society, on Monday evening, February 18th, Mr. Isaac Roberts, F.R.A.S., one of the vice-presidents, gave some results he had obtained with a variety of lenses. In all he had taken twenty-seven photographs. The cameras had been attached to the declination axis of his telescope, which is an equatorial, and driven by clockwork. The object in view was to determine what were the best plates to use and what the best size of lens.

Theoretically, the larger the lens the more stars ought to appear on the plate, or where the lenses were of different apertures the large lens ought to photograph the same number of stars in an exposure which would be less in accordance with the differences between the apertures. To test the various lenses it was necessary to have equal conditions. The plates were taken from the same packet; the lenses were all mounted in cameras on the same equatorial stand; the same group of stars were photographed, and the same exposure used for all. Under these circumstances the conditions were precisely similar, and the differences obtained would be due to the lenses only.

The exposures given were, as a rule, under half-an-hour; for the experiment was not to photograph as many stars as possible, but only to determine the space-penetrating power of the lenses. Hence the length of the exposure was generally short, sometimes being only a quarter of an hour. The objects selected for trial were the Pleiades and the region of the great nebula in Orion. In both, stars ranging from sixth magnitude to tenth magnitude are properly clustered, while the stars below the tenth magnitude are innumerable. The nebula in Orion itself, too, offered an excellent test for the penetrating power of the lenses. The apertures of the lenses tested were three-eighths of an inch, one and a-half inch, two inches, three inches, and four inches. The images given by the three-eighths of an inch were so small as to be with difficulty distinguished from specks on the plate. The one and a-half inch lens drew the stars out into triangles, showing that, although for landscape work the lens seemed perfect, yet when subjected to this test it was not perfectly figured. Various stellar photographs were taken with the one and a-half inch, and always with the same result.

Of all the lenses the two-inch seemed to work best, and several enlargements were shown at the meeting from the negatives taken with this lens. The increase of aperture, for some reason that Mr. Roberts could not explain, did not seem to give a proportional increase in the number of stars. The four-inch lens, for instance, with the same exposure did not show many more stars, but those it did show seemed blacker and sharper. There can be no doubt, we think, that the inaccuracies of lenses may be detected by taking stellar photographs with them. The brighter stars can be photographed in a very few minutes, and the plates could be made especially rapid for this purpose.

As regards the plates used, Mr. Roberts declined at present to say which were the best for stellar photography. Evidently however, much might be done in the laboratory—more, even, than with the increasing aperture of lens; for the plates could be made more sensitive, and thus greater results be obtained.

One point of great value was brought to light in the course of the discussion which followed Mr. Roberts's paper:—With whatever aperture a group of stars may be photographed the relative impressions on the plate remain constant. If three stars are photographed with different apertures the magnitudes as shown on the photographs are the same in all. This point is a very important one; for it shows that the differences are really due to the chemical light in the stars and not to any peculiarities in the lenses. In the Pleiades both Mr. Espin and Mr. Roberts find independently that some of the brighter stars are absent from the plate, while many stars of less magnitude to the eye have left their impression on the plate.

We are pleased to hear that the Liverpool Astronomical Society is taking vigorous measures to continue the work of stellar photography. A very powerful instrument will soon be in position, and then, we believe, a systematic survey of some part of the heavens will be undertaken, and doubtless the results will be valuable and interesting. In the meantime we shall await with interest any further researches into the powers of lenses and the most suitable plates.

DARK ROOM ILLUMINATION.

In an article in your last issue Mr. Herbert S. Starnes quotes an experiment of Mr. A. Cowan's, but has unaccountably omitted to mention a most important factor in this experiment, and the omission renders entirely misleading the argument which Mr. Starnes bases upon Mr. Cowan's statement.

Mr. Starnes states that Mr. Cowan "found that by transmitted light he could obtain a deposit in five seconds; but with a reflected light, with more apparent light to the eye, he could not obtain a deposit in 180 times that period of time." He has ommitted to say that the lights employed were totally different. The light giving the deposit in five seconds was Mr. Cowan's former dark-room lantern fitted with the usual red mediums, while that which gave him a better light, with no deposit, in the longer period of time was the combination of yellow paper and green glass. Mr. Cowan mentioned that simultaneously with changing the colour of his light he had arranged to let reflected light only fall upon the glass, and gave as his reason for so doing that the window could then be equally illuminated all over instead of having one special bright spot opposite the gas jet which formed the source of light.

That there is some advantage in using reflected light is what might be expected from the fact that such a good judge and scientific investigator as Mr. Leon Warnerke mentioned long since that he used it in his coating room. The lantern which he described some year or more ago, at one of the meetings of the London and Provincial Photographic Association, consisted of a hemispherical reflector painted red, with its opening covered by ruby glass. The lamp which it contained was furnished with a screen, which prevented any rays from the flame direct passing through the glass. Substituting yellow for red as the reflector, green glass and yellow paper for the ruby glass, and used as a front instead of a ceiling light—such was the manner in which Mr. Cowan obtained his successful results. That reflected light, however, should give a light fifty times stronger to work by than a light of the same safety for the plate obtained by transmission is a mere unproved guess of Mr. Starnes, and he would do well to bring some evidence, based upon experiments which can be repeated by others, to substantiate it.

The box-lantern which Mr. Starnes showed at a meeting of the London and Provincial Photographic Association is certainly convenient for travelling and very easily made. When it is, instead of the brown colour first shown, painted of bright, deep yellow, and fitted with a green glass in front, as it afterwards appeared, it is doubtless very effective.

Since the appearance in The British Journal of Photography of January 25th of my article on *Dark Room Illumination* I have supplied many small patterns of glass and paper, and from the letters I have received I am happy to say that already many photographers have found relief in abandoning the old red light. There has been a difficulty, however, in some places in procuring glass of the right tint. Perhaps with increased demand this difficulty will disappear. I observe that many speak of the glass I use as "cathedral green." I have never used the expression myself. "Cathedral" is a certain make of glass that is not quite clear and even, and is of all colours. It happened that I could not obtain the glass of the colour I wanted, except of this particular make; but it may be that some makers have a suitable colour—a light yellowish-green, not at all bluish—in ordinary pot or stained sheet.

Since writing the above paragraph I have seen a glass which I have not yet tried, but which appears to be very suitable. It is known as "muffled No. 6A," and is intermediate in depth between the two shades of cathedral glass which I have referred to. I should say that one thickness of this glass, with sufficient thicknesses of paper, would answer for any light. The paper is known as "No. 5½ deep yellow demy." Whether these numbers refer to similar colours in the case of articles kept by dealers who are not supplied from the same factories I am not at present able to say.

I find, too, that I have not in all cases been understood as to the quantity of glass and paper used. I stated that I used for daylight a fixed screen of one thickness and two of paper, and that in front of this was a movable screen similar, which I draw aside as soon as the development is complete, or in a very dull light. This, of course, implies that where only one fixed screen is in use there should be (for daylight) four thicknesses of paper and two of glass. In this case, however, one thickness of a somewhat darker glass will do instead of the usual lighter green, or one of the light green and one of the ordinary orange pot may be used; but in this case the light is not so agreeable.

It is very difficult sometimes with those who have made a study from such writings as have appeared on the subject of the effects of light and different colours upon sensitive substances—and they are rather voluminous—to shake the ideas which this study has instilled. I have just met with an instance of this in the case of a gentleman well known as a photographic experimentalist. He told me that upon receiving the samples of glass and paper which I sent him he had examined them with the spectroscope, and that told him they were worthless for the purpose proposed, so he laid them aside. Afterwards—putting them to actual trial—he had been surprised to find the difference between the resulting facts and the conclusions he had arrived at from spectroscopic examination. Does this prove that the spectroscope is an untrustworthy instrument? Not at all. Or that, as is sometimes said—"Theory says one thing, but practically the facts are the other way?" It only proves that the theory which is contradicted by facts is an unsound one, and had better be amended or replaced. How an unsound theory acquires such general acceptance is another matter; but when a conclusion is found to be erroneous it is well to investigate the premises on which it is based, and to see whether in this case the facts of spectrum photography and of the photographic power of rays of different colour upon sensitive substances have not been incorrectly described by those whose authority has been accepted on the subject. As a matter of absolute fact, in safety of working light Mr. Cowan's experiment, in which he held a rapid commercial plate close to a light which was considered ample for working by for a period of fifteen minutes without getting any deposit upon development, is, I believe, unprecedented. However much it may contradict theories built upon mistaken premises, it should be remembered that this safe light was yellow; whilst the combination of ruby and orange, which the same experimentalist formerly used, gave a deposit on the plate with only five seconds exposure, without, as he stated, affording so much light to work by.

I have frequently been asked what is the object of the addition of the green glass to the yellow paper. When several thicknesses of any clear, deep yellow medium are employed the light transmitted appears orange, or even almost red. A solution of bichromate of potash in thin and thick layers is a good example of this. The green seems to restore the yellow character of the light, and at the same time it cuts off a good deal of light of some actinic power, whilst it does not much lower the luminosity to the eye—the visual power by which we work. W. E. Debenham.

P.S.—I do not propose to follow Mr. Starnes into his curious speculations about "wave-lengths," further than to say that if he objects to the absorption theory regarding coloured media on the ground that no discoverable work, such as expansion or chemical work, has been done by the light, this objection would hold with greater force in the case of an opaque or black body, where the whole, or nearly the whole, is absorbed, and a greater effect, such as of expansion, &c., ought to be observable. Or does he suppose the light in this case also to be merely changed, and that black rays are transmitted or reflected, as the case may be? The idea of rays being changed into others of different wave-lengths by transmission through a coloured medium is one which at present must be con-considered as a mere guess with all the evidence against it. If any evidence in its favour should be forthcoming it will, doubtless, be well considered.—W. E. D.

THE CAMERA IN WAR: A RECOLLECTION.

You had an article about the camera in war, on which subject I can tell you an amusing story. In 1861 I was at Naples with a camera trying to get some good photographs. An old schoolfellow and friend, Lord St. Maur, came out there to join Garibaldi's English legion, and I was, therefore, able to get about pretty well where I liked. One morning four of us drove out from Naples some twelve miles, where a battle was expected between the Neapolitan troops and the Garibaldians. The party consisted of Lord St. Maur, Frank Vizetelly (lately killed with Hicks Pasha), Colonel (now Pasha) V. Baker, then of the 10th Hussars, and the writer.

Suddenly, having been some time within range, on turning a corner of the road we saw in front of us a thin line of some twenty or thirty Garibaldians, with "Garibaldi's Englishman," Colonel Peard, at their head. They were slowly retreating towards us, a regiment of Neapolitan cavalry being barely kept at bay owing to Peard's men being very short of cartridges. Peard hailed us as an available reinforcement. As I thought it a fine chance of getting a picture of a regiment of cavalry charging, out came the camera, and we joined the line. What the cavalry thought I know not, but they charged at once. We all stood our ground till they were within an easy distance, and then gave them a simultaneous volley. This and a strong reinforcement of Garibaldi's own men, who came running across the fields at the moment, upset the cavalry, who actually reined up, turned tail, and fled! (Poor Frank Vizetelly sent home a picture of the affair, which duly appeared in the *Illustrated London News;* and, our names having been put under our respective portraits, Colonel Baker and myself were called to account by the War Office.)

We had a narrow escape of having to walk back, as a half-battery of artillery who were supporting the cavalry had managed to send a round shot clean through the back of our carriage. The coachman ran away; but, luckily, the horses came trotting up the road towards us, and we managed to get hold of them.

But the amusing part is that one of the Garibaldian officers, who had come up just before the cavalry retired, was greatly puzzled by the camera. A few days after he came up to me in the streets of Naples, and begged me to tell him what sort of gun it was I had driven off the cavalry regiment with. At first I could not get him to believe me; but when he did see I was really serious in telling him it was nothing but a stereoscopic camera, and that I had got a capital picture, he remarked, as though he was saying something that explained it all—"Ah! then you must be an Englishman!" He seemed to think that accounted for any act of folly.

I got some very good pictures of the battle-fields at that time—most interesting and instructive, and not the least so was the one of the smashed panels of our carriage! I was using then Hill Norris's plates, and very good they were—better than some I made myself with a gum-arabic preservative, though the year before I had got very good pictures in India on such plates, of my own make—not an easy thing in those days for a young amateur to do. I had been stirred up to photography by Mr. Roger Fenton when in the Crimea. I still have somewhere the pictures taken by him of my hut, in which I spent eleven months before Sevastopol. *Eheu! fugaces anni!* H. STUART WORTLEY, *Colonel.*

STANNOTYPE.

No. IV.

The next step is the sensitising of the tissue—an operation which does not differ materially from the sensitising of ordinary carbon tissue, except in so far as the greater thickness of the gelatine sets up a different state of affairs.

As a matter of course, in order to render the layer of gelatine sensitive throughout its whole thickness, it is necessary that the bichromate solution should thoroughly penetrate it—not necessarily during the time the tissue is actually immersed in the sensitising bath, but at anyrate by gradual diffusion afterwards, during drying. It is a well-known fact to chemists that chemical action proceeds in the same manner—though not so rapidly—in a solid jelly of gelatine as when the latter is in the liquid state; hence, though the brief immersion of a few minutes may be insufficient to penetrate the thick "relief tissue" and cause it to become "limp," if there be sufficient of the sensitising salt absorbed at the surface it will, in course of time, spread itself through the thickness of the layer.

It is, of course, possible to allow the tissue to remain in the sensitising bath for a sufficient time to cause the solution to penetrate it thoroughly; but then another difficulty arises: the quantity of water absorbed is so great that the drying of the tissue is greatly delayed, and, in consequence, the chances of insolubility—partial or total—greatly increased.

The quantity of bichromate actually absorbed by the film of gelatine has an important bearing on the sensitiveness of the tissue. With the comparatively thin layer of ordinary carbon tissue little trouble is experienced in this respect, as a brief immersion in the ordinary five-per-cent. solution is sufficient to thoroughly imbue the whole mass. But when we come to deal with a thickness many times greater, and have at the same time to avoid as far as possible the absorption of too great a quantity of water, it becomes necessary to consider which is the best method of procedure. An immersion of three minutes in a three, four, or five-grain solution of bichromate suffices, even in cold weather, to render ordinary carbon tissue perfectly "limp"—the test usually adopted of complete sensitising. But with the much thicker relief tissue such a period of immersion is in every respect inadequate; and when extended to five minutes it is necessary to employ a solution of the full strength named above, in order to secure a thorough penetration of the film of gelatine and a proper degree of sensitiveness.

As regards the physical conditions of the stannotype tissue we are fortunate enough in finding it—if prepared according to the directions given in the previous article—in a condition which renders us independent of any consideration of its "limpness" or otherwise after sensitising. Stripped, as it is, from glass, and kept under pressure, or at anyrate flat until the time of sensitising, it does not present the same difficulties in the performance of that operation which the carbon tissue supplied in rolls does. We may, therefore, be satisfied with a short immersion, provided the sensitising bath be of an appropriate strength, trusting to the complete diffusion of the bichromate during the subsequent period of drying.

For ordinary use the five-per-cent bath may be used, or, as it is generally stated, one ounce of bichromate of potassium to one pint of water. This must be filtered and kept perfectly free from dust or other matter, which, if it attach itself to the surface of the tissue, will inevitably produce defects in the resulting relief. The dish in which the sensitising is effected must also be kept scrupulously clean for the same reason. The tissue is immersed for five minutes, and the surplus solution then removed from both back and front by means of a fine sponge or a pad of linen free from "fluff." It is then ready for drying.

This portion of the operations requires more attention and care than is usually given, or than is necessary with ordinary tissne. The great thickness of gelatine necessarily causes a larger absorption of solution, and consequently there is a larger quantity of moisture to be got rid of. In addition, there is a stronger tendency on the part of the tissue to curl up in drying. To avoid the latter difficulty it is usual to tack the damp tissue on to a wooden frame large enough to leave both sides open to the atmosphere in order that evaporation may go on from both sides. If such frames be not at hand, a substitute should be extemporised by tacking strips of wood to the four edges or sides of each sheet of tissue, in order to prevent as far as possible the warping and curling which would otherwise occur in drying.

From what has been already said it will be recognised that under any circumstances the drying operation is longer than with ordinary tissue, and that, therefore, it is desirable to hasten or curtail it as much as possible. The application of heat for this purpose is available only to a slight extent for two reasons: its tendency to liquify the moist gelatine film, and, on the other hand, to induce partial insolubility when dry. The chloride of calcium drying-box is, therefore, a great convenience, and, indeed, where much work is done, an absolute necessity. The object to be held in view is to dry as rapidly as possible *without heat*, or with the application of as little heat as can be conveniently managed. The longer the gelatine remains in the moist state after sensitising and the higher the temperature the greater is the tendency to insolubility. This insolubility may not be absolute, but according to its degree it will render the subsequent development of the relief more difficult and tedious.

It has been proposed, in order to increase the sensitiveness of the tissue, to employ a very concentrated solution of bichromate for sensitising, with a view of causing the absorption of a larger quantity of the salt with a short immersion. In making the tissue on a large scale, and with perfect appliances for rapid drying, the bichromate is mixed with the gelatine; but this is scarcely practicable on a small scale for the reasons that we have mentioned—the tendency of the tissue to become insoluble if the drying period be protracted. We have used a ten-per-cent. solution of bichromate, but cannot recommend it for general use, as whatever gain there may be in rapidity of printing is more than counterbalanced by the greater trouble in development, owing to the "insolubilising" effect of the stronger bichromate solution. The five-per-cent. solution is the best for general purposes.

SINGULAR LUMINOSITY OF THE ARGENTIC-BROMIDE GELATINE FILM.

Some time ago my attention was much attracted by the note recorded in these pages respecting Captain Abney's observations on *Shearing Stress*, and as to the fact that, in cooking emulsion, if the same were stirred in the dark a luminous appearance resulted. What the character of this light was—whether fluorescent, phosporescent, or the light usually attending electrical activity of high tension—I do not remember to have seen made the subject of comment, nor do I intend here to offer any opinion on its character, though I am inclined to think it is of an electric nature, similar to that produced when pieces of sugar are rubbed together.

Not long after reading the observations alluded to I was charging my slides, and I use a good strong light (a paraffine lamp behind two thicknesses of stout orange paper oiled). The plates I was using (the Albert) were separated by four small pieces of thick paper placed at their margins. One of these pieces of paper adhered somewhat strongly and resisted a hard rub, so that I had to pick it off with my nail, when at the moment of parting from the film there was a very bright, somewhat greenish-blue, light emitted, which much puzzled me as seen in the full light of my lamp. At that time I could not succeed in reproducing this light, as the other pieces of paper were less adherent.

I thought much on the subject, and almost came to the conclusion that I must have had a fragment of phosphorus from a lucifer match on my nail, and that this had caused the light, for it was very similar in character to that produced by scratching the top of a match; but I was unable to reconcile the silence of the discharge and the colour with phosphorus being the cause.

A few days ago I was tempted by the improved light of the last few weeks to refill my slides, and, using the same plates similarly separated, I tried if the light I had observed on the former occasion could be produced at will. I wish now to record that whenever the pieces of paper adhered pretty strongly and I briskly scratched them off with my nail I was able to again produce this singular light, though never again nearly so brilliantly as on the first occasion, and I have fancied with not quite so yellowish or greenish a tinge. The surface showed a slight disruption of the film where the pieces of paper had been scratched off when the light was produced.

My experiment was with a dry film; the earlier note recorded in these pages was with emulsion. There is, therefore, a little difference in the circumstances attending the two cases. I did not notice that when developed the silver was reduced where the light resulted, but it may have been.

The unstable equilibrium of cooked Ag Br may possibly be upset by friction as well as by actinic energy, and we know that all chemical action is accompanied by electrical disturbance. The explanation may be found in this, but I would rather have others to explain while I record, as the subject is at present in my own mind inexplicable. H. H. Cunningham, B.A. *(Cantab).*

SULPHITE OF SODA IN THE DEVELOPER.

May I ask space for a few remarks in explanation of some of the terms used in my former article on this subject? In speaking of "clear glass in the shadows" I intended especially to refer to the absence of the so-called "pyro. stain" in the more transparent parts of the negative. With regard to the "non-actinic colour of the deposit," exception has been taken to this term on the ground that the colour is due to the above-mentioned staining of the film, and not to the actual colour of the deposit. That this is not the case is readily proved by the experiment suggested. It will be found upon trial that it is quite impossible "to produce a similar non-actinic colour in an oxalate-developed negative, subjected, after fixing, to a bath of alkaline pyro." In this case the film will be stained, but for all practical purposes the colour and printing value of the deposit will remain the same.

Mr. S. Fry is correct in stating that the colour of the image in sulphite-developed negatives more nearly corresponds with that of the retouching pencil. I quite admit that from such negatives an increased number of prints can be made in a given time; but I fail to see the advantage of producing a larger quantity of prints without regard to quality or permanence.

In expressing my views on this question I have assumed, perhaps rashly, that any slight saving of time in printing and retouching, or even the "one greatest charm of delicately-clean figures," so eloquently eulogised by Mr. Fry, should be deemed of minor importance, and scarcely worth consideration as compared with perfection of results. As regards actual development: in my own practice I have always found that all that can be done with the sulphite developer can be done quicker and, I think, very much better without such addition. I am, therefore, surprised to find it stated by Mr. Fry that the pyro. developer without sulphite of soda "becomes at once, on mixing, thick and turbid, throwing down a solid, opaque deposit when the ammonia and pyro. come together." This is quite contrary to my own experience and that of others. There must be something radically wrong in Mr. Fry's manipulations or his chemicals, or possibly in the water he uses, to produce such a result. A solution of fresh pyro. in distilled water containing a trace of citric acid becomes only slightly discoloured on the addition of the ammonia and bromide. It will gradually become darker in colour by keeping, but should remain quite free from deposit; and, although slower in its action, will retain its power of development for a very long time. At a recent meeting of the Photographic Club several negatives were shown which had been successfully developed with alkaline pyro. mixed as above, the developer having been previously used for eight negatives in succession, and kept for twelve months after mixing.

It is possible that the success of the above experiment may have been in some measure due to the small quantity of citrate of ammonia formed in the developer. I would, therefore, suggest, in making comparative experiments to determine the utility of the sulphite, that the required excess of acid be mixed with the pyro. solution, and the same tested with and without the addition of neutral sodic sulphite in various proportions. If tried fairly it will be found that the gradation and printing qualities of the negatives will improve in proportion as the quantity of added sulphite is diminished. B. J. Edwards.

ONWARD!

It behoves thinking men, every now and then, to stop a while in the course of their progress to take a view, philosophical it may be, of the state of things in a given way; examine, with some care, to get a definite idea of the subject under contemplation; and, if advisable, to communicate the impressions left on the mind to those whom it may interest. This is the case with me, and I now purpose laying before the reader the impressions left on my mind by a survey of the photographic work recently produced, or with which, at anyrate, I have come in contact.

I began by asking myself whether much progress had been made in photography within the last five years, and an affirmative answer came forth, on recollecting that five years since a new era was opening; a fresh system of working was steadily forcing its way in hands and minds; that dry-plate work, in the garb of gelatine, was to be the system of the future, to the abandonment of the "messy" old wet-plate process. Difficulties in the working had successively to be overcome; simplification in the manipulations secured; a more accurate knowledge of the power of the new servant attained; and what instruments were preferable in conjunction with it. Although improvements will to a certainty be yet made, it must be acknowledged that the present condition of gelatine working is very satisfactory indeed. Speed to a very great extent; swallows taken on the wing; Neptune's vivid embrace of *terra firma*; topographical views of towns from the trying cars of balloons; man and horse vaulting over gate—features of rider made out—all this speaks for itself. Lenses, too, keep pace with the times; they will do what is required of them in nineteen cases out of twenty, and do their work wonderfully well.

Now come manipulations proper; and here it may honestly be said that the photographic body work to perfection. No more marble stains, no nasty patches, no grubby-looking pictures. Even printing is well understood and carried out, and the results are uniformly satisfactory. Some still produce prints more juicy and mellow than others; it is their privilege, since their discriminating eye shows them it is best so. The lessening of the weight of the *impedimenta*, also, shows progress. The neat and light pocket camera is a gem, as well as the symmetricals, be their denomination what it will, so long as they emanate from an able and reliable worker. With the exception of the stand, one may go out unnoticed, yet really carrying three dark slides, 5 × 4 camera, and lenses, without in the least attracting attention. Surely these are golden days—days such as Rejlander would greatly have relished, fully appreciated, and to which he would have done justice.

And what about the work *per se?* It is unquestionably good in the large majority of instances. Better judgment is clearly discernible, more taste, a better realisation of what goes to constitute a picture, and a laudable aim much more frequently seen. Landscape especially is admirably rendered, and so is the sea and its associations. In both a large number of representatives may justly be regarded as no mean adepts, and in wishing to pronounce who is really best one is often greatly embarrassed. Portraiture appears to have been treated in almost all conceivable ways, and wonderfully mastered by some. In composition work, however, very few indeed can as yet be said to have succeeded; this is the *pierre d'achoppement*, or stumbling-block, over which the daring, but improperly-trained athlete comes to grief, furnishing the bystander the poor satisfaction of witnessing the imperfectly-measured leap and melancholy fall. As yet very few have successfully vaulted over the perilous chasm, and they form a tiny cluster arrayed in their picturesque costumes and with miens worthy of true champions. They are now taking breath, preparatory to furnishing all with some new performance that shall eclipse their previous performance, and, if possible, that will gain them preference over a contesting rival. This is most laudable emulation.

But to work—to the purpose—that I may not be deemed slumbering, and ranked among the drowsy old fogies who lull you to sleep with their dreary talk. Has progress attained its limits? Is there no further room for perfectibility in the photographic work of the day? Indeed much is yet to be attained by the ambitious; a far closer study of nature—of the work of the select *élite* of photgraphers; a much more intent study of what constitutes art proper; a realisation of the ideal; the cultivation of the truly poetical; and, finally, the manner—a way, in fact—to the realisation of all this.

What is the fault of the day—the glaring fault—which causes men of art-culture to turn from photography? The very general want of perception of the poetical, and the knowledge to suitably render this? Photography, as practised by tens of thousands of votaries, is graphically perfect. It is precise, mechanically correct, and incisive. It pierces and cuts; it stares; it has the keen edge of the razor. Slightly mitigated, it loses its offensiveness, becomes placid, and is a quiet friend one takes a walk with, with no positive objection, if with no actual thrill of pleasure.

Then, what is to be done? How is further mitigation to be understood, that the friend may become a really sympathetic one? By seeking to throw into the work that mysterious halo peculiar to genuine art—that poetry which alone can satisfy the true *dilettante*—that is the only way. Is this easy? The query is very pertinent—the reply "yes" and "no." It is easy when innately feeling what is wanted, what constitutes the truly beautiful; but it is absolutely impossible for those to whom this fine gift is denied, and which may be summed up in seeing, feeling, and penetration, with ability to render. That these terms should be to some extent abstruse is not to be denied; perhaps they might form a profitable theme to meditate upon.

Now for examples. Proceeding from the comparatively simple, I shall first take up the portraiture of the day. Side by side with others recently stood a collection of the works of Mr. Mendelssohn; next to his, notably, the work of an otherwise good photographer. From a few yards' distance I cast an alternate glance at the productions of the two, and not a minute's hesitation remained on my mind. Mr. Mendelssohn's pictures possessed art and poetry; his competitor's none whatever. In the latter the lines were harsh, the lights staringly white, the shadows decidedly black; in the former a softness of light, line, and tints, besides capital posing and lighting, made it manifest that a masterly head and hand had the making of the pictures. Mr. Faulkner from the first sought the beautiful, and to the last renders it felicitously. His productions evince taste, culture, knowledge, and sterling ability. They are never monotonous, never harsh, never unsuggestive, never done to death, never stagey—*à bon entendeur, salut!*

In landscape a vast deal of really excellent work comes yearly to the front. Seen individually or collectively the pictures are good—mostly well chosen, neat, and pleasing. A strong affinity is manifest in the productions of many workers living far apart and unknown to each other oftentimes; but they use the same type of lenses, stereotyped sizes of plates, develope and treat in a manner somewhat identical, and only differ in the views taken. Here and there someone will soar higher—as does Mr. W. McLeish—distinguish himself at a stroke, and carry off the coveted laurels, which he (Mr. McLeish) well earned. Somehow, there is something finer to be done than the work of the man whose work resembles other men's work. There is something infinitely superior in every respect, and that is work such as Mr. H. B. Berkeley recently had at an exhibition. Now with his productions I have every sympathy; it is my ideal of what the sort of work should be. It is as beautiful as the finest etching; possessed of the same delicacy; and each production, taken individually, is a gem. Here size has nothing to do with the matter, for I doubt their much exceeding a half-plate. No; the whole thing lies in the mode of treatment and finish. I sincerely wish I understood platinum printing as that gentleman does, and if I wished to follow any one I would certainly follow him. Then there is art, and, next, higher art still, even in landscape. Yes, and this is simply unquestionable.

But it is to composition work I must now revert—to the forming of a picture that will convey a thought, because of its characteristics as a subject and mode of treatment. The first thing I would strongly impress on the mind is the twofold aphorism "*ars probat artificem,*" and "*ars celare artem.*" They are distinct, and, withal, play into each other's hands. Those round whom the *Venus de Medicis* was produced were right in propounding these phrases to guide the artist in his work—to remind him of "the art to conceal art." There is an infinite deal in that. The highest and best photographic instances of this, to speak of the pictures of the day, are to be found in Mr. Adam Diston's *Industry*, in his *Gloamin'*, and *After the Storm*. He understands how to conceal the manner by which he proceeds. He knows the value of concentration of light. He possesses the skill to effect this. How to subdue parts, so as to make them unobtrusive in his work. You want delineation perfect; he will furnish you with it wherever necessary, and nowhere else. The accessories are simple, natural, not over-prominent, *ad rem;* not overcrowded, not too sparse, retiring where need be, a little more forward when of importance, and withal perfectly subordinate to the figures. The last are simple, characteristic, interesting, eminently human, possess feeling, and are sympathetic. In all three subjects named the figures are striking amid the quiet of the surrounding tones. Even on the very bust of the two first a soft harmony pervades; there is tone on them and in them. Isolate any one of these three pictures; stand back a couple of yards, screen all things surrounding with your hands spread outwards from your eyes, and look. Look well, read intently, and the small personages delineated by Mr. Diston will grow in magnitude; life will permeate through the soft tones; real live figures will stand before you, till you become unconscious that you have before you only a phantasm—a reflex of the living. Look longer at it. The old figure will linger in your mind—will stamp an ineffaceable impression on your brain. You will begin to put to yourself numberless questions about the interesting figure, her childhood, her youth, her prime, the turn of life, the descent down hill; all this, with its multitudinous incidents—that which gradually sank those deep furrows in the brow of this, God's creature! When you turn away, the figure will follow you, the old soul will be your companion, you will wonder that she should have become such a friend, and wish her well from the bottom of your heart.

This is what real art alone can do. No other way is there to appeal to the sympathy. It must be realisation to the most complete extent, by means artistic, by able treatment, by judicious selection, by proper and natural choice of attitude, by degradation or subduing of tones, by the use of a suitable light, by the toning of that light so that not a crude spot remains—not a speck intrudes. The pictures are, I think, to be had. Procure and study them; ask yourself the why and wherefore of this, that, and the other. Your queries, if properly propounded, will to a certainty elicit satisfactory answers; and you will be the wiser, and possibly be put on the road to improvement over your past work. Your aim will be higher; you will no longer rest satisfied with secondary work, but wish to produce better and more perfect pictures. Were Gerard Dow alive he would delight in *Gloamin'* and in *Industry*. He would heartily shake hands with Mr. Diston, and acknowledge in him a brother mind. The two would, I warrant, value and fully appreciate each other's society—the themes would be in common—the chitchat delightful to both. Thus it is with men of a similar stamp, whose aim is honest and high. The breadth of their minds precludes jealousy. If they emulate each other, it is all for art's sake, and not out of mean rivalry. Thus it is with noble minds.

I trust I shall not be suspected of writing anyone up. Not one of those whose names are mentioned in this communication have I ever come in contact with, or in any way do I know. I have but one object in thus writing—the furtherance of art study proper, and the desire, all the while, to furnish hints of a nature to stimulate the worker to higher exertions; that the productions of the camera may steadily improve in character and quality; to direct the mind to rise above the tedious humdrum so repulsive to superior intellects. It is such a relief to soar in higher and more wholesome air, to be able to grasp a better and broader view of things, and to render them accordingly! Who would be a tame plainsman if he could be a hardy mountaineer and live aloft? Who would either crawl or walk if he could fly? Further study, and dare—*Audaces fortuna juvat.*

A. F. Genlain.

SILVER PRINTS.

These might be made more permanent if photographers would be satisfied with a paper having a fair surface. Pure albumen alone without the addition of other ingredients gives but a certain amount of glaze; but it ensures perfect coagulation with the silver, printing better, and making comparatively easy the toning operations, to say nothing of the worry and anxiety saved to the poor printers, who are an intelligent class, not sufficiently recognised as they should be, especially in these days of gelatine negatives.

In the matter of washing: twelve or fourteen changes, hand to hand—that is, transferring the prints, one by one, from one water to another—will do far more to remove the hyposulphite of soda than by leaving them wallowing and clinging in a mass all night.

From the very nature of the compounds used in the preparation of the highly-glazed papers, now so much in demand, instead of being a gain they are a direct positive loss, in every conceivable way, to the albumeniser as well as to the photographer and printer—by unnecessary additional labour, &c., to the former, as well as chemical action being retarded by the use of the substances alluded to, and innumerable difficulties experienced by the latter in accomplishing (which is too often the case) the production of an unsatisfactory batch of prints.

To alter all this the remedy is simple—*use only pure albumen paper;* sacrifice all else, if it be a sacrifice, in dispensing with the treacherous high glaze. If a high glaze must be had, first secure good prints; and then burnish or enamel them, which will tend further to preserve the pictures in the future.

W. H. Hunt.

CLEARING GLASS.

This title is, no doubt, sufficiently comprehensive to include all methods of getting rid of dirty glass, whether they consist in making it clean for further photographic use or in converting it into "cullet" for making paths or for mingling with the fresh charges of the glass-makers' pots. In these days of gelatine there is certainly much in the way of waste plates (*carte-de-visite* size especially) that will not pay for cleaning off; and, as most of us are averse to entirely wasting them, they are allowed to accumulate in the dark room (usually) and elsewhere on the premises of a photographer, till they become a grievous nuisance and an eyesore to anyone with the bump of tidiness and order. Nothing gives a more disreputable look to a dark room than dirty glass scattered about, the greater part of which has not been half washed and having the hypo. crystallising out upon it, so contaminating the fingers that nothing can be touched by them after they have been in contact till they have been thoroughly washed.

I have an idea which, I think, I have seen expressed in these pages, that these small gelatine plates, loaded as they are with silver, would pay a glass-maker to collect and buy up for the manufacture of that particular tint of glass so fashionable now, and which is, if not produced with silver, very similar in tint to glass having that metal in its composition. If they were of any value for this purpose the enormous number of waste plates would go far towards supplying all the materials for the manufacture of that description of glass, and would remove the greater part of the dirty-glass nuisance from the premises of the photographer. Can anyone move in the matter? Who has friends among glass workers?

All sizes above and, perhaps, including half-plates will pay for cleaning—where there are any boys or apprentices in the establishment who may be not always fully employed in winter time—if stored and done in batches. To prevent, however, the glass from deteriorating or making a nasty litter, each waste piece, when condemned, should be allowed to dry and then be stored away on a shelf in blocks of the various sizes, by rearing face to the wall, and according to the treatment they are likely to require—that is, gelatine plates, varnished films, and carbon transparencies in one part; unvarnished collodion films in another. It is far better to put them all away quite dry thus than to let them stew in their filth for weeks, or stick together and stain, till they are quite worthless in photography.

When the quiet time comes the whole may be speedily converted into a clean and useful article by proceeding as follows:—The unvarnished plates—collodion films, I mean—should be put into a crock, tub, or dish of dilute hydrochloric or sulphuric acid till the film floats off, then rinsed, and put in a tub of clean cold water. The others—consisting of gelatine plates, varnished films, and carbon transparencies—must be placed one by one on a wooden dipper, made of a lath with a couple of wire nails to rest the plate on, and immersed in a copper of strong and boiling soda water till the film dissolves off; then withdraw the plate and place it upon a piece of wood, and well rub both sides with a piece of canvas to clear away any obstinate particles adhering. Re-dip it in the copper and pass it to boy No. 2, who should immerse it in cold water and well rub it again with the fingers on both sides to remove bits and rinse off the soda before plunging it into the tub of water which has already received those from the acid. Carbon transparencies on a bichromated gelatine substratum are about the most difficult to remove. These will stand some minutes of the strong boiling soda-water before yielding. It is better not to hurry these out, but to let the gelatine dissolve off entirely. It will not rub away. Dry plates skin off at once without any trouble, and varnished wet films immediately on entering the soda water. With a couple of boys at work who are making use of three or four dippers there will be no excuse for standing idle; for while boy No. 1 is removing a piece of glass from the soda, rubbing and re-dipping it, No. 2 feeds the copper by putting another glass on the empty dipper and placing it in the water under those already in pickle.

After the whole has passed this stage, and is in the tub of water, the next operation is to get the clean but wet glass dried and stored as quickly and easily as possible. To do it with cloths is certainly one of the most disagreeable and tedious operations anyone could desire. No drying-cloths should be used. The copper must have its dirty water ladled out and carried to the waste tub for what silver there is to settle, and its place supplied with a few buckets of clean water. When this is raised to the boiling-point boy No. 1 takes a glass out of the tub, dips it with his fingers into the boiling water for a few seconds, then hands it to No. 2, who mops it on both sides with a pad of old rag or a sponge, and rears it up dry. Four or five hundred an hour may be thoroughly dried in this way.

The glass thus treated is equal to new, and may be repeatedly used without exhibiting any defects arising from its having been used before; whereas, when the pieces as wasted are put together wet, the surface of the glass is immediately spoiled by the stains and tarnish proceeding from the unequal wetting. It is, besides, a marketable article now it is clean.

The value of the foregoing I am able to vouch for from my own experience. My periodical clearing-up takes place about every six weeks, after which I am able to say that I have not a piece of useless, dirty, or broken glass on the premises. As a lad I have had a hand in clearing up large batches, frequently numbering as many as five thousand pieces, the principal portion of which consisted of glass of an exceedingly delicate description, and many of which have been used in that most delicate of all photographic operations—the production of high-class stereoscopic transparencies in the camera. On the other hand, I have worked in studios where soiled glass was allowed to accumulate almost by the ton without remedy, as far as I was concerned. I hope, therefore, that these remarks may help to a riddance of the nuisance.

John Harmer.

THE UTILISATION OF THE LAWS OF LIGHT.

There are two methods of developing photographic plates:—One is by unintelligently using, always in the same manner, the illumination given by the screened window or lamp; the other is by developing with a knowledge of the laws under which that illumination is useful.

The other night the paper, green-yellow Debenham screen of my pasteboard lantern caught fire and was burnt up in a minute, because of the candle-flame being too close. A plate had yet to be developed. It was one of the Monckhoven plates, which I am using extensively, and with which I am very much pleased. As a transparency with them is printed by an exposure of about ninety seconds at twelve inches from a common candle, it was evident, according to the law that the intensity of light varies inversely with the square of the distance, that at twenty feet from the candle it would take 400 times longer to print the same image at that length of separation. I therefore went to one end of the room, while the candle was placed at the other, turned my back to the light, put the plate in the dish, developed it, and when the image was fairly out walked slowly up to the candle, finishing the development close to the bare candle flame, without fog. This may be called "development by legs and law." Except for the trouble of walking about, it raised the question whether travelling lamps are an encumbrance or a necessity.

In these operations the walls of the room took the place of the sides of Mr. Starnes' lamp. They were worse in being less non-actinic in colour, and better in being further from the source of light; but the latter influence is of much more practical importance than the former. Mr. Starnes argues that actinism is something distinct from the wave-length and periods of vibration of portions of the spectrum. Ideas should not be opposed because they are at variance with orthodox science; but those who advance such variations should, at least, print the best evidence on the orthodox side, and then oppose it with crucial experimental evidence, giving facts which can be explained by the new position and not by the old one. This Mr. Starnes has not done.

Light of certain wave-lengths probably sets up intermolecular vibration between the ever-swinging atoms of the bromide of silver, so that their affinities are weakened where light has acted. The discussion of this matter, some ten or twelve years ago, in your pages may be referred to with advantage. In some cases in time the atoms fall back to their normal position, so that the plate is ready for a fresh exposure and has lost the original image, as proved by the experiments of Mr. M. Carey Lea. In other cases, as when gelatine is present, other attractions come into play, so that the partial separation of the atoms of the molecule by light is maintained. This hypothesis of the nature of the latent image has much experimental evidence in its support, and is in harmony with the accepted laws of molecular and etherial motion.

W. H. Harrison.

NOTES FROM THE NORTH.

The versatile Mr. A. Cowan has conferred a great favour on many photographers north of the Tweed by enabling them to see his instructive series of twenty lantern transpariences printed from one negative, each differing in colour from all the rest and ranging from deep black to warm brown. There are few, experienced in lantern work, who would not pronounce each specimen seen by itself a perfect picture, and who would not, in looking at them altogether, find a difficulty in deciding as to which is best for general use. Personally I confess to a leaning in favour of those marked respectively "five" and "ten;" but if in practice it should be found as easy to vary the colour at will as Mr. Cowan believes it to be, the lanternist desirous of making his exhibitions as nearly perfect as possible will select several favourite tints and employ them with discrimination on subjects to which each is most suitable.

Exhibition of lantern pictures absolutely alike in colour, even although the pictures themselves are of the highest class, are to most people just a little monotonous; and there cannot be any doubt that a study in architecture, a sunlit landscape, and a so-called "moonlight effect" can hardly each be shown at their best if printed in the same tone.

The *developing* agent employed by Mr. Cowan is in all cases iron, and the great diversity in colour is got by additions of a few acids, alkalies, and salts, in varied proportions and quantities.

The experimentalist, however, in following Mr. Cowan's lead, must not expect to reach at once success equal to his. An examination of the instructive table of chemicals and quantities appended to the frame in which the pictures are mounted, shows that a very trifling increase or decrease in the proportions exercises considerable influence on the resulting tint; and when the unstable nature of some of them—ammonium carbonate, for example—is remembered, it will be evident that when any particular colour is required the operator must either have all his material of constant strength—and for this purpose standard solutions will be found best and most convenient—or make up his mind for a little experimenting before obtaining the desired shade.

A transparency on glass, whether for lantern or decorative purposes, has long been recognised as one of the most perfect photographic productions, and the introduction of Mr. Cowan's gelatino-chloride plates and his method of development ought to make it sufficiently popular to give work to many who at present suffer from the proverbial dulness of photography as a business.

Judging from the frequent allusions to the subject of intensification, it would seem that there are still photographers who find difficulties in the successful practice of the operation. Intensification by silver is said to result in stains, either during the operation or at some time after, while mercury is looked upon with suspicion—some declaring that the negative intensified by its aid will gradually fade, while others believe that exposure to light will result in something akin to opacity. Possibly the allegations against both substances may have some facts for their foundation; but, if so, I have no hesitation in saying that the faults lie in the method and not in the material.

In 1856 I saw (using the language of those days) a positive converted into a negative by bichloride of mercury, iodide of potassium, and ammonia, and only a few days ago it was taken out of the paper in which it had lain for eight-and-twenty years, and yielded a print quite as good as those first obtained. Several of the published methods of mercurial intensification may be relied upon as both safe and practical; but the following, which has been repeatedly described, I believe to be the best:—

A.

Mercury bichloride	1 ounce.
Ammonium chloride	1 ,,
Potassium iodide	*quant. suff.*

Dissolve the mercury and ammonium salts in ten ounces of water, putting them both in together, and add sufficient of a strong solution of potassium iodide to dissolve the red mercury iodide formed by the first additions. Then make up the bulk with water to twenty ounces.

B.

Silver nitrate	½ ounce.
Potassium cyanide	*quant. suff.*

Dissolve the silver in five ounces of water and add sufficient of a strong solution of the cyanide to dissolve the precipitate formed by the first additions, and make up the bulk with water to twenty ounces. The solutions will keep indefinitely, and where very much intensification is required should be used at the full strength; but when only a slight action is desired, A may be diluted to one-half or one-third.

The fixed and well-washed negative should be placed in a dish with sufficient of A to cover it, and kept in motion for a few seconds. Let the action proceed, examining the plate from time to time, till apparently sufficient—or, rather, a little more—density is produced. At this stage the negative will have the appearance of a rather dense but thoroughly good printing collodion image, and the operator may feel inclined to "let well alone." On well washing the plate, however, he will find the whole deposit has assumed a yellow colour, and the washing must be continued till that colour is uniform all over. When that change has been accomplished the plate must be placed in another dish, covered with B, and kept in motion for a few seconds as before. Gradually, beginning with the higher lights, the yellow will give place to a fine olive brown, and the action must be allowed to continue till the whole negative has assumed that colour. A final wash completes the operation, and I have little doubt that whoever will give it a fair trial will no longer feel that there is any difficulty in intensifying his negatives.

Regarding the practical permanence of the image thus intensified I have no doubt whatever. I have practised the matter pretty constantly during the last two years, and there lies before me while I write a negative of the birthplace of the late Dr. Moffat from which some hundreds of prints have been taken, and it is, so far as it is possible to judge, absolutely unchanged. JOHN NICOL, Ph.D.

THE BEST METHOD OF PRINTING.

THE best method of printing upon albumenised paper is to float for one minute upon a solution of nitrate of silver forty-five grains to each ounce of water, draw the surface of the paper over a glass rod, and then lay between sheets of clean blotting-paper. By these means the whole of the sheet is uniformly sensitised, which is not the case if the sheet is suspended to dry directly it is withdrawn from the silver solution, as the lower portion must absorb more of the silver solution than the upper; and the longer the paper is in drying the greater will be the difference between the upper and lower parts of the sheet.

The sensitive sheet, being carefully blotted, may at once be hung up to dry, which operation ought to be conducted at as high a temperature as possible; when dry, expose to the action of the fumes of ammonia in a box made as follows:—Procure a packing-case 24 × 20 × 15 inches deep, with a good fitting lid, two inches from the top bore five holes on each of the sides of the box and three on each end. Now pass a long piece of string through one of the holes and out of the opposite one, so as to form a sort of network, the strings from the holes in the end crossing those from the side, and on the bottom of the box place a sheet of white blotting-paper.

Now, for fuming the paper:—Sprinkle about half-a-drachm of liquor ammonia upon the blotting-paper at the bottom of the box, place the sensitive paper face downwards upon the network of string, and close the lid. The time the paper is to be exposed to the fumes of the ammonia must be varied according to circumstances. In damp weather ten minutes will be sufficient, but in dry weather twenty or even thirty minutes will be better, this being, of course, for good ordinary negatives; but for hard and long-printing negatives the longer time *must be given* to secure the best results.

With ammonia fuming it is useless to expect the best results if the paper be floated too long, as there is then a tendency to flatness and slowness in printing; therefore do not float more than one minute on a strong bath (forty-five grains), or one and a-half upon a weak solution (thirty grains). In floating, remember that each sheet takes up a certain amount of silver, and that the last sheet before strengthening must have a longer floating than the one sensitised directly after strengthening.

For the preparation of sensitive paper that will keep, float for two minutes upon a sixty-grain bath; place between sheets of blotting-paper, dry, and then float, *face up*, upon a five-grain solution of citric acid for one minute and again dry. Just before use place in the fuming-box. But, as far as my experience goes, Mr. V. Blanchard's formula is the best ever published for ready-sensitised paper, as it is the only method that yields prints with the same surface and brilliancy as freshly-sensitised paper.

For those readers who have not seen this formula I here append it:—Prepare a silver solution sixty grains to the ounce, and be careful not to allow it to sink below fifty grains to the ounce. For each ounce of nitrate of silver used add ten drops of a saturated solution of citric acid; then add nitric acid drop by drop until the slight precipitate of citrate of silver formed is just redissolved. Float from two to three minutes, and after removing from the solution place the sensitive sheet between sheets of blotting-paper, which may be used over and over again until the power of absorption is destroyed, when, of course, it will be a valuable addition to the residue basket.

Now, about washing the prints before toning. Whether using freshly-sensitised paper or that prepared for keeping, to get the finest tones the whole of the silver must be quite removed. This can only be done by thorough washing in many changes of water, and then, but not till then, immerse in a very weak mixture of water and acetic acid (just sufficient acid to taste and no more), after which give a change or two of clean water. Tone in an acetate bath, allowing one grain of chloride of gold for each sheet of paper, and use fresh bath (not freshly prepared, but twenty-four hours' old at least), throwing it into the residue when it has done its duty.

When the prints are toned place in a weak solution of salt and water, and, if of the proper depth, give a change or two of water before placing in the fixing bath; but those prints that are too dark transfer at once to the hypo., which will to some extent remedy the over-printing. Do not allow any of the salt and water or hypo. to come in contact with the toning bath, otherwise it will be spoilt by the hypo. and stopped in its action by the salt and water.

Let the hypo. bath be made fresh each day for the prints, then be used for fixing gelatine plates the next day, and placed in the waste tub for reduction. Have a piece of carbonate of ammonia in the hypo., keep the prints moving all the time, and after fixing give at least ten changes of water at once before leaving in the washing tank.

"Gur."

ON THINGS IN GENERAL.

Well thought out, lucidly expressed, and full of true feeling for art, was Mr. Hume Nisbett's paper—*Camera Lucida, Paletta Obscura*, &c. —read before the Edinburgh Photographic Society. It was a most interesting and valuable contribution to photographic literature, and one which I advise all subscribers to this Journal to read, if they have not already done so. It is valuable to amateur and professional photographers alike, and contains many bright thoughts they may peruse with advantage. I must take exception to one little fly in this pot of honey, in that he says—"Photography is most to be relied upon for truth in all *except perspective*." Photography, I may observe, for the twentieth time, is *not* necessarily false in perspective, though it may be made so; but a good photograph, if rendered so transparent that objects beyond it could be seen, would, if held at a proper distance between the eye and the view it represented, accurately and exactly coincide line for line, point for point, with the lines and points of the scene depicted, and would be identical with a picture drawn in accordance with recognised mathematical modes of representing objects in perspective. Many photographs include a wider field of view than a painter would depict, but that fact does not touch the argument.

Another capitally-useful paper is the gleaning the Editors have made from *Autotype Notes* in the shape of the article, *Copyright Law in Brief*. It forms a short digest of the law relating to copyright, but fails in exactitude in at least one place. I point out the place in order to render still more valuable this useful "brief." At the end of paragraph 13 occur the words—"Illicit copying of an original work before the copyright is registered is actionable." Now, though a special meaning may be intended to attach to the word "illicit," the sentence, on the face of it, is contrary to paragraph 2 of the Copyright Act, which says—"Nothing herein contained shall prejudice the right of any person to copy or use any work in which there shall be no copyright." Further (I now write subject to correction): is the "brief" correct in stating that in the case of a photographer taking the portrait of a person of eminence (he presumably not paying for it), that particular person must sign an agreement? (What agreement, by the way?) Does not the Act require the agreement to be made with the first purchaser of a print of the picture? I write now purely to elicit information from the Autotype Company or anyone else. In the case of a view of a building, for instance, would not the first purchaser be the one to sign the agreement? Also, I would like to ask: Is not this point of view sometimes lost sight of—at anyrate with inanimate objects?

There is a fine point raised in the new *Notes and Queries* department of the Journal—a most useful institution, I am inclined to think, with a journal of so widespread a circulation as The British Journal of Photography. An inquirer wishes to know whether he would infringe the law of copyright by taking engravings from a book, pasting them on glass, and using them in public as magic lantern slides after rendering them translucent. It is indeed a very nice point, and worthy of the subtlety of a Q.C.

Another point about which there can be no doubt is raised by another correspondent, and reveals a state of mental turpitude I had hoped, for the credit of the profession, did not really exist. A third-rate photographer employs a first-class operator, sets him to work to make a collection of fine specimen photographs, and then—sends him about his business. The degrading meanness of such conduct is beyond the power of words to describe.

I was interested to learn, from the pages of The British Journal of Photography, that the British were going to carry war into the American camp, and start dry-plate making in the United States on a large scale. Naturally I wish my countrymen every success; but when, with labour at the price it is, and foreign materials, glass, &c., subject to the high duty there required, we see plates now sold at a price little exceeding English rates, I cannot but think the syndicate will have their work cut out. Will the next syndicate be one for the manufacture of lantern slides, I wonder? It should have good promise of success.

Mr. S. Fry says, in his article on the use of sulphite in the pyro. developer, that one of its greatest charms is "that the most delicate fingers are kept perfectly clean." My fingers would not be called delicate; yet, whenever I go in for developing and wetting my digits with the solution (with plenty of sulphite in it), they get stained with a horrible pale brown, which is as difficult to get rid of as the old silver developer stain.

In reading the report of the Photographic Society of Great Britain I noticed that there had been so much application for space at the last exhibition that it had been found necessary to reject many pictures. Yet the hangers live to tell the tale! How they managed to survive after being compelled to gaze upon photographs worse than some that gained admission is an inscrutable mystery!

The question of dark-room illumination is undergoing a thorough examination, and good will come of it. For a scientific mode of arriving at the best light for the purpose I am much pleased with Mr. Macdougald's diagram, as recently depicted in the Journal (page 103). Properly carried out, there is contained in it the germ of great usefulness.

The thanks of the photographic community are due to Mr. F. A. Bridge for bringing forward, at a late meeting of the South London Photographic Society, the subject of *Willesden Paper*—a material which is too little known at present, but which is calculated to subserve a variety of most useful purposes in connection with photography and photographic operations.

At another society (the Coventry and Midland Photographic Society) an interesting experiment with the oxymagnesium light was carried out—a kind of proceeding calculated to convey more instruction than the most learned of papers or lectures. Portraits and groups were, with the aid of this light, taken and developed upon the spot; and although the results showed the need of more complete diffusing and reflecting arrangements, a notable proof was offered of the possible usefulness of this method of artificial illumination. The published description, however, of the lenses and stops is decidedly "mixed," to say the least of it. A single landscape lens, with No. 2 U.S. stop and eight seconds' exposure, was a failure on account of the "size of the stop and the slowness of the lens," yet with a No. 10 stop and twenty seconds' exposure a "decided success" was obtained. Seeing that this should have had eighty seconds for an equivalent exposure, one is inclined to ask "why is this thus?"

It would seem that the more exalted the position of a periodical the more liable it is to be occasionally hoaxed. Everyone remembers the story related—of the *Athenæum*, I think—where a deceased *savant* was gravely described as having arrived at the "quadrature of a circular arc, and discovered the exact solution of a lunar caustic—a problem which," the paper went on to state, "was likely to be of great use in nautical astronomy." This occasion *The Times* seems to be the victim, and it has been describing for the benefit of its readers the details of a balloon to be used in an ambuscade, and which is provided with the new electro-magnetic balancing bar, which prevents the balloon from gyrating, and it is expected will be the means of eventually dispensing with ballast! I have not seen the account in that paper; but I have been credibly informed that it is there to be seen.

The Editors are careful to say they are not to be supposed "to endorse the speculations put forth in Mr. Starnes' interesting article." I think the disclaimer quite unnecessary. As to the article itself, I seem to have read something very similar in effect by Mr. W. Harding Warner some time since.

Free Lance.

FOREIGN NOTES AND NEWS.

The First Paper Photograph in Berlin.—Photographing a Flash of Lightning. — Daguerre *versus* Niepce. — Changing-Boxes. — Flexible Supports. — Twenty-first Annual Festival of the Berlin Photographic Society. — Correction. — Dr. Eder on Development of Gelatine Plates in Tropical Regions.—At too Close Quarters with a Turbulent Sitter.

The *Mittheilungen* has lately made the interesting discovery of the first paper photograph which made its appearance in Berlin. Though the Talbotype process was discovered in 1840, it was some time before it was much worked on the continent; but in 1842 Mr. Fox Talbot taught his new process to the eminent Egyptologist, Professor Lepsius, who hoped to be able to employ it in an expedition to Egypt, upon which he was about to be sent by King Friedrich Wilhelm IV. The intention of taking Talbotypes in the course of the journey through Egypt was unhappily frustrated by the breakage of the apparatus; but before setting out Professor Lepsius took a portrait of the poet Thomas Moore, which he still has in his possession, and considers it the oldest paper photograph in Berlin.

According to the *Weiner Neuen Frien Presse*, as Herr Hänsel was photographing a landscape there was a flash of lightning, and the flash was photographed along with the landscape. Its outline was distinctly recognisable on the plate, as well as its contact with the earth. Computed from the picture, its length was about 1,700 metres. The zigzag flash lately photographed by Mr. R. Crowe was supposed to be about twenty-seven metres.

On the pedestal of the memorial recently erected at Cormeilles to Daguerre is the inscription—"The Discoverer of Photography." The town of Chalons-sur-Saône now intends to erect a memorial to Nicéphore Niepce, who was born there, and the *Moniteur de la Photographie* supposes that this second tablet also will be erected to the memory of the "discoverer of photography." In inquiring how these conflicting claims are to be reconciled, the *Moniteur* would like in some way to indicate that though Daguerre had most to do with the working out of the process, yet Niepce was the real discoverer—a fact we are apt to forget. Probably the name of "Daguerreotype" having been given to the process has kept his name fresh in the memory, while, as we do not speak of Niepceotypes, the name of Niepce has fallen into undeserved desuetude.

Amongst the German patents recently applied for or obtained is a method of constantly regenerating the ferrous oxalate developer, by Dr. T. Kötteritzscha; flexible substitute for glass for negatives, by Herren Fickeissen and Becker; and changing-boxes, by Herr Mader. Herr Mader encloses each dry plate separately in a thin, light-tight tin or sheet-iron shell for a covering, one of the sides of which can be pulled up like that of a dark slide, for which it may be substituted; yet each plate with its shell occupies little more room than a bare plate. The plates so covered are placed in an ordinary plate-box, the grooves of which are widened to admit them. The plate with its metal cover is laid in a wooden dark slide specially constructed for the purpose, exposed, the metal slide shut down, and then plate and cover exchanged for a fresh one taken out of the box. The object of these covers is to do away with the use of a changing-box or for carrying about a great number of double dark slides, as the thin metal slides seem to allow of a fresh dry plate being put into the wooden dry plate about as readily as a fresh wet collodion plate used to be done, or even more readily, as, of course, the bath is dispensed with.

As flexible supports for negatives to replace glass, Herren Fickeissen and Becker use a white paper, comparatively free from texture and containing little size; they damp it and stretch it upon a suitable frame. When dry it is rendered transparent with fine copal varnish. When repeated coating with varnish and polishing has made the paper sufficiently transparent, and so hard that it is no longer sticky, some of the following solution is floated over the glass and allowed to dry, after which the paper is ready for use—instead of a glass plate—either for the wet or dry process:—Some ox-gall is mixed with acetate aluminium, which immediately precipitates the fat of the gall, so that if this mixture be placed on a filter the bitter part of the gall is obtained free from fat. When required for use some dissolved glue or gelatine is added to it. The object of this preparation is to cause the emulsion, &c., to adhere more firmly to the plate.

On the 22nd November last the Berlin Photographic Society celebrated its majority by a banquet, the chair being occupied by the President, Dr. Stolze, who addressed the meeting at the commencement of the proceedings. In the course of the evening a special journal was circulated, having a humorous title page, by Herr Bussler, and two lays by Dr. Stinde, one of which (the *Lay of Emulsion*) found so much acceptance when sung to a well-known air, that it was encored. The proceedings were terminated by a lottery, the prizes in which were various fantastic pieces of furniture and accessories, mostly droll toys.

Herr Fr. Wilde, of Görlitz, whose death was announced in many of the photographic papers for November, writes to say that he is, happily, still alive, and that the deceased is quite a different person, namely, Herr F. A. Wilde, of Halberstadt.

The sixth part of Dr. J. M. Eder's exhaustive treatise on photography has just been published. Many of our readers who are familiar with Dr. Eder's profoundly-scientific writings will be surprised to learn that he is still quite a young man, being under thirty. His first considerable contribution to photographic literature was a monograph on the double salts of iodide and bromide of cadmium, which appeared in 1876.

In tropical regions it is difficult to keep the developer cool, and the easiest method of doing so, namely, icing it, is too expensive to be much employed. The South American *Boletin Fotografico* recommends the following remedy, first proposed by the editor of *The Photographic Times*:—Take a flat bath considerably larger than that in which it is proposed to develope; cover the outside of it with felt or some other bad conductor of heat, and cover the inside of the bottom of the dish with a layer of crystals of nitrate of ammonia. Place the developing-dish upon that; fill the interval between the sides of it and of the outer dish also with these crystals, and pour water over them. When they dissolve the temperature is considerably lowered, and this coldness is communicated to the contents of the inner dish, which may either be a developer or an alum or hyposulphite of soda bath.

M. Petit has succeeded in photographing a number of wild beasts belonging to the menagerie of M. Pinnet, taking his camera with him into the cages of a leopard, a tigress, a tiger, a pair of leopards, and three lions. The tigress flew at M. Petit just as he had uncapped the lens, but M. Pinnet succeeded in calming her before she had injured, though not before she had seized, the operator. The other animals, who were afterwards photographed, proved tolerably quiet "sitters."

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 3,722.—"Apparatus for Changing the Sensitive Plates in Photographic Cameras." J. STURROCK.—*Dated February* 21, 1884.

No. 3,865.—"Phototype Blocks to Print in the Ordinary Type Press to Produce Half-Tones and Gradations. T. JAMES.—*Dated February* 25, 1884.

No. 3,866.—"Head Rests for Photographic Chairs." J. W. SAUNDERS, D. T. DAVIES, J. A. MACDONALD.—*Dated February* 25, 1884.

AMERICAN PATENTS GRANTED.

No. 292,515.—"A Photometer." T. O. SLOAN.
No. 292,707.—"Photographic Shutters." D. B. SWEET.

NOTICE TO PROCEED.

No. 5,062.—"Improvements in Perspectographs or Instruments for Reproducing Pictures, Plans, Drawings, and the like." HERMANN RITTER, Frankfort-on-the-Main.—*Dated October* 24, 1884.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
March 3	West Riding of Yorkshire	Godwin-street, Bradford.
" 4	Sheffield	Freemasons' Hall, Surrey-street.
" 4	Halifax	*Courier* Office, Regent-street.
" 4	Bolton Club	The Studio, Chancery-lane.
" 4	Glossop Dale	Glossop Coffee Palace, High-street
" 5	Benevolent	181, Aldersgate-street.
" 5	Edinburgh	Hall, 5, St. Andrew-square.
" 5	North Staffordshire	Town Hall, Hanley.
" 5	Photographic Club	Anderton's Hotel, Fleet-street.
" 6	London and Provincial	Mason's Hall, Basinghall-street.
" 6	South London	Society of Arts, John-st., Adelphi.
" 6	Bolton	The Baths.
" 6	Leeds	Philosophical Hall.
" 6	Glasgow	177, Buchanan-street.
" 6	Dundee	Lamb's Hotel, Reform-street.
" 6	Coventry	Coventry Dispensary.
" 6	Yorkshire College	College, Cookridge-street.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

AT the technical meeting of this Society, held on Tuesday evening last, the 26th instant, the chair was occupied by Mr. T. Sebastian Davies.

As had been announced, the evening was devoted to the comparison of optical lanterns, and several members brought slides for exhibition; but as the objectives used in the various lanterns were unlike in focus, no positive opinion could be formed of the illuminating power of the instruments in use.

The CHAIRMAN opened the proceedings by describing various sources of illumination suited for small screens, and mentioned that the argand burner with colza oil, although not giving so powerful a light as the many-wick'd paraffine lamps since introduced, yet gave a more evenly illuminated surface, and for a small disc was to be preferred. He then showed a lantern of this character fed by almond oil, which, he said, gave a better light than colza, but had the disadvantage of being more expensive.

Amongst the lanterns shown was the three-wick one belonging to the Society, a two-wick one shown by Mr. G. Smith, of the Sciopticon Company, and a four-wick burner, in which the wicks were arranged like the letter W, shown by Messrs. Wood. The last-named lantern had an advantage in not showing the dark line down the centre which was noticeable in one of the others, especially when a disc without a slide was shown; but, on the other hand, there was a faint image of the four flames.

Amongst the slides shown were some illustrating the warm tones that might be produced upon gelatino-bromide plates. These were prepared by Mr. J. B. B. Wellington upon plates coated with an emulsion, the formula for which was given a few weeks since at a meeting of the London and Provincial Photographic Association. The development had been conducted with the mixture recommended by Mr. B. J. Edwards for use with chloride plates; but for warm colours varying proportions of bromide of potassium, amounting in one case to thirty grains per ounce of developer, had been added. This necessitated an exposure to a gas flame of minutes instead of seconds. The development was slow, occupying about half-an-hour; but the colour was of a powerful maroon, approaching claret. One plate that originally had been nearly of this colour showed a part changed to a cold bluish-black. This Mr. Wellington attributed to the plate having been but slightly washed after coming out of the hyposulphite fixing bath, and then being immersed in dilute sulphuric acid. On the part of the plate from which the hypo. had not been entirely removed a sulphur toning action had been set up.

Mr. C. RAY WOODS exhibited several slides from negatives taken in Egypt. He also showed a set of slides not produced photographically. These were pencil drawings on ground glass, which had afterwards either been varnished to render it transparent, or else cemented to another glass with Canada balsam for the same purpose. In order to render the glass more transparent for tracing upon than it would otherwise have been, it had been treated with glycerine and water, after a method introduced some years since by the Rev. Mr. Dallinger. When the drawing was finished the plate was washed to remove the glycerine, and then dried and varnished.

Mr. H. A. MONCRIEFF showed some slides produced by wet collodion in the camera, reproduced from larger negatives.

Mr. F. YORK exhibited slides produced upon gelatino-bromide plates and developed with pyro. and sulphite of soda.

Some collodio-bromide slides prepared by Mr. Nesbitt were thrown upon the screen, and some upon gelatino-chloride plates by Mr. Geary—reproductions of scenes in the Holy Land, taken under the auspices of the Palestine Exploration Fund Committee.

A very effective carrier for lantern slides, the contrivance of Mr. A. Cowan, was employed in one of the lanterns. This consisted of a frame with a travelling-piece. This travelling-piece was made to hold two slides which dropped into grooves. Strings led through the bottom of the travelling-piece and drew it from one end to the other, in either case leaving one of the slides opposite to the centre of the condenser. The other slide could then be changed, and a pull of the string at the opposite end brought the new one into place.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society, held on the 21st instant, the chair was occupied by Mr. F. Piper.

Mr. J. B. B. Wellington showed a series of transparencies possessing a great range of tint, from a beautiful deep rich claret colour, through warm brown and sepia to black. They had been printed on gelatino-bromide plates, the emulsion for which had been prepared by the formula published a few weeks since. The developer employed was that prescribed by Mr. B. J. Edwards for use with chloride plates, but to this had been added, in order to obtain warm colours, varying proportions of a solution of bromide of potassium. The composition of the developer would then be—

1.	Oxalate of potash	4 ounces.
	Chloride of ammonium	40 grains.
	Water	20 ounces.
2.	Sulphate of iron	4 drachms.
	Citric acid	2 ,,
	Water	20 ounces.
3.	Bromide of potassium	160 grains.
	Water	1 ounce.

For black tones a mixture of Nos. 1 and 2 in equal proportions was used, and an exposure of twenty seconds was given to the light from an ordinary gas jet at a distance of one foot six inches. For a sepia colour the exposure had been sixfold, and thirty minims of No. 3 had been added to each ounce of developer. For claret colour an exposure of fifteen minutes, or seventy-five times that given when no restraining bromide was employed, had been allowed, and one hundred minims of No. 3 then added to each ounce of developer.

Mr. W. E. Debenham said that the obtaining of such colours on bromide plates was a remarkable step, and inquired if Mr. Wellington had tried the same development with ordinary bromide plates to see whether similar results would be obtainable upon them, or if it were necessary to make a special emulsion such as had been previously described.

Mr. Wellington had as yet only tried with the particular emulsion the formula for which had been given.

Mr. A. L. Henderson inquired whether Mr. Wellington had tried boracic acid as a restrainer.

Mr. Wellington had not done so.

Mr. Henderson continued by saying that boracic acid was the most powerful restrainer with which he was acquainted. A drop or two of a thirty-grain solution sufficed to stop the action of the developer. He then inquired whether any gentleman had tried any further experiments with canary medium. He had exposed a plate giving 16 on the sensitometer, at a distance of four feet from a screen of the medium, at a further distance of two feet behind which a gas flame was burning, for periods of from seven to twenty-two minutes, without getting fog.

Mr. A. Cowan said that he had experimented with Mr. Henderson, and calculated that at a distance of nine inches from the canary medium, with the gas flame two feet behind it, there should be no deposit from an exposure of thirty seconds.

The Chairman had tried canary medium with different results from those obtained by Mr. Henderson. He had exposed for twenty minutes at a distance of eighteen inches from the lamp, and got a weak transparency printed.

Mr. W. Coles asked whether Mr. Henderson had tried canary medium with daylight.

Mr. Henderson had not tried it fairly. He had oiled it and then it was very unsafe. The effect of oiling seemed to be to take all the green tint out of the paper.

Mr. Debenham said that the comparative safety of canary medium, as testified to by Mr. Henderson and Mr. Cowan, supported the view which he had put forth, namely, that yellow light had less photographic action in proportion to its visual power than red light, and was, therefore, proper for dark-room use. Certainly red light was the less actinic, but then it was so much less luminous than yellow that, when sufficient of it was employed to get luminosity by which to work equal to the yellow, there was more effect upon the sensitive salts than with a sufficient amount of yellow light. He had tried canary medium, and found it safer either than one thickness of cherry fabric or of ruby glass flashed on orange pot, and was, of course, a more pleasant and less injurious colour with which to work. The objection to it was that it was not even in thickness, and, of necessity, its safety was only equal to its thinnest places. Moreover, there was a great body of substance in the paper stopping light of all kinds, so that it was not practicable to use several thicknesses. He certainly preferred to use several folds of paper of a finer make, and to supplement these with a sheet of yellowish-green glass. Mr. Cowan had shown at a previous meeting the light obtained with this combination, and had told them that with a rapid commercial plate held close to the lantern no effect was produced with an exposure of fifteen minutes—a result, he believed, that had not hitherto been obtained with any arrangement giving good illumination.

Mr. Henderson said that there was a great difference in the speed as shown in the camera, for plates prepared by different methods gave the same number on the sensitometer. He believed that an emulsion prepared by the ammonia method, giving 16 on the sensitometer, would be as fast in the camera as one prepared by boiling and giving 20. To put this to the test he had arranged with Mr. J. Cadett (who was present) to prepare emulsions, one each way, and try them. He knew that Mr. Debenham stated that those divergences between camera and sensitometer speeds were caused by pre-exposure to light, but he (Mr. Henderson) thought they were also due to different methods of preparation. He would like to hear from their visitor, Mr. J. M. Turnbull, of Edinburgh, his experience of emulsion making.

Mr. Debenham replied that, although both Mr. W. K. Burton and himself had shown the great effect which exposure to light had in making plates give a higher number in the sensitometer than their camera speed warranted, yet he had stated that other causes might produce a similar effect, particularly any cause which would induce a weak, unsatisfactory character of image, and that the emulsion which gave the ripest and best image in the camera might not be expected to give so high a sensitometer number as one requiring the same exposure in the camera, but giving an image of inferior character.

Mr. Turnbull had given over plate making, but he had never thought so much of ammonia-prepared emulsion as of that obtained by cooking. As to the best medium for the dark-room window: in Edinburgh orange paper was generally preferred; they had not succeeded so well with yellow.

Mr. Debenham inquired whether those Edinburgh photographers who had tried yellow paper had done so with the addition of green glass.

Mr. Turnbull said that they had not. Mr. Tunny had been promised a pattern by a friend, but the sending of it had been delayed.

Mr. Debenham remarked that he had that morning received a letter from a photographer in Edinburgh, to whom he had forwarded a pattern of the glass and paper that he used. The gentleman in question said that, using it in the combination advised, he had developed rapid commercial plates in a bright light with no sign of fog, and he believed that in future he should be better able to turn out good negatives.

The opinion of the meeting was asked whether the use of sulphite of soda did or did not to any extent destroy the half-tones of the negative, as recently stated.

The Chairman found that it did.

Mr. Coles said that, when the use of sulphite of soda in the developer was introduced by Mr. Herbert B. Berkeley, Mr. G. Watmough Webster had not published his discovery of the slowing effect upon the plate of the addition of citrate of soda to the developer. It was advised to neutralise the excess of alkali in the sulphite with citric acid. This introduced an amount of citrate of soda into the developer, and had a slowing effect. If the sulphite were neutralised in the first instance with sulphurous acid, or were used without neutralising, he did not find any slowing effect, either in the time of exposure or in the development. If the plate was thinly coated there was the disadvantage that the negative was of a colour giving less printing density, but there was the great advantage that it prevented staining of the hands.

Mr. F. W. Hart had recently been exposing trial plates, and from the exposure which had been found sufficient (three seconds on a sunlit house with stop $\frac{f}{8}$) he did not think that the sulphite of potassium which the developer contained, or the citric acid which had been added to neutralise the very alkaline sample of sulphite, had had any slowing effect.

It was inquired whether Mr. Hart had made any comparative experiments with other plates at the same time developed in the usual way.

Mr. Hart had not done so.

Mr. Henderson said that some time ago he had made some emulsion for precipitation, and then had added sulphuric acid to decompose the gelatine and enable it to be entirely cleared away. The emulsion proved to be slow but very clear. The clearness was no doubt owing to the gelatine being completely eliminated. Another plan was to add pepsine, so that the gelatine might be got rid of by digestion. There was a commercial solution known as lactopeptine which he would advise to be tried.

Mr. A. Haddon inquired whether the use of sulphite of soda was attributable to Mr. Berkeley or to some other person. Mr. S. Fry, in The British Journal Photographic Almanac, had claimed for himself the credit of the general use of the article; but the particular details which he insisted upon could not be called even a modification of the methods previously published.

Mr. Turnbull said that sulphite of soda varied considerably. The proper method was certainly to neutralise with sulphurous acid.

Mr. F. York suggested that the best plan was to use sulphurous acid for neutralising, and then to filter through marble; any trace of excess of acid would then be removed.

The Chairman inquired whether any member had tried castor-oil as a vehicle for emulsification. He had done so, and had coated plates which, not being yet dry, he could not report upon, but would do so at the next meeting.

Mr. Turnbull showed a carrier for lantern slides, made upon the plan described by Mr. G. D. Macdougald, but partly of metal, so that it was thin enough to go into any lantern.

Mr. Debenham suggested that a spring should be adjusted to the frame so that it would work sidewise, instead of having to depend upon the weight of the slides. Many lanterns were only made with a side opening, and with some of the sciopticon kind it was not practicable to alter this.

BERLIN ASSOCIATION FOR THE CULTIVATION OF PHOTOGRAPHY.

The above Association met on the 1st instant, when the President, Professor H. W. Vogel, occupied the chair. Two new members having been admitted, the Chairman placed the current photographic publications on the table. Amongst them were a Portuguese Journal—*A Arte Photographica*, and the *Annuaire pour 1884*, published by the *Bureau des Longitudes*, Paris, containing a photograph of the eclipse of the sun of 6th May, 1883, taken by Professor Janssen, Director of the Observatory at Meudon. In this photograph the corona is particularly well represented.

Herr Grimm, of Offenburg, forwarded a number of instantaneous pictures of animals.

Herr FISCHER recounted his way of testing the suitability of lenses for taking groups, particularly for ascertaining whether they give a sufficiently-good definition of a wide angle. The persons to compose a living group not always being available, he arranges a number of large letters as if they were persons, and exposes a plate.

Professor ROESE, heliographer to the Imperial Printing Establishment, showed a great number of excellent heliographs, which were formerly used in the Military Geographical Institute at Vienna.

Some dark slides used in 1870 by Herr Striedeberg were also exhibited, and proved to be similar to Herr Martini's pasteboard slides. It was, however, remarked that the priority of publication was usually supposed to be a proof of priority of invention.

Herr BIEGNER showed a wire-curtain stretcher—that is to say, an arrangement for the horizontal expansion of the curtains of a studio.

Herr GAEDIKE exhibited some dry plates of his own manufacture to which he tries to impart, as much as possible, the character of collodion plates.

Herren Haberland, Sellin, and Schultz-Hencke, who had tested some of them, pronounced them about twice as sensitive as Monckhoven's; but Herr Haberland found that they were apt to slip from the plate—a fault which might perhaps be remedied by a substratum.

Herr Frisch forwarded to the Association five of his splendid coloured lichtdruck reproductions of water-colour and pastel drawings, of which mention was made at the previous meeting of the Association.

It was resolved to hold the winter festival of the Association on Friday, the 28th March, and that ladies should be excluded.

The question-box was then opened and found to contain four questions, two of which were:—1. Is it useful or advisable to evaporate the positive silver bath and then to melt it down again? The reply was that the general experience showed that such procedure actually effected a radical restoration of the silver bath; but the Chairman considered it necessary only in the most extreme cases. He preferred to free the bath from organic substances by means of permanganate of potash. Herren Halwas and Biegner doubted that permanganate of potash could completely replace the evaporation and re-smelting, especially if the paper gave off much organic matter.—2. Is gold salt (chloride of gold and sodium) a chemical compound or only a mixture? In reply the Chairman explained that pure chloride of gold and sodium is a chemical compound, but the commercial article occasionally contained in addition an admixture of chloride of sodium.

The proceedings were brought to an end by Herr MOHR telling the following ridiculous tale:—Last year there was an international photographic exhibition at Görlitz at which a certain Herr ——, photographer at L——, received a bronze medal, of which he appears to have been somewhat proud. It occurred to some rivals in trade, who were jealous of this distinction, to doubt the existence of an exhibition at Görlitz, and accordingly they addressed an inquiry to the burgomeister of that town. He being unfortunately absent his *locum tenens* replied that there *had been no photographic exhibition at Görlitz*. Our friend's medal was thereupon regarded as a swindle, until at length by dint of sending some Görlitz newspapers containing an account of the exhibition he convinced the real magistrate of the actuality of the exhibition, and this induced him to confirm the award. The honour of the possessor of the medal was thus vindicated beyond dispute.

PHOTOGRAPHIC SOCIETY OF VIENNA.

THE above Society met on the 15th January, when the chair was taken by the President, Dr. Hornig. Several new members were admitted.

The CHAIRMAN referred in suitable terms to the death of Mr. Dallmeyer. He announced that the silver medal for progress had been awarded to Dr. Eder by the Photographic Society of Great Britain; that Herren Angerer and Göschl had received from the Emperor of Austria a gold medal in recognition of their services during the late exhibition of graphic art; and that the Société Française de Photographie had sent 100f. and M. Davanne 20f. as contributions to the Martin memorial. Further: that having considered the invitation of the Photographic Society of Berlin that the Vienna Society should take part in an international German photographic exhibition to be held at Berlin, the committee had resolved to send a collection of historically-interesting pictures and, perhaps, some sheets explanatory of new processes, on the express condition that should there be a competition for prizes at the exhibition the exhibits of the Vienna Society should be considered *hors de concours*.

The prize committee was then re-elected. It consists of Herren Angerer, Burger, Löwy, Von Melingo, Dr. Eder, and Professor Luckhardt. The committee resolved to renew the offer of all the prizes offered for competition last year for the current year except that for a monograph upon pyroxyline and collodion, and to add two new prizes, namely—1, for a dry process with collodion emulsion which should combine certainty of working and permanency with at least the sensitiveness of the wet process; and 2, for a process by which gelatine negatives may be securely and certainly drawn off the glass plate.

The CHAIRMAN called attention to some landscapes in Finland, by Herr Von Wischnakoff, portraits by Herr Solowieff, and an album full of portrait studies by Herr Schapiro, amongst which were several portraits of Herr A. Burlack, the actor, in the character of a madman.

Herr SCHLOTTERHOSS, an engineer, demonstrated an automatic exposing apparatus, and Herr JUST showed a great number of platinotype prints and prints upon emulsion paper produced by it. The apparatus may be driven by hand and separated from the electric motor. The electric part of the apparatus is said to require no special skill to manage, nor to be easily put out of order, resembling in the last respect the switching apparatus on the railway, which continues to act notwithstanding the vibration caused by the frequent passing trains.

The scrutineers who had been examining the voting papers announced the names of the office-bearers for the year, viz.:—*President:* Dr. Hornig.—*Secretary:* Herr Luckhardt.—*Treasurer:* Herr Schrank.—*Committee:* Baron Schwarz-Senborn, Graf Wimpfen, Dr. Eder, Dr. Székely, Major Volkmer, Captain Tóth, Herren Angerer, Antoine, Haack, Kramer, Löwy, and V. Melingo.

A number of articles were placed on the table for inspection—amongst others a copy of the sixth part of Dr. Eder's exhaustive *Handbook of Photography*.

The question-box was opened and, after its contents being attended to, the meeting was adjourned.

Correspondence.

A CONVENIENT SENSITOMETER.

To the EDITORS.

GENTLEMEN,—As those who make their own gelatine plates are now busy, or soon will be, perhaps the enclosed description of a sensitometer I have used for some time may, on that account, be found acceptable. This one differs from that I previously described in your pages, as with the present one two plates can be tested side by side for comparison.

On a glass plate (I use $7\frac{1}{4} \times 5\frac{1}{4}$) lay two thicknesses of pink tissue paper, and gum round the edges. This gives No. 1. For No. 2 take another double piece, only half-an-inch narrower, and gum as before; and so on, half-an-inch less for each of the remaining numbers. Number 8 will have sixteen and No. 10 twenty thicknesses.

After all the tissue paper is made secure, place another glass, $7\frac{1}{4} \times 5\frac{1}{4}$, on the top, and with gummed strips round the edges bind the two glasses together, with the pink paper between them. Then cut out of dark paper two sets of numerals and gum on, with a dividing strip across the centre of the plate.

To use this sensitometer: place the plates to be tested, face downwards, on to the numbers. Now place dark felt on the plates, screw down firmly in a pressure-frame, and expose at a distance of one foot from a paraffine candle (6 to the lb.) for one minute. Then develope with two grains of pyro. to the ounce and two drops to the ounce of—

Amm. *fort.*	1 ounce.
Brom. of potass	60 grains.
Water	3 ounces.

Let this act for three minutes and a-half (I use a sand glass) and then fix. The last number that is plain gives the sensitiveness of the plate. I find Nos 4 and 5 very suitable for ordinary landscapes, and Nos. 7 and 8 for instantaneous work.—I am, yours, &c., J. C. STENNING.

Beckenham, February, 26, 1884.

GELATINE-PAPER AS A SUBSTITUTE FOR GLASS.—TONING AND FIXING IN ONE BATH.

To the EDITORS.

GENTLEMEN,—I note your remark upon the use of gelatine-prepared paper as a substitute for glass. In a paper read by me before the Liverpool Amateur Photographic Association, some nine years ago, this transfer paper was recommended for this purpose, and negatives shown. The difficulty was, in transferring the whole of the negative to glass, to avoid the grain of the paper in printing.

As regards toning and printing in one operation: I may say that warm and pleasing tones may be procured by directly steeping the unwashed prints in a five-ounces-to-the-pint solution of hypo., to which gold has been added in the usual quantity, viz., one grain for each sheet. Immersion for ten to fifteen minutes suffices.

I do not advocate this method, but time may be saved by using it. Why do you recommend so strong a solution?—I am, yours, &c.,

Liverpool, February, 25, 1884. J. H. T. ELLERBECK.

HALATION.

To the EDITORS.

GENTLEMEN,—Allow me to point out to you that I did not feel aggrieved at space not being found for my remarks upon *Halation*, neither did I say so. I only wished to know through your "Answers to Correspondents" if my communication had reached you; hence my remarks at the meeting of the Dundee Society.

I lay no claim to be an ardent investigator, nor have I any desire to "rush" my ideas into print whether right or wrong. I simply thought I had found a means of curing halation, and I wished to give co-workers in the profession the benefit of my cure.

Am I then to infer from your remarks that the blackened cardboard does no good? Am I to believe that light does not penetrate through the gelatino-bromide film on to the back of the dark slide, and react again upon the prepared film? I may be misled in my ideas regarding what halation is, and you may call this reaction upon the back of the plate anything you like; but it is *this* (halation or not) that I hold the blackened cardboard pressed behind the plate cures, and of which I have ample proof in our everyday work.—I am, yours, &c., J. GEDDES.

Arbroath, February 25, 1884.

TONING AND FIXING BY ONE OPERATION.

To the EDITORS.

GENTLEMEN,—Referring to your article in the last number of the Journal—*The Practicability of Toning and Fixing in One Operation*—I have evidence before me in my office of the superiority of the old system of gold and hypo.

(in combination) toning over the present method, styled "alkaline toning." I have some large silver prints, 24 × 18, made by myself thirty-two years ago, toned and fixed in the one operation, that are nearly as good as on the day they were made. One thing, however, which I consider has had to do with their permanency is that plain salted, instead of albumenised, paper was used, and for large pictures plain paper has a better effect.

The washing of these prints was completed in ten minutes, thus proving, as I have contended many times with my photographic friends, the needlessness of long washing—in fact, that long washing or soaking of the prints does more harm than good. With a proper system of washing I am certain all traces of hypo. may be thoroughly removed in the time stated. I shall be pleased to show these prints to anyone favouring me with a call.—I am, yours, &c., JOHN J. ATKINSON.

37, *Manchester-street, Liverpool, February* 25, 1884.

LANTERN SLIDES IN AMERICA.

To the EDITORS.

GENTLEMEN,—When I was engaged in the United States of America as operator part of my duties consisted in making lantern slides for a well-known dealer. I have, therefore, read the letters of Mr. Hicks and Mr. Taylor with some degree of interest.

Over a period of ten months I have very often had numbers of London-made slides placed in my hands with instructions to reproduce them in *facsimile*, and I have reason to know that my reproductions were sold as "imported" slides. Certainly, in a catalogue I send herewith, they will be found quoted at a dollar and a-quarter—the retail price, in Philadelphia, of imported slides.

I have always considered it a great error of judgment that such high prices are charged by the American dealers in slides and lantern appliances in general, as it serves to deter people from purchasing. There is no doubt whatever in my mind that the prices might be reduced by more than one-half, and still leave a very large profit to the seller. During the time I was operating in Philadelphia I had sent out to me from London a few dozen English-made lantern slides of the finest quality; and previous to my returning here I was able, after having defrayed all costs of custom-house duties and freight, to dispose of them all at fifty cents each as against the dollar and a-quarter of the stores, and still make what in most lines of business would be considered a very handsome profit indeed. I need scarcely say that they were originally purchased on wholesale terms.

The excuse pleaded for charging such extremely high prices as those you find quoted in the catalogue is the comparatively small demand that exists for lantern pictures. I feel certain, however, that if the charges were approximated to those in England, or even reduced to within fifty per cent. of them, it would create a greatly-increased demand, and thus prove eventually beneficial to all concerned.

I am glad to learn that there is a prospect of a lantern business being established in the United States in which English prices are to be charged. It *can* be done, and after a short time will be found to pay well.—I am, yours, &c., ANGLO-AMERICAN OPERATOR.

London, February 26, 1884.

Notes and Queries.

I AM at a loss to know how to deal with unmounted photographs (views) to get them to remain perfectly flat, and with a polish on, like the views offered for sale, such as Frith's, Bedford's, &c. Any information will be thankfully received.—INQUIRER.

ARE there any patent rights connected with photo-mechanical printing processes in this country? If so, what are they? Has the Albertype patent expired? Is there any patent in force that would prohibit one from printing in printers' ink from gelatine films?—J. CAMERON.——In reply: There is no patent restriction on the employment of the Albert process in this country.

IN looking through the few negatives I have taken during the past season, I notice that the least unsatisfactory of them were exposed on a cloudy day or in very weak sunlight. Nearly, if not quite, all those taken in strong sunlight are hard, harsh, and unpleasing, and this defect is noticeable both in under- and over-exposed plates. I enclose for your inspection some rough trial prints I have taken from four plates selected at random. The points on which I should be glad to have your advice are—1. Whether it is desirable, in working with a lens like the portable symmetrical, to select bright, sunny days for landscapes.—2. Whether the use of a sky-shade on the lens, when working in bright sunlight, would tend to give softness to the negative.—3. Whether it is not preferable to use with the full aperture of the lens rather a small stop when a soft, delicate negative is desired.—S. CASBOURNE.——In reply: The least successful of the prints enclosed is so in consequence of a want of detail throughout, the shadows being exceptionally black. This would have been palliated, if not remedied, by modifying the developer so as to avoid intensity. Our correspondent merely requires a little more experience. The only precaution necessary in working with the lens mentioned, or indeed with any lens, is to see that no sunlight is permitted to fall upon it. The use of a sky-shade, although advantageous in some instances, is not of so much consequence for general work that it cannot be discarded. Softness and delicacy may be secured when employing a small stop, but the time of exposure must be increased. Under-exposure—no matter whether a large or small stop be made use of—invariably causes hardness, or a too-violent contrast between the lights and shadows, with an absence of detail.

IN your article on *The Use of Sulphite of Soda*, in the Journal of the 22nd instant, you give an instance of the difficulty experienced in obtaining certain chemicals. I have experienced such difficulty frequently. I have tried in vain to get citrate of ammonia and citrate of soda in Bristol within the last month. Would it be out of place to suggest that when a "rare or little-used preparation" is brought before the notice of your readers the place where it can be obtained, as well as the price, should be stated? Unfortunately, I presume, the great majority of photographers are not practical chemists, and therefore cannot make the preparations themselves.—A. L. M.——In reply: Without touching the main question as to the desirableness of indicating the places at which may be procured chemicals that are not as yet in general demand, we may state that, while sulphite of soda can now be obtained from most of the dealers in photographic materials, this may not apply to the citrates mentioned. Fortunately, these may be made very easily. In the one case liquor ammonia, and in the other bicarbonate of soda in solution, have a solution of citric acid slowly added until effervescence just ceases and neutrality is reached. The resulting solution is one of the citrate of whichever base was employed, and, if preferred, it may be evaporated to dryness.

A. B. says:—"I do not clearly understand the relationship of width of angle to focal length of single combination landscape lenses. Is it reasonable to write to an optician for a lens one inch and a-half in diameter, of a focal length of eleven inches, to cover but just so much more than a half-plate as to give fairly-straight architectural lines up to the edges of a half-plate, with an angle of not more than forty-five degrees—preferably forty? And what advantage is there with three lenses cemented together in the single combination?"——In reply: Any optician will construct a lens of the diameter and focus mentioned; but to make a single combination that will give "fairly-straight architectural lines" under the circumstances mentioned is beyond the power of any optician, unless we adopt a very elastic meaning of the term "fairly." If the word be taken in a sort of poetical sense, and is held to be synonymous with "tolerably," "moderately," or "half-and-half," then the lens will answer the purpose, provided the diaphragm is placed close to the lens (in which position the marginal definition will not be good); but if, on the other hand, "fairly" be held to be a synonym of "perfectly" or "absolutely," it cannot be done. The curvature of the lines commences at either side of the centre of the picture, but only becomes noticeable at a distance from the centre. The extent at which this is noticeable depends entirely upon the education of the eye of the observer. The advantage of three lenses over two in a single combination consists in the flint glass (which, being soft, is liable to become scratched or damaged) being protected on both sides by the harder crown glass.

"C. P." asks in last week's Journal whether varnishing a print with collodion affects its permanence. While there is no chemical reason apparent why it should do so, I have a strong suspicion that fading has been the direct result of collodion having been applied to some prints which were thus treated by me some years ago, when there was a craze, happily short-lived, for collodionising prints. The fact of the discontinuance of the practice is a strong argument against its value.—OLD PHOTO.

I HAVE had something to do with the taking of portraits at night by artificial light, and beg to inform "Night-Light" that the cheapest, best, and most easily-worked lamp is a common shallow tin saucer. It must be supplied with fuel composed of the pyrotechnic compound known as "signal fire" or "Bengal light," which is composed of sulphur, nitrate of potash, and sulphide of antimony. Placed immediately behind the saucer must be a large reflector, the best for this purpose being concave surface glass, silvered behind and protected with tin. The lantern in which the signal fire is ignited must be of very large dimensions (especially as regards the area of its front), and it must be glazed with roughly ground glass—the ground to the outside.—J. B.

LIME-LIGHT ACCIDENT.—An explosion, which shook buildings for several hundred yards distant, occurred on Friday night last, at Chadderton Town Hall, Oldham. A series of dissolving views were being exhibited, and whilst five hundred children were singing "Shall we Gather at the River?" a loud report was heard, accompanied by the smashing of windows. The room was placed in darkness. On the gas being lighted, the magic-lantern apparatus and furniture were found smashed to fragments. Children rushed down the staircase, and the police assisted numbers of them through windows and down ladders. Several were crushed; but the principal injuries were attributed to the inhalation of poisonous gas. A boy, six years of age, was suffocated, and nine others were rendered unconscious. The explosion is said to have been caused by the gas bag coming into contact with the flame. The floor of the hall was ripped up, and the room beneath—where the Chadderton Local Board assemble—was wrecked. Mr. Diggle, the photographer who was exhibiting the magic-lantern, was cut about the face and thrown down by the force of the explosion. As the gas was extinguished by the explosion, an appalling scene ensued, which was heightened by the cries of parents outside. The body of the boy who was killed was found on the staircase, he having evidently been suffocated by the pressure of the crowd. The main egress, however, was good. We learn from a correspondent that the light used was not the oxyhydrogen, as commonly supposed, but the ethoxo-lime light. In an article on this subject by the Rev. T. F. Hardwich in our ALMANAC for 1883 (page 46) he dwells at some length on the precautions necessary to make the ethoxo lime light *safe* as well as effective.

Exchange Column.

Wanted, good studio camera (whole-plate, swing-back) and stand for same. See advertisement.—Address, A. J. Brown and Son, Halstead, Essex.

I will exchange a half-plate lens, stand, and camera. Wanted, scientific apparatus or offers.—Address, A. Chambers, 8, Gordon-road, West-hill, Hastings.

I will exchange Entrekin's cabinet burnisher, in good condition, cost £5, for good interior or exterior backgrounds.—Address, E. Denny and Co., 43, St. Sidwell-street, Exeter.

I will exchange a dark tent for backgrounds (outdoor), and posing-chair with two or more backs; cash adjustment.—Address, Horace Rutley, 18, Fransfield-grove, Sydenham, S.E.

I will exchange a rolling-press, steel plate, which will take cabinets, or a conservatory background, by Marion, for a plain background in good condition.—Address, Photo., Wesley-square, Pembroke.

I will exchange Seavey's seascape background for Shew's eclipse instantaneous shutter, suitable for a whole-plate rapid symmetrical lens.—Address, S., photographer, 9, Berkeley-vale, Falmouth.

What offers for dark box, quarter-plate camera and good lens, dipping-bath, &c.; also rustic chair, imitation old stone arch, and rustic cottage window?—Address, W. H. Redshaw, Bourne, Lincolnshire.

I will give either large musical box, amateur lathe, sewing-machine, or other good exchange, for a modern tourist half-plate camera and wide-angle view lens.—Address, Beck, Belbroughton, Stourbridge.

I will exchange a cabinet burnisher, in good order, and a cabinet lens (portrait), for a universal camera, cabinet or *carte*.—Address, G. Robinson, 1, St. Mary-place, Castlegate, Berwick-on-Tweed.

I will exchange Solomon's cabinet hot rolling-press, cost £4 10s., with lamp, silver plated rollers and bed, for a good, short-focus portrait lens, cabinet or *carte*.—Address, David M. Linley, Harriet-street, Cross Louis-street, Chapeltown-road, Leeds.

I will exchange a view lens, by Lancaster, for 5 × 4 plates, to which has been added a rack and pinion, also extra small stop, as good as new. Wanted, a single meniscus for half-plates. Will give part cash for a good lens.—Address, H. Walker, 18, Yonge-park, London, N.

I will exchange the *National Encyclopædia*, thirteen volumes, perfect and as good as new, cost £7 16s.—also *Josephus' Works*, nicely bound in one volume, good as new, cost £2 11s. 6d., full of plates—for photographic apparatus. Difference adjusted in cash.—Address, B. Egginton, Tudhoe Grange Market-place, Spennymoor.

I will exchange Ross's quick-acting *carte* lens, good as new, quarter-plate mahogany sliding camera, with one dark slide, nearly new, whole-plate vulcanite bath and dipper, air-tight, and posing-chair. Wanted, a half-plate bellows-body camera and good French or other portrait lens, and quarter-plate square bellows-body camera, with three or more slides, must be in good condition, for positive work.—Address, Sulphite, 52, Goldsmith-road, Peckham, London, S.E.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

Photograph Registered.—

William Charles Waldron, Holyrood-street, Chard. — *Photograph of Charles Isaac Elton, Esq., M.P. for West Somerset.*

A. W. K.—See reply to "Amateur" in last week's issue.

Cox Brothers.—Your letter has been forwarded on as requested.

H. J. C.—The exposures will be the same, provided the lenses are identical in form and made of similar glass.

M. W. B. Collyer.—You will find an article on the subject on page 160 of our Almanac for 1881. That will give you full information.

William Surtees.—The lectures will be published in full in the *Journal of the Society of Arts;* but we believe they will not appear for several months yet.

A. R. W.—No one has yet discovered the means of taking photographs in natural colours, notwithstanding it has often been asserted in the newspapers that the thing had been accomplished.

Robt. Macfarlane, Jun.—The conditions are—employ the maximum of bromide and the minimum of gelatine. From your description of the behaviour of the plates during development we imagine they have been exposed to some injurious fumes, thus producing the veiling.

Jas. K. O'Connor.—1. The plan is not very extensively employed. The drawback to the use of the bichromate of potash is that if all the salt be not entirely eliminated the emulsion will prove very slow.—2. Not generally used. Alum is much preferred for the purpose.

E. Beveridge.—Neither of the lenses will answer quite so well as a lens specially constructed for the purpose; nevertheless, if you are content to employ a small stop they will prove very serviceable. A very small stop will be required for the smaller of the two lenses.

H. Bratt.—If you have compounded the matt varnish according to the formula we cannot understand why it should dry with a glossy surface. Of course you have not warmed the plate before applying it? If you have, that will account for the appearance you obtain.

Wm. Lang.—We have no further information than that given by the writer of the article. The gelatine you have been using is unsuitable for making Woodburytype reliefs. You require a more soluble kind. Full directions are given in the series of articles now appearing on the stannotype process; why not follow them?

A Lover of Enlargements.—By monohydrated nitric acid is meant that represented by HNO_3, and is the strongest nitric acid of commerce. It may be obtained of such firms as Messrs. Hopkin and Williams. With care there is no particular danger in making nitro-glucose. You will have to keep the temperature low, and employ strong acids. We have no idea of the value of the work in question.

Kenric B. Murray.—So many articles have appeared in the back volumes there is really nothing more to be said on the subject. There have been no improvements made beyond what have from time to time been given in our columns. Any builder will construct a studio for you, but you will have to furnish him with the design. We are not aware of a builder who makes a speciality of constructing photographic studios.

E. Y.—The cause of spots such as those in your negatives has often been explained in this column. It is that the hyposulphite of soda is not thoroughly eliminated from the gelatine; consequently the silver paper has stained the film through the varnish. No varnish will prevent staining if hypo. be left in the film. If you require further information on your previous query we shall be happy to give it if you put it in a definite form.

Beta.—It is impossible for us to judge of the quality of the lens, inasmuch as you do not state its focal length. A $\frac{f}{8}$ stop may be a very large one in the case of a short focus lens; but the same-sized stop and a long focus lens may be a very small one. The group appears to be moderately sharp. The landscape is doubled in the printing, so of the sharpness of that we can form no opinion. By employing a smaller stop a larger plate can be covered, consequently a larger angle is included. We do not agree with the writer in question.

Received.—A. C. Doyle, M.B., C.M.; W. H. Harrison. Thanks.

Photographic Club.—At the forthcoming meeting of this Club, at Anderton's Hotel, Fleet-street, on Wednesday next, March 5th, the subject for discussion will be—*On the Advantages or Disadvantages of Sulphite of Soda in the Developer.*

South London Photographic Society.—The next meeting of this Society will be held in the Rooms of the Society of Arts, John-street, Adelphi, W.C., on Thursday next, March 6th, at eight o'clock, when the adjourned discussion on *Whether Pictures upon Ready-Sensitised Paper are More or Less Likely to be Permanent than those on Ordinary Paper*, will be resumed, and Mr. Edward Dunmore will read a paper upon *Old Photographs*. Members and friends having old photographs (of the method of production of which they can give particulars) will oblige by exhibiting them.

The Postal Photographic Society.—Mr. H. H. Cunningham, B.A., who has acted as Hon. Secretary to this Society since its formation in 1882, has been offered by the Earl of Derby, and has accepted, the appointment of stipendiary magistrate in British Guiana. Mr. Cunningham has, therefore, been compelled to resign his post as Hon. Secretary, and it is requested that, till the appointment of his successor, all communications be addressed to the Hon. Treasurer, Mr. W. M. Baylis, 3. Plowden Buildings, Temple, E.C.

The Tricyclists' Camera Stand.—Among the pieces of apparatus which were especially noticeable at the late exhibition of the Photographic Society of Great Britain was a camera stand that, when erected, was of the usual height and possessed a remarkable degree of rigidity, especially when its unusual lightness was taken into consideration. Its leading "idea," however, consisted in the ease with which it could be packed in any portmanteau of twenty inches in length, this being the longitudinal dimensions of the stand in question. Messrs. J. F. Shew and Co., the manufacturers of the stand, have just issued what may be termed a new or tricyclists' "edition" of it, in which certain features of advantage find place. The most noteworthy of these is the mechanism effecting the junction of the legs with the top, all loose screws being now done away with. This renders it useful to the tourist. There is also a combination of the keyhole and bayonet joint which, as applied to the joints found in this stand, confers rigidity in use and comfort in erecting it. The extent to which the legs are capable of being elongated or shortened to suit inequalities in the ground is no less than twenty inches, which forms the length of the three sets of elementary portions of which this portmanteau or tricycle stand is composed. Including the top, together with all the bolts and nuts, the weight of the stand is only two pounds nine ounces, which, with its other good features, must render this stand a boon conferred on tricyclists, or travellers who desire their *impedimenta* stored away in the recesses of a small portmanteau.

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POLARISED LIGHT.

All who witnessed the brilliant demonstrations of the effects of polarised light, given by Messrs. Darker Brothers, at the last meeting of the London and Provincial Photographic Association, must have felt astonishment at their extraordinary nature, as well as gratification and pleasure in seeing objects which were intrinsically beautiful, in addition to being interesting and instructive from a scientific point of view. Messrs. Darker have for many years been recognised as authorities in all that appertains to the polarisation of light, whether as regards the manufacturing of the special appliances for conducting this line of demonstration and experiment, the possession of specimens of polariscope objects which in many instances are unique, the successful exhibition of them in public, or, we may add the "coaching" of popular lecturers on this imperfectly-understood subject. Their demonstration at the meeting referred to was the second of this description, being by special request, and serving as a continuation of one they gave a few weeks ago towards the termination of the ordinary business, when it came in the form of a *bonne bouche*.

The varied phenomena arising from the polarisation of light have for a long period been known, and it is not surprising that soon after the organisation of the Photographic Society, in 1853, attention was prominently directed to the advantages conferred by photography in securing permanent records of such phenomena. But we read that in the year just mentioned the light by which certain crystalline structures were eventually displayed upon the ground glass of the camera "was so exceedingly faint, having to pass through many thicknesses of glass beside two dark brown tourmalines not a quarter of an inch square, that no image could be perceived on the focussing-glass unless the camera was held pointed direct to the sun, and every other light carefully excluded from the eye:" when that is contrasted with the projection of similar objects brilliantly illuminated upon a large screen by the oxy-hydrogen polarising lantern, so as to be plainly visible by a large audience, then we realise the great progress made in this particular department of applied science.

The special lantern by which all the effects of polarisation may be exhibited to an assembly comprising numerous spectators is of a somewhat simple description, and analogous to the polarising arrangement of the microscope. First of all, the body of the lantern is not only of similar construction to that in everyday use for the projection of photographic transparencies, but the polariscope addition is in reality an attachment to this lantern. The body, the light, and the condensers are therefore required in common for both purposes.

The first departure from the usual routine of lantern pictorial projection takes place just outside of the condensers where the emergent beam of light is polarised. This is effected by interposing in the path of the light a parcel or bundle of plates of plain glass carefully selected with a view to flatness, good polish, and freedom from scratches, air-bubbles, or defects of a similar character. Thin patent plate answers the purpose better than any other kind of glass. Of these there must be from nine to eleven or twelve so packed as to lie close to each other. Nine such plates form the smallest number that can be successfully employed for the object intended. Those who are fortunate enough to possess any of the thin French glass that was employed several years ago in connection with stereoscopic transparencies will, probably, find in such glass that which is best of all suited for the purpose. A bundle of glass of this description having been interposed at an angle of 57° in the path of the emergent beam, the light becomes, by such simple means, quite polarised.

But the inquiry will here be made, "which light?" for, when placed at such an angle, a large portion will be reflected from the surface of the glass, the remainder being transmitted. To this we reply that both the light reflected and the light transmitted are polarised, and the various phenomena dependent upon such light can be shown by either; but the advantages arising from the reflected beam so greatly exceed that from transmission as to cause the former to be almost exclusively employed, and, in consequence, there is an angular bend in the tube containing the optical system of all polarising lanterns. Here again, it may be asked—"What *is* the polarisation of light? or what is the difference between ordinary light and polarised light?" The easiest mode of replying to these queries is to assume that ordinary light consists in a vibration of the etherial particles in planes resolvable into two at right angles, and that polarised light is wanting in one of those sets of vibrations. Any means by which these are separated prove to be polarisers of light, and among such means the bundle of glass plates of which we have spoken answers the purpose well.

When only small objects are to be viewed by polarised light, a Nicol prism (composed of a rhomb of calcite or Iceland spar, divided and re-cemented in such a manner as to eventually transmit only one of the images which it is the property of this crystal to show in duplicate) forms the best polariser, and this is always employed in the polariscopes fitted for use with the microscope. But no Nicol prism has yet been obtained of such large dimensions as to be practically available for application to the lantern as a polariser.

But, if not suited for such purpose, the Nicol prism is admirably adapted for effecting the part of the second element in the polariscope, namely, that of analyser. When a ray has been polarised and deprived of its vibration in one direction, it is sufficient that the ray be transmitted through such a body as the Nicol prism, which, when placed in a certain relation to the ray, obliterates it on the same principle on which the original ray was deprived of its motion. Of course, under these circumstances, darkness ensues by the horizontally-vibrating ray having been stopped by one and the vertical ray by the other of these agents in polarisation.

The various phenomena of polarisation are observed by the insertion of the body to be examined between the polariser and the analyser, and some of the effects produced are magnificent in the extreme. Simple crystalline substances that are almost invisible—such as a drop of a solution of washing soda spread upon a glass slide and allowed to become dry—display not only the most beautiful forms but the most gorgeous colours. If a piece of glass be examined, and one side then subjected to pressure, the strain thus caused upon the substance of the glass, although invisible under ordinary circumstances, is here rendered most palpably distinct by a series of black bands or lines starting from the point of pressure and extending to a distance corresponding with the degree of pressure. Incidentally, this shows that an otherwise first-class lens may have its excellence seriously impaired by being screwed or burnished too tightly into its cell. This also occurs when any piece of glass has not been properly annealed and internal strain is set up. The polariscope reveals every, even the slightest, defect of this nature.

By their appearance by polarised light the difference between two nearly similar crystals can be immediately discovered. No one who has ever witnessed in this way the difference displayed between two drops respectively of weak solutions of iodide of cadmium and bromide of cadmium would ever afterwards mistake them. In this way it acts as an analyst or detective.

We have said that in order to polarise the light properly the bundle of glass plates must be placed at an angle of 57° to the light. This angle is determined, for any substance, in accordance with Brewster's law—that when the tangent of the angle of incidence is equal to the refractive index of the medium upon which the light is incident, the reflected ray is completely polarised, its undulations taking place in one plane only. Therefore as plate glass has a refractive index of 1·54, the angle of which it is the tangent is 57°, and this is the angle at which the parcel of plates of glass must be placed when it is desired to fit up a lantern or any other instrument to investigate the subject of the polarisation of light. We hope that what we have written will prove the means of inducing many of our readers to enter into this field of physical research and recreation.

ON PHOTOGRAPHING COINS, MEDALS, &c.

It frequently happens that an apparently simple application of photography proves exceedingly difficult to carry out in practice until a certain amount of experience has been acquired in the method of working. This remark is well exemplified in the photographing of coins or medals. This, at first sight, appears a simple operation, yet those who attempt it for the first time often meet with no little difficulty. As an illustration: let us suppose that a photograph of a gold, silver, or bronze medal gained at some exhibition be required, as it frequently is, for advertising purposes. In the first place the medal has to be secured in position on a suitable background, and it is obvious that the means of attachment must not be apparent in the picture.

If the negative be required for any of the photo-mechanical processes (and, consequently, reversed), the matter is simple enough. The medal has only to be laid on a suitably-tinted piece of cardboard to form a background, and placed on the floor. Then the camera is arranged so that the prism or reversing mirror is directed downwards instead of sideways. Of course, the illumination must be so arranged that the dominant light shall fall on the medal from the side and not from the top, and at a considerable angle, otherwise there will be but little or no relief in the picture.

But, presuming the medal has to be photographed from a vertical position (this being generally the case): it must be secured in some way or other, and it frequently happens that its owner will not permit any form of cement to be employed for the purpose owing to his fear of its soiling the metal. This difficulty may be overcome thus:—Take a piece of stout mounting board of a tint suitable to form a good background. On this lay the medal, and with a pencil make a mark round the rim; then, with a sharp penknife, cut out a clean hole, keeping the knife slightly within the line. Into this hole the medal will fit tightly and be held securely. On no account must the medal be pressed in flush with the surface of the cardboard, otherwise the photograph will appear wanting in relief. In lighting the medal, some little judgment is required in order to obtain good *chiaroscuro* in the design. A good, strong side light must be employed, but not at too great an angle, otherwise the outline of the medal may become lost in the strong cast shadow from its rim.

New gold or bronze medals or coins are much easier to photograph than silver—the latter metal, when fresh from the die, often causing considerable trouble by reason of the strong reflection from the bright portions. This difficulty can, however, be avoided by dabbing the surface over with a piece of common putty; but it is seldom the owner of the medal will permit this to be done, and the operator must therefore rely upon his skill in lighting alone. A very full exposure in all cases must be given, and a well-restrained developer should be employed to bring out the image.

In most instances where a medal has to be photographed both the obverse and the reverse have to show in the same picture. When this is the case, of course two negatives must be taken. They may then be combined by one or other of the methods described in the articles which recently appeared in our columns on *Combination Printing*. Here is a plan which is sometimes adopted:—The background in each negative is blocked out, and the two negatives are then fitted together and secured to the glass of the pressure-frame, a piece of opaque paper being pasted over the junction of the two glasses. Of course by this method a white background is secured in the prints, which is often a desideratum. Frequently when medals gained at exhibitions are used for advertising purposes they are duplicated—both the obverse and the reverse—by the electrotype process; then both sides can, of course, be copied on the same negative.

Now, the photographing of a medal or coin—be it gold, silver, or bronze—while it is new and unsoiled and the design clear and sharp, is an exceedingly simple affair compared with copying ancient coins, such as those in numismatical collections. Many of these are old bronze coins—centuries old—with the design and inscription wellnigh obliterated with age and the wear to which they were subjected during the period they were in circulation as current coin. In addition to the design being nearly all worn off (so that, however skilfully the lighting may be arranged, little or no relief can be obtained in the negative), the difficulty of the photographer is often increased by the coin being oxidised in some portions, while others are bright, and therefore reflect light. The difficulty is still further increased when, as is frequently the case, a number of coins—gold, silver, and copper—have to be included in the same negative.

Yet such work is executed, and ancient coins (whether they be of gold, silver, or baser metal) are successfully represented by photography, as witness the illustrations in several works on numismatics, and also the examples which have been shown from time to time at the different photographic exhibitions. How is it accomplished? Simply enough. The negatives are not made direct from the coins at all, but from casts taken from them, either in plaster of Paris, wax, or sulphur. With either of these materials all the sharpness (be it much or little) in the original design is secured. But, for the purposes of photography, the plaster of Paris is much to be preferred, as its surface is dead and absorbent, while that of either of the others is more or less bright and reflective of light. Indeed, it is the dead surface of the plaster which enables a much sharper photograph to be taken from the cast than can possibly be obtained from the original with its reflecting metallic surface. It may be mentioned that the plaster used for this class of work is a specially-fine kind prepared expressly for modellers, and is not the ordinary plaster of Paris of the oil shops.

It will now be seen that the copying of a number of ancient coins of different metals in one negative is not such a difficult undertaking after all if this plan be adopted. No matter how oxidised, discoloured, or bright the coins themselves may be, the colour, of course, is not reproduced in the cast. Still, even with the plaster casts, some amount of skill is requisite in the illumination in order to secure a marked relief in the inscription and design, particularly if it be much worn in the original.

Matters may still be further simplified if, in making the casts, a small quantity of some dark pigment—such, for example, as burnt umber—be mixed with the plaster of Paris, as it will take off its dazzling whiteness, and enable better effects in *chiaroscuro* to be obtained. When coins of gold, silver, copper, or bronze have to be included in the same picture, the plaster used for the gold and copper ones should be more deeply tinted than for the silver, so that they appear somewhat darker in the photograph.

From the foregoing it will be seen that whenever medals or coins, even if they be new, have to be photographed, and the best results are imperative, it will in all cases be advisable, when possible, to have tinted plaster casts taken, and to photograph these. When this is done a sharper and crisper picture, and one fuller of detail, will always be secured than it is possible to obtain from the originals with their bright, reflecting surfaces.

HYGROMETERS.

At the commencement of the year we devoted an article to the subject of moisture in the atmosphere, and showed the important part it played in the everyday economy of the studio, and the bearing it had even upon the permanency of prints. We now revert to the matter with the intention of giving some practical hints as to the ready determination of the moisture at any time present in the air—a subject which cannot but be of considerable importance when we reflect how greatly it influences such processes as the drying of emulsion plates, of carbon tissue, and of mounted prints, besides the manner it operates upon the preservation of apparatus and the storage of negatives, not to speak of its more intricate connection with weather forecasting. These points of view were sufficiently treated in our article already alluded to, a passing reference to which is all that is now required.

Though a minute and scientific amount of precision is not necessary in hygrometrical observations in the studio or the workroom of the photographer, the trouble involved in making notes possessing considerable accuracy is so slight that it is desirable to bring before our readers the very simple arrangement which is largely used for such meteorological purposes at a great number of stations throughout the country. Meanwhile it may be said that indicators so slight as those found in many popular weather glasses are by no means devoid of moisture-registering power. Thus, there is often to be found in the old wheel barometer a little dial with index indicating moisture or drought which is usually actuated by an awn or small vegetable filament which, under the action of moisture, twists or untwists, and so moves the index. A human hair is very sensitive to moisture, and some time ago we called attention to an instrument intended for actual scientific use which was worked simply by the contraction and expansion of such a hair. Then, again, an instrument so primitive and unscientific looking as the old-fashioned chimney ornament, in which figures were made to enter or leave a little portico according to the amount of atmospheric humidity—such movements being caused by the expansion of catgut from moisture—gave decided indications of changes in the state of the air.

Leaving these now on one side, the reference to them indicating how readily an ingenious and handy worker could contrive an instrument possessing appreciable utility founded on the use of some hygrometric substance, we may now describe the wet and dry bulb thermometer, often termed "Mason's hygrometer."

This instrument is founded primarily on that very property of vapour which renders it so desirable for the photographer to possess a measure of its power; that is, the increase or decrease in the amount of aqueous evaporation according to the increase or decrease of moisture present at the time in the atmosphere. It is well known that evaporation involves a loss of sensible heat, or, in other words, produces cold. The quicker the evaporation the greater the cold; hence, if two similar thermometers be exposed to the air, one being in its ordinary condition and the bulb of the other kept constantly moist, it is obvious that evaporation will, usually, be continually taking place from the wet bulb, and that it will, in consequence, give a lower reading than its companion dry bulb thermometer. Increased cold following increase of evaporation—which latter condition naturally follows diminution of the amount of atmospheric moisture—it is obvious, *per contra*, that whenever there is a large amount of water in the air evaporation will be so slight that the two thermometers will show very little difference in their readings; but if the air contain little moisture, or is "dry," the difference will be considerable.

We may further remind our readers that as the utmost possible amount of water which may be contained in the air increases very considerably with increase of temperature, the difference shown by the two readings of the thermometer has to be considered in conjunction with the actual temperature when the observation is made, if a correct idea has to be formed of the evaporating power of the air. Thus, when the two thermometers read alike, the air could contain no more or would be "saturated;" neither prints nor tissue would dry, and any negative brought out of a cold room would instantly be covered with moisture. If, however, by artificial means the temperature were raised, the water present would naturally remain constant, but the moisture-containing power of the air would be vastly greater—a fact explaining one advantage gained by raising the temperature of drying-rooms.

In practice the mode adopted for keeping the bulb wet consists in tying round it a piece of thin muslin, which is kept moist by a piece of soft cotton thread—such as thin, open lamp-wick—leading from the bulb to a small reservoir of distilled or rain water kept at one side, capillary attraction serving to keep the bulb continually wet.

Such instruments are usually more costly than ordinary thermometers, but the photographer can readily make one himself. Two thermometers (common shilling instruments will answer) as nearly alike as possible, and with the freezing-points about the same distance from the bulb, should be chosen, the tubes removed from the frames, and the latter sawn off at the freezing-point. The tubes after being carefully replaced will project a little distance below their wooden support, leaving the bulbs free to be acted upon by the air. The two shortened instruments may now be mounted side by side upon a small board, which they are kept from touching by a half-inch bar of wood, to which they may be screwed. To one corner of the board may be attached a half-ounce, narrow-mouthed phial for holding the water, into which the thread from the muslin-covered bulb dips, and then the instrument is complete.

Mr. J. Glaisher, the esteemed President of the Photographic Society of Great Britain, has made a very elaborate series of investigations and calculations on this subject, and has embodied the results in a series of tables, the following abstract of which is self explanatory:—

Temperature by the Dry Bulb Thermometer.	Difference between Dry Bulb and Wet Bulb Readings.					
	2°	4°	6°	8°	10°	12°
	Degree of Humidity.					
34°	79	63	50	..	..	..
36	82	66	53	..	..	..
38	83	68	56	45	..	..
40	84	70	58	47	..	..
42	84	71	59	49	..	..
44	85	72	60	50	..	..
46	86	73	61	51	..	..
48	86	73	62	52	44	..
50	86	74	63	53	45	..
52	86	74	64	54	46	..
54	86	74	64	55	47	..
56	87	75	65	56	48	..
58	87	76	66	57	49	..
60	88	76	66	58	50	43
62	88	77	67	58	50	44
64	88	77	67	59	51	45
66	88	78	68	60	52	45
68	88	78	68	60	52	46
70	88	78	69	61	53	47
72	89	79	69	61	54	48
74	89	79	70	62	55	48
76	89	79	71	63	55	49
78	89	79	71	63	56	50
80	90	80	71	63	56	50
82	90	80	72	64	57	51
84	90	80	72	64	57	51
86	90	80	72	64	58	52

This table, it will be seen, gives the relative amount of moisture contained in the air at various temperatures for each difference of two degrees in the readings of the wet and dry bulb thermometers. It does not give the actual amount, nor the difference in amount that would be found by raising the temperature of air possessing a given amount of humidity. To do so would require either too extended a table or the use of calculations with which we do not desire to complicate the subject. With the aid of such a thermometer as we describe and the use of this table observations of considerable value may be made, and we trust that the valuable assistance which Mr. Glaisher's tables as abstracted will afford may render our remarks useful to a large circle of readers.

It will be remembered that at the time the new Patent Act was passed we called the special attention of photographers to one of its clauses, namely, that which prohibits the use of the Royal Arms for any purpose whatever, without legal authority, under a penalty of £20. In reference to this subject the Board of Green Cloth has given notice that, by section 106 of the Patents, Designs, and Trade Marks Act of 1883, a penalty of £20 is incurred by any person who, without proper authority, shall assume the Royal Arms with a view to lead other persons to believe that they are employed under any department of the Royal Household. This monition is promulgated by order of the Lord Steward, Lord Sydney.

The *Athenæum* gives prominence to the suggestion of a correspondent that photographic and other artists will not suffer to vanish and leave no record of the quaint mouldings and jutting storeys of the picturesque old house near the St. Clement's end of Wych-street, now in course of demolition. We cannot better serve the desire expressed than to call attention to it in these columns. The same paragraph states that there are two good views of the house extant, the Society for Photographing Relics of Old London having published them in 1876.

We extract from a trade journal the following information:—"Those who practise the bichromate process of photography must of necessity get the skin stained by this chemical, which produces a reddish-brown stain that is not thoroughly removed by washing with soap and water. If, however, a small quantity of sulphuric acid be added to a strong solution of hyposulphite of soda, and applied to the skin, the stain can be quickly removed; or the same effect can be obtained by the use of a little sulphurous acid, and afterwards washing in rain or distilled water." We should like to be informed what or which "the bichromate process of photography" means.

The water analysts have been taking a leaf out of the photographer's book, Dr. A. R. Leeds having, in a preliminary and as yet unpublished note to the New York Academy of Sciences, called attention to a new actinic method for determining putrescible organic matter in potable waters. A certain amount of the water under examination is mixed with a measured quantity of nitrate of silver solution, and the mixture exposed to light after the old method of sunning the bath. The organic matter becomes oxidised and the silver reduced to the metallic state, when it precipitates or adheres to the sides of the bottle. This silver is washed, collected, redissolved in nitric acid, and estimated. From its weight the amount of oxygen used up to oxidise the putrescent matter can easily be calculated. Mr. Nelson H. Darton, of New York, states that so far the process has yielded most satisfactory results, and promises to be a "convenient, applicable, and accurate method for the analysis of potable waters."

In writing of pure water we are naturally reminded of a recent letter to *The Times*, by Dr. Frankland, in which he points out how gravely the possibilities of water purity are compromised by a recent decision of Mr. Justice Pearson (case of Ballard *v.* Tomlinson). Briefly put, the matter lies thus:—A certain brewer depended on the purity of his well water for brewing good beer, but a neighbour who had a disused well about a hundred yards away used it as a cess-pit, and the contents leaked through the strata into the brewer's well, and so ruined it for brewing purposes. The law gave him no remedy. "Hence," says Dr. Frankland, "a man may not discharge noxious matter into surface water, but may do as he likes with subterranean water." He further draws a picture of a possible aniline dye manufacturer working a factory in the neighbourhood of the deep wells used by the Kent Water Company for the water supply of a part of the metropolis, and discharging his waste arsenical liquor into the subterranean reservoir from which the water is drawn. We do not know that arsenic would injure a dry-plate film to any great extent, but it would certainly be startling to find a batch of negatives left to wash dyed red through the filtration of waste magenta into the water supply.

According to the *Lancet*, luminous paint when unprotected is found to be perceptibly blackened by the fumes from fresh lead paint in its vicinity. We have not met with any such experience ourselves, and it would be interesting to learn if this alleged fact can be substantiated by any of our readers.

It has been suggested to us by a correspondent that a large source of albumen is entirely lost sight of in failing to utilise the humours of the eyes of oxen slaughtered for food. As it is not likely that they could be had in sufficient quantity or be rendered practically available—if even they could be shown to possess suitable properties for photographic use—the suggestion must merely pass as a curiosity. The more so as, according to a continental chemist, there is very little albumenoid matter in the human eye, its viscidity being, he considers, due to an excess of salts over albumenoids.

The authorities of the Observatory at Paris seem to be in hot water just at present. They hold a large area of "eligible building sites" which, if sold, would enable another observatory to be built in a more favourably-situated spot without incurring any expense; but the plan is warmly denounced. A member of the section of astronomy said he was sure that if an astronomer wished to execute any special work for which provision did not exist at Paris M. Janssen would lend his instruments and grounds. To this M. Janssen replied that he would be most happy, as the Observatory was not his private property, but belonged to the Government.

An interesting comment upon the capability of a large reflector retaining its surface for a considerable time is made by the director of the Observatory at Melbourne with regard to the large reflector there, which has been in use for twenty years. He says the inevitable loss of reflection power in the great telescope increases a little year by year, but does not yet sensibly affect the work upon which it is employed. Indeed, Mr. Ellery remarks—"Some photographs of faint objects obtained lately are clear evidence of the immense light-gathering power it still possesses, and of the trivial loss occasioned so far by the slight tarnish apparent."

SODIC SULPHITE AND ITS CRITICS: PLATINOTYPE AND ERRONEOUS IMPRESSIONS.

Doubtless there is a very strong "case" in favour of sodic sulphite; but, while agreeing to the full in Mr. Samuel Fry's estimate of its value in the alkaline developer, I cannot follow him in his statement that the thorough, practical, value of the method is due to his recommendation to use boiling water instead of cold water for making the solution. The only real advantage in using the former in this case would be more quickly to dissolve the salt. To one in a hurry there would be an advantage, but to none other. When the solution had cooled it would be just like one made with the same quantity of cold water; and, of course, any excess of the salt, if present, would be thrown out on cooling.

I say that without doubt my formula and instructions, as originally published by me, strictly followed, are as "definite" and as good as any—better than most—that have been published since by others, and by those who seem to think there is a difference "betwixt tweedledum and tweedledee."

The whole of the advantages set forth by Mr. Fry were pointed out by me, with the exception of the suitability of the colour of the image for the retouching pencil; and I contend (as, of course, many others, including the Editors,* could testify) that the preparation as made under my supervision after that formula, and sold by the Platinotype Company, was equal to any, and better than most, of the preparations emanating from other sources. So much for the original formula.

Since advertisements are *sometimes* admitted into these columns, I may be permitted to add that I have improved upon my original method (but *not* by using "boiling water"). This modification, however, it is not my intention to publish; and, after all, is there much inducement to do so, seeing that either the solutions, being

* By-the-bye, why do the Editors allow misleading statements to be published unnoticed at the expense of their supporters and original contributors? Is it "*pour encourager les autres?*"

ill-made, obtain a bad name, or else that my rightful claim to such little credit as may attach to the matter is sought to be transferred to other names than mine?

I have thought over these and kindred matters often enough, and am firmly of opinion that the man who will not only originate, but also *carry out his ideas commercially*, putting them in the way of the public, is doing more for that public, not less than for himself, than he could possibly effect by making a "clean breast" of all he knows—virtually, in most cases, that men may try, fail, and abuse; and, perhaps, finally, in the mind's eye, catching a sight of the bantling dressed in clothes of their own making, that they may condescend to pick him up, give him a *hot bath*, and then, as an adopted child, dandle him before the admiring gaze of a gullible public.

Since writing the foregoing I have read Mr. B. J. Edwards's communication in the last number of this Journal. Well, I suppose we can all be right under certain conditions. But these do vary—especially in chemicals; and so does the manner of using the latter. For my own part, having seen a goodly number of negatives produced by almost as many operators, my experience tells me that there is much less gradation generally to be found in the negatives developed by ordinary alkaline pyro. than in those developed with such preparations containing sulphite as I have confidence in. Still, it is certain that a rather bad thing worked well may turn out better results than may a good thing used badly. A large quantity of negatives, developed by the ordinary developer, are stained in the shadows and flat and thin in the high lights; they very commonly have one or the other of these defects. Now, when sulphite has been properly used at least there is no stain, and the parts not acted upon are clean. Such a negative, if not sufficiently intense, may at least be easily intensified; while, by allowing the proper time and by not rushing the development, any amount of intensity and sparkle may be obtained. Some say that they get the same effect by using "clearing solutions;" but I do not think this is so—certainly not always. Besides, "prevention is better than cure."

Mr. Edwards makes—or is made to make—the statement that the same developer by which eight negatives were developed in succession was kept for twelve months after mixing and then used with success. Are we to understand that the *alkaline* developer was kept for twelve months after mixing, or the solution of pyrogallic acid only? I should like to know what was the colour of the developer after eight negatives had passed through the solution, or, what would be more to the point, the colour of the negatives; how long the films were subjected to the solution; and, also, the quantity of ammonia present, particularly after several of the plates had been developed.

Such a method of working—if "method" it can be called—is quite feasible with sulphite, and the developer may be kept for twelve months afterwards without further discolouration. I have now such a solution with which was developed a plate for the long period of half-an-hour. This was fully two-and-a-half years ago. It is still only straw-coloured. Such experiments, if not tending to methodic modes of working, are at least interesting. That citrate of ammonia may have a certain amount of retarding effect upon the oxidation of alkaline pyro. is extremely probable. Sulphate of ammonia has a very decided influence in this respect.

Now, of course, if Mr. Edwards admires stain in the shadows or an ochre-coloured image—just as some admire green fog—or the use of clearing-baths, it would be quite impossible to make a convert of him; but if, on the contrary, he admire what has been called "wet-plate quality," I should like him to try some sulpho-pyrogallol, as prepared by the Platinotype Company under my directions, and also to follow one or two hints which I should give him. Then let us hear again from him, and I think he will have a different tale to tell. Nevertheless, as I have said before, methods of working greatly affect success; one will succeed and another fail with most methods. Still, of this I am certain—that to most workers sulphite is of very great value; of this I have absolute proof in the shape of numerous letters.

In the same number, in an article entitled *Onward*, Mr. A. F. Genlain does me the honour to eulogise my platinotype work. Now, it is not with the object of pointing out "what a good boy am I" that these remarks are written, but to impress upon Mr. Genlain and on others who may believe that there is "a lot in understanding the process, don't you know?" that platinotype, being the simplest of printing processes, ought to be *tried*—fairly tried—before giving way to the feeling to which Mr. Genlain gives an almost fervent utterance. No; what little pictorial value there may be in my occasional efforts is not due to my "knowledge of platinotype" (though it may be partially to the method of printing—so artists say), but to the choosing, lighting, and development of the negative, combined with a few "dodges" common to silver printers.

But, *apropos* of the subject which commenced this communication, how greatly has sulphite aided in the little negative work I have done since I have adopted platinotype! Of your sickly-yellow negatives, with that density which should be piled on the extreme high lights spread over the extreme shadows, I have seen the last. But no; I am still doomed to see those held up to me by others for my admiration or approval—or condemnation!

But, really, Mr. Genlain, why despair before you have tried? Why lament when you might rejoice? But is Mr. Genlain quite in earnest? I am, and have very good reason to ask the question. In this I mean nothing personal, Mr. Genlain being entirely a stranger to me. HERBERT B. BERKELEY.

STANNOTYPE.

No. V.

BEFORE exposing the tissue it is presumed that a suitable transparency has been obtained, and that it has been properly prepared for this special purpose. The qualities desirable in the positive have already been described in a previous article, and mention has also been made of the importance which attaches to the "safe-edge." We may at this point, however, reiterate the remarks made in this latter connection.

The positive itself represents the picture to be reproduced, surrounded by a margin of practically-clear glass—the "safe-edge," in fact. In making the relief it is, of course, again necessary to form a "safe-edge" by pasting strips of opaque or semi-opaque paper along the edges of the transparency; but, in doing so, it is imperative that these strips of paper be *narrower* than those originally employed, and that they be so attached to the positive that *a line or band of clear glass be left between the picture itself and the strips of paper.* Upon this simple point the whole success of the printing operations depends. As we have pointed out, this space of clear glass represents the highest lights in the relief or printing surface, from which all the other gradations take their value. Thus, the margin of the relief is represented in the print by pure white; and if in the picture itself there be any point or points which should be perfectly white they will be as high in relief as the border, the lower tints being all in proportionately lower relief.

Now, it can be well understood why such importance is attached to the preservation of clear glass in the high lights of the transparency or positive. However perfect the positive may be in its proportionate gradations, it stands to reason that if its highest lights are not clear glass they must necessarily exhibit a certain amount of "tint" in printing, owing to the higher relief of the margin or border, and, in fact, the tone of the whole picture is degraded. A fogged or an over-developed transparency which—being perfect in its gradations—is perfectly suitable for enlarging purposes, or will even pass muster satisfactorily from an artistic point of view, is wholly unsuited to the requirements of stannotype, for the simple reason that the fog or veil is inevitably reproduced in each print, and no variation in the intensity of the printing ink or of the pressure employed will avail to prevent it.

It may be remarked, *en parenthèse*, that though the statement just made as to the inevitable reproduction of any fog or veil existing in the transparency is practically correct, a certain modification may be made. If the marginal zone of clear glass can be dulled or degraded to the same tint as the highest light in the veiled transparency, then the same effect will be produced as if high lights and safe-edge were both clear glass. But, we imagine, the skill and judgment necessary to effect such a modification of an imperfect positive would be sufficiently great to render the production of a new transparency the preferable course. However, in cases were such reproduction is an impossibility, it may be useful to know that the expenditure of some care and trouble may render an otherwise useless transparency available.

So much having been said with regard to the preparation of the positive, we come now to the actual exposure of the tissue. This presents no special difficulties or peculiarities, and differs only from the ordinary practice in carbon printing in that the tissue being thicker and less pliable requires even greater care in order to secure perfect contact with the transparency during printing than is the case with the usual "portrait" tissue. A printing-frame, with plate glass front, is almost—if not absolutely—a necessity, in order to permit the application of sufficient pressure to *ensure* perfect contact. In practice, if the tissue have been properly kept and in a flat state before use, the difficulties will not be great—not so great, in fact, as with ordinary tissue—but, in order to be "on the safe side," it is well to observe the direction with regard to the pressure-frame.

As regards the time of exposure, it is, of course, quite impossible to give any explicit directions, as so much depends upon the conditions of light, density of transparency, depth of colour of the tissue, and strength of sensitising bath, together with minor circumstances which may work in to modify the final result. It may, however, be taken that the exposure usually required will be from three to six times as long as for an ordinary carbon print, the time being proportionately shorter in a good light—summer sunshine—than in the dull light of winter. The so-called "continuating action"—*i.e.*, the effect which is produced by keeping the tissue for some time after exposure and before development—must also be taken into account; but in any case a photometer is a matter of necessity.

Perhaps the best for this purpose is the well-known "Woodbury" photometer which has been frequently described in these columns; but on using it for this special purpose it will be necessary to employ one or other of the coloured discs supplied with the instrument in order to bring its "tints" within the range of present circumstances. The Warnerke sensitometer scale forms a useful photometer for the purpose of gauging the exposure of the positive, and with the interposition of a sheet of coloured glass or gelatine would, no doubt, answer equally well for the longer exposure of the relief. But in any case a graduated scale for photometric purposes is easily made, and especially so by the stannotype process itself. It is, indeed, by "Woodbury" printing that the Warnerke scales are made, the relief being produced in, practically, the manner we shall describe.

On a piece of patent plate glass lay down by means of paste or other suitable mountant a piece of paper, tinfoil, or other material; on this lay in the same manner a second piece a-quarter of an inch shorter, and on this again a third also a-quarter of an inch shorter, and so on until a scale of sufficient range is formed. This being done cut neatly round the edges of the "scale" to form a clean square or oblong, and paste round this a frame composed of a number of thicknesses of the same material—paper or tinfoil—greater by one thickness than the largest number employed in the scale itself. If tinfoil be used the scale so produced is ready for employment as a printing surface. If paper be the material adopted it will be necessary to face it with tinfoil first before employing it for that purpose.

We have now a matrix from which any number of photometer or sensitometer scales can be produced by means of gelatinous ink and ordinary Woodbury printing; and we have, further, this advantage—that by modifying the quantity of colouring matter in the ink the scales can be arranged to suit negatives or transparencies of any degree of intensity. Such scales printed upon thin plate glass or even paper may be cut into strips, and each printing-frame in the establishment may be provided at a very small cost with its own photometer.

GELATINE TRANSPARENCIES.

After numberless trials with gelatino-bromide for transparencies for the optical lantern I have at last met with some degree of success—due, I believe, to the plates employed combined with a suitable developer. For the plates the formula I find to be best is:—

A.

Brom. ammon.	120 grains.
Water, distilled	4 ounces.
Gelatine, Nelson's No. 1	60 grains.

B.

Nitrate of silver	200 grains.
Water, distilled	4 ounces.

C.

Gelatine, Nelson's No. 1	200 grains.

Raise A and B to boiling-point; add B in about eight or ten portions to A, shaking briskly after each addition. Put into boiling apparatus, and after the water has boiled for six or eight minutes cool down and add C.; set and wash thoroughly. *I hold to the necessity of very ample washing.* If the formula be carried out exactly as above the plates will be found to be rather slow, which is an imperative condition of success; with quick plates it is most difficult to get satisfactory results.

I use Ross's four-inch symmetrical to reduce 5×4 and $7\frac{1}{4} \times 5\frac{1}{4}$ to lantern size, with an exposure, on an overcast day at this season, of from half-a-minute for a thin negative to as much as four minutes for a dense one.

The developer is that of M. Audra, lately given in these pages. The proportions I find best best are—

D.

Neutral oxalate of potash	1 ounce.
Water, boiling	3 ounces.

E.

Protosulphate of iron	3 ounces.
Tartaric acid	48 grains.
Water	10 ounces.

Add one of E. to three of D.

Develope until details are out and the dark portions are black, taking care not to veil the high lights, such as sky, water, &c.

Fix in a *fresh* solution of hyposulphite of soda. Should the transparency show any opalescence after washing, a few minutes' immersion in a dish of the following solution will completely remove it, and brighten the picture:—

Citric acid	½ ounce.
Alum	1 "
Water	8 ounces.

J. C. Stenning.

AN IMPROVED CARRIER FOR LANTERN TRANSPARENCIES.

The lantern-slide adapter or carrier which Mr. Alexander Cowan exhibited last week at the technical meeting of the Photographic Society of Great Britain is, we think, destined to prove of great value, if not of eventual universal adoption; and we again draw attention to it in a further and stronger manner than could be done in the report of that meeting which appeared in our last issue.

The success of a lantern entertainment depends in no small measure upon the manner in which the pictures are projected on the screen. Up to a period which may be roughly enumerated as twenty years ago each photographic transparency was mounted in a special wooden frame, and the act of making these appear in succession was a rather clumsy and laborious one, the withdrawal of each slide from the firm spring-grip of the lantern, followed by the slow, "jerky"-like insertion of its successor, being plainly visible on the screen, while the picture was finally "adjusted" in its place by one or two tentative motions. This state of matters was terminated by the introduction of an adapter by our predecessor in the editorial chair of this Journal, who, about the time mentioned above, described it, with a drawing, in these pages. This, under various trade designations, has been the adapter in use up to the present time, its principle of action being that, when the adapting-frame was once inserted and adjusted in the lantern, unmounted transparencies could be passed through the aperture in the end of the frame, and pushed in succession to the other end, with the absolute certainty of each being perfectly centered as it passed the aperture in the middle of the adapter. This useful carrier, after enjoying a lease of life for nearly two decades, is now, in our estimation, destined to be superseded by one which we believe to be a great improvement on the old form.

For several years past endeavours have been made, with more or less success, to have the pictures in a single lantern to succeed each other with a degree of rapidity suggestive of the idea "quick as a wink." The principle of action in such endeavours—several of which have proved quite successful—is to place the carrier in a vertical position and allow the pictures to fall by gravity, a check being interposed to cause them to remain in succession in the axis of the condensers. But the objection to such an arrangement is that almost all lanterns are constructed with special reference to the pictures being inserted not at the top but at the side. It was upon realising the force of this objection, made at a meeting of one of the societies upon the exhibition of an adapter by Mr. J. M. Turnbull, of Edinburgh, that Mr. Cowan fell under the influence of the happy inspiration which resulted in the bringing into existence, within a few days afterwards, of the carrier which forms the subject of these remarks, and which we shall endeavour to describe from the brief glance we had at the solitary specimen then existing.

Let the reader imagine a modern frame sufficiently long to take in two lantern pictures, which are inserted in grooves, these pictures being placed edge to edge, and, of course, separated from each other by the central division between them, the framework assuming the following form . This skeleton frame, with its two pictures, slides easily from one end to the other of an outer frame in which it is contained, and in which there is only a central aperture. The sliding movement is effected by the pulling of a string which depends from each end, or nearly so, of the external frame, and is attached to the internal or running frame, the adjustment being made so as to bring each picture in turn directly opposite the central aperture and no farther. But, owing to the top of the fixed frame being cut away towards each end in a slanting direction, it is now easy to remove the slide that is not in the centre, and drop another in its place. This having been effected, the string at the opposite end is pulled, when, with the velocity of a dart, the new picture is shot into the place of the former one, which, in turn, is now lifted out of its grooves and a new slide inserted. This to-and-fro motion goes on with the greatest simplicity and rapidity until the supply of pictures has become exhausted.

At the time we conversed with Mr. Cowan he had not then had time to devise the means of instantaneously darkening the screen during the fraction of a second required for effecting the changing of the pictures, but he was about to effect an automatic arrangement for doing so. From the well-known mechanical ingenuity of this gentleman we have no doubt of his success. But in the meantime, and whether this last-mentioned addition be completed or not, the carrier, even in its existing state, is the most convenient we have yet seen.

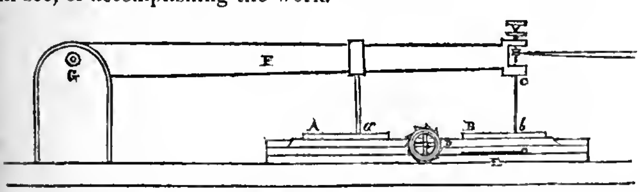
MACHINE FOR CONVERTING WOODBURYTYPE RELIEF INTO TYPOGRAPHIC BLOCK.

A favourite idea of mine was, I observe, spoken of at one of the Cantor lectures. Mr. T. Bolas, F.C.S., is reported to have said, at the lecture delivered by him at the Society of Arts in connection with advancement in photo-mechanical processes, that "he believed there was a still greater development to be looked for from processes in which the Woodbury relief was converted into line and stipple."

Now, as this very subject has been to me a "thinking point" for over twelve months, and as I have a machine partly constructed by which I expected to have been able to say "I have done it!" I may be excused if I desire to put on record my proposed method of converting a gelatine relief into a line printing-block. If any process already exists for this purpose I am quite ignorant of it. The machine I am to describe is purely the outcome of my thoughts on the subject. As this will probably meet the eye of Mr. Bolas I shall be obliged for his opinion as to its practicability.

The character of the printing-block produced by the machine will be somewhat different from an ordinary woodcut, as the lines will be all in one direction. Difference in shade will be represented solely by difference in breadth of the lines—the very highest lights having extremely fine lines or no lines at all, whilst the points of deepest shadow will have lines of maximum breadth or merged lines.

The machine is a very simple one, which cannot fail, so far as I can see, of accomplishing the work.



A, is the relief; *a*, smooth point resting on same. B, prepared plate-block, such as is used for stereotyping purposes; *b*, point of drill resting on block; *c*, very finely-pointed V-shaped drill.

The relief and the block are both on a table capable of motion sufficient to traverse the whole breadth or length of the relief and block. D is a toothed wheel with screw, which is capable of giving a motion exactly at right angles to the other—the whole forming, in fact, a mechanism like the slide-rest of a lathe. F is a metal or wooden beam hinged at G.

Now, it will be evident—if the relief and prepared surface be moved, the relief under the smooth, round point, and the prepared surface under the drill point, which is revolving at high speed—that as the point at *a* is raised or lowered the drill will produce either a fine or a broad line, due to the action of the V-shaped point.

If, further, as each line is formed a pawl, E, causes the toothed wheel D to revolve, bringing a new part of the relief and prepared surface to be operated on, there will at last be produced an exact copy of the relief, with this difference: that its heights and depressions are accurately represented by breadth of lines on a plane—the thing wanted in a typographic block.

This is the machine in its simplest form. It may be modified in a number of ways, such as the substitution of a V-shaped cutting tool in place of the drill, in which case the prepared substance at B would require to be easily cut—soft, yet brittle, somewhat after the nature of Chinese wax—which could be afterwards electrotyped. Another modification, and one which would probably form the best machine, is the multiplication of the lever F with its attachments, and abolition of D with screw. This would allow of a copy or matrix being produced with one movement of the table. The downward pressure in this case might be produced by a series of spiral springs or by one large electro-magnet. Other modifications might be introduced without departing from the nature of the invention.

G. D. Macdougald.

LECTURES AT THE ROYAL INSTITUTION.

PHOTOGRAPHIC ACTION.

Captain Abney commenced his course of lectures at the Royal Institution on Saturday last with a fairly-large and appreciative audience. The afternoon audiences, as a rule, are not of a demonstrative character, many *habitués* apparently attending courses for the sake of an hour's undisturbed nap. The lecturer had, however, provided for this emergency by detonating a chlorine and hydrogen bulb as a commencement of his series of experiments about half-an-hour after his preliminary words. The opening subject of the lecture was on

The Structure of Matter, and on Molecules and Atoms.—The character of a molecule was stated, according to Sir W. Thomson, to be somewhere between $\frac{1}{25000000}$ and $\frac{1}{250000000}$ of an inch, and that in solids and liquids they were separated by a distance which could not be more than $\frac{1}{12000000}$ of an inch, nor less than $\frac{1}{250000000}$ of an inch. An idea of the coarse-grainedness of molecules was given by the fact that the best microscope could enlarge an object from 6,000 to 8,000 diameters, and that if this enlargement were again magnified to the same amount the structure of a drop of water would be seen. The atoms composing these molecules, it was stated, might, as a good-working hypothesis, be supposed charged with energy of some kind, either positive or negative, much in the same way that the ends of a magnet were charged, only with this distinction—that the atom had only one kind of energy, either positive or negative, and not both. An interesting experiment to illustrate the arrangement of atoms was made with needles which had been equally magnetised, the eye-ends of which were fastened to small corks. These were floated on a dish of water, and shown in action on the screen. When a magnet was brought near them they arranged themselves in groups, or when a current was passed through a coil of wire surrounding the basin the same action was visible. By moving the magnet or the coils an oscillation was given to the small floating corks, imitating the oscillations of the atoms and the molecules.

The lecturer next showed how radiation affected these vibrations, explaining the action by the well-timed impulse given to the atoms by the ethereal waves of certain lengths. Using a pendulum to illustrate the action, he showed that by properly-timed puffs of air from a bellows the swing was increased. By increasing the swing of the atoms the amplitude was so increased that it got within the region of attraction of another molecule, and thus left the first molecule, which indicated the necessity of having some substance present which would readily absorb the liberated atoms. The time of oscillation of the atoms was said to be about $\frac{1}{7000000000000000}$ of a second. The ease with which the atoms could be separated one from another could be judged by the energy with which they combined. An experiment of powdered silver and powdered antimony sprinkled into a jar containing chlorine illustrated the lecturer's theory, the former becoming red-hot, whilst the latter became white-hot, immediately they came in contact with the gas.

The production of sub-chloride of silver and chloride of silver was then touched upon, an experiment illustrating the production of the former before the latter being carried out by immersing precipitated silver in a liquid (probably cupric chloride) which readily gave off chlorine. The final experiments went to show that the prolonged action of light could be recognised by chemical analysis—by applying some chemical reagent which has a greater affinity for certain atoms in the altered molecule, and in which, consequently, the atomic energies took up the most stable positions; by a change in colour, as in the darkening of silver chloride; and by rendering inert matter either insoluble or soluble in water by the decomposition of the molecules by light.

These examples, which the lecturer took to show thus, were—1. The explosion of a chlorine and hydrogen bulb. 2. The development of uranium paper. 3. The development of iron paper with gold and silver and ferrocyanide of potassium; also, a platinum print was developed for the same purpose. 4. The development of a carbon print. With these experiments the lecture came to an end, the audience seeming more interested, perhaps, in the practical demonstrations than in the drier scientific part.

The next lecture, according to the very short syllabus placed in our hands, should be on the *Rapidity of the Effect of Radiation and the Physical Development of the Molecular Changes.* We believe, however, that a further short reference will be made to the printing action of light.

ACTINISM *VERSUS* WAVE-LENGTHS.

In this controversy I am placed at a great disadvantage, because in justice to your other contributors I ought not to take up so much space, as I know that, possibly, this subject is interesting to only about one in twenty of your readers. For this reason I endeavoured to make the explanation of my theory as short as possible, and because I have given no proofs of it, in the way of experiment, Mr. Debenham and others seem to think that it is mere guesswork on my part. The theory of the two forces has been built up gradually in my mind by reading various books on physics, photography, light, heat, &c.

If we take the question of absorption alone, I should have to quote the experiments of Forbes, Leslie, Tyndall, Pictet, Saussure, and many others, and then show what bearing each had on the question. This alone would require at least twenty pages of this Journal, which is, of course, impossible for me to obtain, because, as I said before, the discussion would be of interest to so few. I do not think for one moment that I have been able to unravel the whole mystery of light, and have explained in about two pages of the Journal what has puzzled the greatest thinkers and experimentalists of generations past, and concerning which dozens of books have been printed. But I wish to say, in reply to the note by "Free Lance," that I have never seen any articles by Mr. W. Harding Warner—or, indeed, of anyone else—that were in any way similar to the theories I have set forth. If anyone has previously come to the same conclusions that I have I was totally unaware of the fact, and I shall be only too pleased if my theory will support theirs or theirs mine, because, after all, what does it matter who finds a thing out? Photography gains by the fact being discovered. It is sad to hear at our meetings, &c., these continual cavillings as to who first proposed this, or if that is not a "crib" from someone else. It seems to show narrowness of mind. If time prove that my theory that actinic force is a counter-force to colour, and *vice versâ*, be correct, the credit is due to the writers and experimentalists of the past. I have simply built up a theory on their discoveries and experiments. And it is nearly the same with my theory of the action of light on a sensitive film, though I have experimented on this subject more. If my theories are proved to be wrong the subject seems to have raised some interest, to judge from the last few numbers of the Journal; and if through my having raised the question a correct explanation be found for the action of light on a sensitive film I shall not have written in vain. I have simply tried, to the best of my ability, to help other workers in the art I love so much, and we all know that there are plenty of difficulties in connection with photography yet to be overcome.

Mr. W. E. Debenham asks me how my objection to the absorption theory regarding coloured media, on the ground that no discoverable work (expansive or chemical) has been done by the light, holds good in the case of an opaque or black body. Does Mr. Debenham think that because the eye cannot see a colour nothing is reflected from a black surface when light strikes it? Is it possible that the force in light, which travels at a velocity of 192,500 miles in a second, can be absorbed and annihilated without reflecting anything? I think that the black substance has made the wave-lengths so much longer, and they are so lowered in refrangibility as to be beyond the visible range of the spectrum. Does not this explain why light reflected from a black surface has less actinic power than from a red—namely, because the wave-lengths of the dark-heat rays being longer are a greater counter-force to actinism?

I will take one of Professor Tyndall's experiments, made during his lectures on *Light,* delivered in America in 1872-3, to explain what I mean. He showed that a black ribbon, when passed through the spectrum, was found to quench all its colours; but at every stage of its progress an amount of heat was generated in the ribbon exactly equivalent to the light lost. Is not this the reason, viz., that the black ribbon had *altered* the wave-lengths of each colour so that they were changed into dark heat rays beyond the visible spectrum? If it were not so, how could heat be generated? In this case we have long wave-lengths and little actinic power; but, if we remove the black ribbon and put a white one in its place, at the violet end of the spectrum we shall find great actinic force and short wave-lengths. In the first case the rays of light had passed through the prism, and the blue and violet rays had still the great actinic power in them until they reached the black ribbon.

Now, according to the absorption theory, the ribbon absorbs or annihilates not only the various colours of the spectrum but the actinic force that has also passed through the prism, and to the eye and a sensitive film this would appear to be so; but Professor Tyndall shows that heat has been generated, so that the forces which produced the various colours of the visible spectrum on the white ribbon, instead of being absorbed by the black one, must have produced the long wave-lengths of the invisible heat rays. And does not this prove that my theory—that any substance which transmits or reflects light at one wave-length, instead of absorbing the other rays of the spectrum, brings the whole of them to this one wave-length—is correct? If it were not so, when light passes through red glass the latter would have to annihilate not only the other rays of the visible spectrum and their actinic power, *but the heat rays of the invisible spectrum as well.* Professor Tyndall's experiment, however, shows that they cannot be annihilated, so the short wave-lengths of the violet and the long ones of the heat rays must have been brought to one length by the glass; and does not the spectroscope show us it is so—at least as regards the visible spectrum?

Would Mr. Debenham kindly explain what he means by "black rays?" I have never heard the term before. Does he mean the ultra-violet or the dark-heat rays? As to his remarks on Mr. A. Cowan's dark-room lamp: it will be remembered that the sentence that Mr. Debenham quotes was in a reply to a question of Mr. Macdougald's as to whether the law of inverse squares applies to actinic force as it does to luminous power. The question as to how the light was produced was another matter; the only reason why I stated the results of Mr. Cowan's experiments was in their bearing on the law of inverse squares. I may say, however, that I was not at the meeting when that gentleman's lamp was exhibited. I gained my knowledge of it from the short description in one of the journals, *written by Mr. Debenham himself,* in which he stated that Mr. Cowan had taken the idea of the tin shade and reflected light from the lamp I had exhibited some weeks previously.

Mr. Cowan has demonstrated that reflected light through yellow paper and green glass is 180 times safer than when transmitted through the usual red mediums: and as Mr. Debenham has never proved or claimed that these substances combined were anything like 130 times safer than the red by transmitted light, I was perfectly justified in saying that with reflected light we may have over fifty times more light in the room to work by than by transmitted light. I explained, further on, that the reason was that in the latter case a good deal of the light was reflected back into the lamp. If Mr. Cowan will kindly expose a plate of the same rapidity without the tin shade, we shall then be able to know how much of the safety of the light is due to reflection and how much to Mr. Debenham's combination of mediums. Will Mr. Debenham please state what authority he has for saying that my assertion that reflected light is fifty times safer than transmitted light was a mere "unproved guess?"

I regret that when such a good judge and scientific investigator as Mr. Leon Warnerke showed the advantage of reflected light it was not taken up at the time; but until I saw Mr. Debenham's article I was not aware that a reflecting lamp of any kind had ever been exhibited. Still, what does it matter from whom Mr. Cowan got the hint, if we have a safer light to work by than we had before? That is all I care about, and I am sure Mr. Warnerke will feel just the same.

I must apologise to Mr. Macdougald for not answering his interesting questions now; but I have just come across some experiments by Professors Bunsen and Roscoe, in which they unite chlorine and hydrogen under the action of light to form hydrochloric acid. This seems to have an important bearing on one of his questions, so I will leave them all for a separate article. HERBERT S. STARNES.

GENERAL NOTES.

[A communication to the Bristol and West of England Amateur Photographic Association.]

In accordance with the request of the Secretary, and feeling it advisable that each member should make some exertion, however small, to promote the interests of the Society, I have proposed to make a few remarks, as the result of reading the journals—from which something new is always looked for; but this paper avowedly traverses old ground.

I find I have marked a considerable number of places as the journals were perused; but, being so numerous, they can only be touched upon in a very general sort of way. We are concerned more especially with the gelatine process; and if a beginner were to turn over the pages of the journals to know what to do, or if an old hand were to refer to them trying to discover the best process, he would be rather puzzled with the amount and variety he had to deal with. Even in the present day, if the question—What plates do you use, and how do you treat them? were to be answered by different people, the person seeking information would have a variety of answers.

To show how the subject of development alone has been discussed, I have a list of what I noted in the journals, showing that during 1882 in THE BRITISH JOURNAL OF PHOTOGRAPHY there were twenty, and in the *Photographic News* for 1882 there were nineteen, articles; and in 1883 in THE BRITISH JOURNAL OF PHOTOGRAPHY there were fifteen, and in the *Photographic News* ten, articles.

A very great deal has been written regarding the gelatine process, but, notwithstanding, what strikes me as being very peculiar is the small variation between the make and treatment of a gelatine plate in 1873 and one in 1883. Much of the discussion has been owing, no doubt, to the different material with which writers and experimentalists have worked; for instance, the propotions of an emulsion had been given, and when people came to try it they commonly used their own developer, which, the chances are, was not proportioned as the one used by the person recommending the emulsion, and the same with developers being tried on different styles of plates. The one great advance has been the increase in rapidity, and this advantage chiefly caused the old processes to be laid aside.

In 1873 I dialysed with heat at about 100° for twelve hours; in the present day the heat for emulsification has, in many cases, been increased to boiling point. I have tried most of the processes in their day, the most charming being the collodio-bromide, and if anyone were to produce in the market a rapid plate I am sure there are many who would return to that process. One which I adopted some years ago was making a collodion with silver dissolved in it. I dipped the silver film in a bromide bath, just as the iodised film is dipped in the silver bath, and, after washing off the superfluous bromide, flowed over a preservative and dried. The want of rapidity, however, stopped me; but since our knowledge of the effect of ammonia in the gelatine process I have thought rapidity might now be produced by the addition of ammonia to the bromide bath. I have not tried it, but it is possible that something in this direction might be adopted to increase the rapidity.

For a long time the gelatine process caused much trouble and disappointment, owing to frilling, staining, green fog, and ignorance in developing; but, happily, these are things of the past, although many produce green fog by pyro. development. It can be effectually got rid of by Captain Abney's treatment with bromide of iron and ferrous oxalate.

Regarding emulsion-making and plate-coating: as a communication on the subject is to follow, I will only remark that when I left off experimenting in this direction I found the "cold emulsifying" of Mr. A. L. Henderson, as well as the "depositing system" of Mr. W. K. Burton, easy, and to give good results. I now use plates from a maker, and am saved a good deal of inconvenience.

As respects development: in the year 1881—the first half especially—a great many articles were written, hardly a number of the journals being issued without an article on or some allusion to the subject. Very little alteration has taken place, however, in the nature of the developer. Formerly it was an object to get the developer from anyone who had done good work; but the application of it to some other person's plates was a test which did not always produce the desired effect. No wonder, when reference is made to the leading article in THE BRITISH JOURNAL OF PHOTOGRAPHY of the 3rd August, 1883, showing the different proportions of developers used by the different makers of plates. Experience has taught people now more about what they are using, and the object to be aimed at by altering proportions to suit their requirements, according to light, subject, exposures, &c.; in fact, this has been so generally established that an article on development is rare in comparison, and certainly it does not call forth a discussion, as on former occasions.

I will mention a few of the articles written in THE BRITISH JOURNAL OF PHOTOGRAPHY in 1881 as exemplifying different ideas of the method of using the pyro. developer, and, therefore, giving a selection from which one can choose his own style:—Mr. W. Brooks, April 8; Mr. A. Pringle, April 22nd; Mr. H. Y. E. Cotesworth, May 6; Colonel Stuart Wortley, June 10; and leading article, June 24.

It was the writing of articles containing differences of opinion which, no doubt, encouraged the photographic public to experiment. I think the most generally-adopted plan now (with amateurs at least) is to feel the way with a standard weak solution first, whereby the effect of exposure is ascertained, and to finish by degrees according to circumstances. The latest published formulæ are those of our Treasurer, Mr. Brightman, in the *Photographic News* of December 14, 1883, and of Mr. H. Manfield in the *Year-Book* of 1884, page 85; also one by Pierre Revan, in the *Photographic News* of November, 30, 1883. Each point to the same treatment—"slow development;" but whether this will not be questioned by someone recommending the development to be strong and quickly over remains to be seen. One which has the characteristic of not staining dishes, as well as giving a difference of tone, will be found at page 149 of THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for 1883, by Mr. Thomas Farnell, who publishes one in THE BRITISH JOURNAL OF PHOTOGRAPHY for October 5, 1883, in which he says green fog is prevented altogether. If so, it will be a boon to many. The peculiarity consists in treating the sulphite of soda first with alum.

There are many advocates of the ferrous oxalate developer, and the question as to which is the best developer might be practically tested when the outdoor meetings are held by taking duplicates of a subject, and developing one by pyro. and the other by ferrous oxalate, the negatives being exhibited by the different members. This would be a matter of curiosity and create some interest. Formerly—in fact, till lately—when a plate was cleared in the hypo. it was considered finished, and properly ought to be. But in cases of miscalculation we now have at command subsequent treatment, and clearing it from stain, reducing and intensifying are resorted to; in fact, a gelatine negative is now so under control as to be finished according to the standard of one's own fancy.

To say what is the *best* way of the many to make a gelatine plate and develope it can only be looked for when it is discovered that one maker's plates are superior in every respect to another. Some approximation, however, might be obtained if medallists could be induced to mention the makers of their plates and their treatment of them—I mean specially as regards landscapes; but I fear this high road to perfection would detract from the interest of those who take a pleasure in experimenting to overcome difficulties. Even much could be learnt among ourselves if (say) a particular subject in the vicinity were selected, and a competition for the best negative and print were to take place. The effect of different makes of plates and developers would then be apparent. A comparison of results, knowing the details of how they were manipulated, would tend to increase our interest. I think it would give a stimulus to our work, and be productive of the best results. COLONEL PLAYFAIR.

ROUND AND ABOUT SNOWDON.

[A communication to the Birmingham and Midlands Institute Scientific Society.]

OF the many thousands of holiday-makers who yearly visit our native Mont Blanc, the greater number attack it from the side of Llanberis. Here, newly arrived by train, the unsuspecting visitor is beset by swarms of boys who importunately offer their services as guide to summit, waterfall, or apartments, till the tourist is driven to the verge of distraction. If, as is probable, he deem it his duty to struggle to the summit, and the weather seem tolerably clear, he starts off up a long tedious road until at last, when he attains an altitude which should yield him some views to reward him for his exertions and encourage him to further efforts, too frequently the misty clouds come sweeping up, and, folding him in their cold embrace, bid hope depart from his soul. He then returns to the lower regions with no other satisfaction than that of gratifying a good appetite.

As a contrast to this, let lovers of natural scenery do as I, accompanied by the partner of my joys, did last summer—that is, go by the Snowdon Ranger line round to the back of Snowdon, attack the mountain from the Glaslyn side, and return by Llanberis.

We had been one morning to visit the celebrated Aber Falls, and in returning to the station found that we had an hour to wait. We went to see the sea, but found that it had gone out for the afternoon over to Beaumaris, so we returned to the station and whiled away the time by reading the placards—a proceeding which the company kindly facilitated by delaying the train nearly an hour. Amongst the announcements was one of a tour round Snowdon, which undertook to convey the tourist by train to Pont Rhyddu, thence by coach *viâ* Beddgelert, Nant Gwynant, and the Pass of Llanberis. Although I have a strong objection to being "personally conducted" anywhere that a map and a compass will take me, the idea of getting to Beddgelert was not to be resisted, so a two-day excursion was fixed for the next morning.

An early hour accordingly found us in the train from Penmaenmawr to Bangor; and it is worth noting that if you wish to travel by parliamentary trains on Welsh railways you must get up early. The morning was dull and the clouds rested so closely on the Carnarvonshire hills as to give little prospect of any ascent of Snowdon; but, still, whatever the weather may be to the geological or botanical student, there is always plenty to interest in a new district among the mountains. At Bangor I asked for Beddgelert tickets, but only received those for Pont Rhyddu, although Bradshaw gives the fares to the former place. We pass Carnarvon, and then alighting at Dinas we perceive a little toy engine, with three diminutive carriages to match, standing alongside the platform. These belong to an old mineral line, which although only of a very narrow gauge has been adapted for passenger traffic. The train of course travels only at a slow rate, and you are requested to keep your heads inside the carriage lest you should knock down the bridges. We get into one of the little wooden boxes amidst a liberal allowance of Cymric from our fellow-passengers; the little engine buckles manfully to, and with much snorting and bunting we get into motion.

The first part of the journey is flat and uninteresting. The fields bordering the line are swampy and stony, showing little sign of cultivation. Presently we arrive at a junction, for this little line, like its more pretentious brethren, rejoices in the dignity of a branch. Passing on by Bettws Garmon the hills begin to close in upon us, and the way becomes steeper and more winding. Next we catch sight of Nant Mill, with its waterfall, on our left, and begin to wish we were walking instead of riding; but we make a note of it for a future occasion and look ahead. Here we see coming into view Llyn Cwellyn—a fine sheet of water one mile long and a-quarter of a mile wide. The train runs along on the left-hand side of the lake, and at about halfway along it stops at the Snowdon Ranger station. This station takes its name from the adjoining inn, and claims to be the nearest one to the summit of Snowdon. This is, indeed, only four miles away, and can readily be ascended from this point.

A good view of the mountain should be obtained from here; but on the present occasion the monarch is shrouded in mist, though Mynydd Mawr, a 2,300-feet mountain across the lake, stands out clearly. Two miles further on we come to the present terminus of the railway, Pont Rhyddu, where we find two brakes waiting to receive those going on to Beddgelert, and since there are only two other passengers, clerical tourists, we are easily accommodated. The distance is only four miles, through a tract of wild and desolate country. Scarcely a house is to be seen, and the wind blows chillily across the watershed. We pass another small lake, Llyn-y-Gader, and presently see the Pitt's Head rock—a large detached boulder by the roadside, presenting a rude likeness of that renowned statesman; and, lest the tourist should miss the treat, some public benefactor has painted up on both sides of the stone the word "Pitt" in large letters.

The road now declines by the side of a stream coming down from Snowdon, and the scenery becomes more softened, until we arrive at the celebrated village of Beddgelert. Resisting the inviting aspect of the numerous hotels, we step out at a brisk pace to warm our stiffened limbs, and, passing the supposed grave of the faithful hound, make for the famous Pass of Aberglaslyn. Before, however, we have got far the pangs of hunger become irresistible, and, sitting down by the side of the rushing river, we bring out the trusty sandwich tin. Having refreshed ourselves we continue our walk, and now the sides of the valley narrow in closely upon us, and the frowning precipices convince us that the title of "Pass" is really deserved far more than by any other pass in Wales that we have yet visited. The road rapidly descends by the side of the now foaming torrent, in marked contrast to the flat plain on which Beddgelert is situated. It is plainly evident that where that village now stands once existed an ancient lake, and that since then the river has cut its narrow channel through the barrier of rock closing it in, and thus drained and exposed the alluvial deposit previously laid down by itself.

The way grows continually grander. The road has only gained a footing by being built up out of the bed of the stream, which forms a continuous series of cascades beneath us, and we arrive finally at Pont Aberglaslyn. Here, standing on the old, romantically-situated bridge, we look back up the pass and revel in the scene before us. The pass lies in front of us, the mountains rising up and appearing to actually bar the progress. The road, as I have said, built up out of the gorge winding with the stream; the white foaming water of the latter coming tumbling over the boulders; the beautiful dark fir trees clothing the sides of the valley—all combine to form a picture never to be forgotten.. The scene is indeed one to bear comparison with many a famous valley in Switzerland, and we lose no time in getting out the pocket camera and converting "a thing of beauty" into "a joy for ever." We scramble down the sides of the chasm and admire the luxuriant growth of ferns from every crevice in the rock; gaze into the dark pool below the bridge, so inviting to a bath, and wish that we could spend the whole day here. But we have made up our minds to try to get to Penygwryd for the night, and so retrace our steps to Beddgelert. Here we get on a coach which will convey us through the beautiful vale of Gwynant, which well deserves a chapter to itself; but I have lingered already so long that I must pass rapidly over it.

The top of a coach is well adapted for seeing the landscape, but the scenes change so rapidly that one has to be continually on the alert and the beautiful spots have not time enough to soak in. Moreover, as the evening comes on the wind blows cold in these valleys, and it is with a feeling of relief that we catch sight of Kingsley's beloved hostelry of Penygwryd. Here, after a wash and hearty tea, we feel "like giants refreshed," and sally out to make the most of the evening.

Having resolved on the morrow to descend the Pass of Llanberis, we determine to visit the lakes of Llyddaw and Glaslyn. These lie on the route to the summit of Snowdon; but we have little expectation that the mist will clear off from the peak, even on the morrow. To our surprise, however, after we have climbed to the summit of the Pass, and, leaving the main road, wander round the shoulder of the mountain, we catch sight of Y Wyddfa clear before us. We shortly meet a gentleman who has come down from the top, and reports that it is quite clear. We wish now that we had started sooner, but resolve to press on as far as we can ere the shades of evening overtake us. We pass the little lake of Llyn Teyrn, and note how the rocks on our right have been planed and scored by the ancient glaciers which descended from the crown of Snowdon. This whole hollow is, indeed, intensely interesting to the student of the glacial epoch. The flora also begins to assume an aspect unfamiliar to dwellers in lowland plains. The Alpine clubmoss points out to us that we are arriving at a height of 2,000 feet, whilst on every piece of boggy ground the yellowish leaves of the Snowdon violet stand out like so many stars.

We arrive at Llyn Llyddaw, and here the question presents itself to us how we are to get across, for the path leads straight into the water. In order to save the circuit of the lake a roadway has been built up from the bottom; but when the lake is full, as on the present occasion, the water overflows it, and in order to accommodate foot passengers a number of stones have been placed along one edge of the path for them to walk upon. The stones have a disagreeable rocking propensity, and, the water being a foot deep on the horse-track and an unseen depth on the other side, the prospect in case of a slip is not assuring. However, we get safely over, and continue ascending alongside the lake. The precipices of Lliwedd stand out grand and gloomy over on the other side, and we think with awe of the fatal fall of our townsman from those dreadful heights. As the road bends round the mountain we turn round and survey the scene behind us. The prospect is a delightful one. We are ourselves in deep shade, the awful precipices around us cutting off so much of the sky. Across the rippling waters of the lake, however, the sunshine is falling placidly on the farther side of the Valley of Gwynant and Moel Siabod in the distance; but the declining light warns us to hasten our steps.

We toil steadily up the old miners' road, with their old deserted buildings as our landmark, whilst the stream comes bounding in cascades to meet us. Snowdon has again put his nightcap on, and when we at length arrive at the upper lake, Llyn Glaslyn, the scene is cold and dreary. We walk to the upper end of the lake, along the ruined tramway with lumps of ore still lying about it, take a wondering glance at the steep path which leads to the final ascent to the summit, and then face homewards. Half way along the lake, however, our attention is arrested by a fine example of a perched rock. Left by the old glacier, as it wasted away before an ameliorating climate, on a boss of rock which has been rounded and smoothed by the same agency until no plant can get a footing upon it, there the old boulder stands, grey with age and split across by the action of numberless frosts, on a spot which must carry conviction to the most sceptical of geologists, for, from the position in which it stands, it could not possible have rolled down to where it now rests from any superior height. This is too good to be neglected. The camera is again brought into requisition, a good long exposure given, and then without further delay (for we think of the walk across the lake) we trot rapidly down the hill, get back to the hotel, and go to sleep, with the sensation of having by no means lost a day.

The next morning we are out early to inspect that all-important factor—the weather. The white clouds are lying low on the Glyders at the back of the hotel; but the bright sunshine gives promise of their eventual dispersion. After breakfast we take a vehicle down the pass of Llanberis. Whether, however, our hopes had been raised too high, or that passes should always be viewed ascending, certainly it was that we were rather disappointed with this one. After passing the summit of the pass we look out for the noted perched block up on the right, and our driver presently points to a very diminutive-looking stone up aloft, saying at the same time that it is a long way up. We scarcely credit this latter, it seems so close in the clear morning air. I get down, and, camera in hand, go vigorously for it. I am, however, soon convinced of our driver's superior knowledge, and have to stop several times for breath before reaching it. Still it is worth the climb, though the ground is rugged and sometimes boggy. The block is about nine feet high, and stands on the very edge of a massive bastion of rock, in such a position that it would surely not have stopped if it had rolled down from above. The rock, moreover, on which it rests has been unmistakably smoothed by the touch of glacier ice, and shows thus to what a great depth the valley was formerly filled up by that sluggish current.

The picture taken, a rapid but cautious descent brings me again to the road, and we continue our journey down to the Cromlech Bridge. This takes its name from some immense blocks of stone by the roadside, which, however, are not true cromlech stones, but are simply parts of an immense fall of stone from the Glyders. Indeed, this side of the pass here presents, as high as the eye can reach, one continuous straight slope of talus from the rocks above, and which is waiting for the next glacial epoch to be borne away; for I think it is a mistake to suppose that a little mountain stream can ever roll away the *débris* continually showered into it by the side of a valley of any width. Lower down on the left some rocks, plainly glacier-rounded, point out the *embouchure* of Cwm Glas—a hollow well worth visiting by the student of glaciology—and we presently catch sight up it of the peak of Snowdon standing out clear against the sky.

Arrived at Llanberis, we first go to see the beautiful waterfall formed by the stream coming down from Snowdon, and which must, by all means, be viewed from its own left bank. There being no means of crossing the water, we are compelled to retrace our footsteps for some distance before we can get upon the Snowdon ascent proper. This calls for little remark; for, as I have already said, it is about the most monotonous road that could be taken, there being no view until the top of Cwm Glas is reached, where we look down into the Pass in the reverse direction to that before mentioned. The road is quite clear below us. The Glyders stand grandly opposite us, and the sound of blasting reverberates across from the Llanberis slate quarries. The ascent now stiffens. We pass the junction with the road from Penygwryd, where we see the little lake of Glaslyn again, but lying far below us; and, striving against the strong blasts which now encompass us, we gain the summit. Here the first objects which meet us are our fellow-tourists of the day before, who have come up from Beddgelert, and whom we greet with the friendly feeling we always acquire for those with whom we travel for even a short time.

Having ensconced ourselves under the trigonometrical cairn, we endeavour to count the numerous lakes in view, check off the mountains, and strain our eyes on the low, black bank presented by the Isle of Man, the under-surface of the clouds cutting off, like a drop scene, all more distant views. But the clouds come and enfold us, chill us through, and make us take refuge in the sheds, where we have refreshments; but let me draw a veil over that. We take some more views, with vain endeavours to get a lull of a few seconds in the wind. and then rapidly descend the mountain. As the evening closes I go to the base of the old Dalbadarn tower and enjoy the beautiful scene here spread out to my view. The lake before me, beautiful, though much disfigured by the immense masses of *débris* sent down into it from the slate quarries, which rise terrace-like above it on the other side, the lower lake gleaming in the light of the setting sun, and the pass overshadowed by the grey shadows of the coming night, sink deep into my memory. I tear myself lingeringly away, for the time of the last train is approaching, and soon we are on the way back, delighted with our two days' experiences, and hoping that all our friends may be induced to venture on a similar circuit. C. J. WATSON.

RECENT PATENTS.

PATENTS APPLIED FOR.

No. 4,119.—"Photographer's Lamp." G. WILSON, 4, Hope-street, Withington, Manchester.—*Dated February* 29, 1884.

No. 4,144.—"Colouring Photographic Prints." W. B. ANDERSON, 26, Union-terrace, Aberdeen.—*Dated February* 29, 1884.

No. 4,258.—"Photographic Camera Clip Support." L. B. PILLING, 16, Thornsett-road, Anerley.—*Dated March* 3, 1884.

SPECIFICATIONS PUBLISHED DURING THE PAST WEEK.

PRODUCING PLATES BY PHOTOGRAPHY TO BE USED FOR PRINTING PURPOSES.

THIS invention, which received provisional protection only, is a communication from Messrs. BENECKE AND FISCHER, of St. Louis, United States of America, and JOHN FRANK, of Frankfort-on-the-Main, Germany.

IT relates to an improved method of producing photolithographic plates for use in printing, and the object is to produce a plate from which a picture or the like can be printed, the shades of which are formed by a number of points or dots placed more or less close together, the design for the picture being engraved upon a zinc or other plate, from which impressions may be taken by pressure. The production of the design is accomplished by taking by photography from a negative a small representation of the object which is to be reproduced. This representation is enlarged whereby a design is produced which consists of a great number of small points or dots, and which is thus in a suitable form to be engraved upon a zinc or other plate in order to be reproduced by pressure. To prepare such a design it is necessary that the collodion employed for taking the representation should be very thin and only slightly iodised, as upon this depends the size of, and the distance between, the points or dots. The plate should have a coarse or a fine grain according as a greater or lesser enlargement of the proof is required.

The liquid, the composition of which is given below, is that which is required for the production of the small image.

Alcohol	30 grains.
Ether	30 ,,
Gun cotton	0·8 grain.
Iodide of ammonium	0·8 ,,

To cause the image to appear or be developed the following composition is used:—

Water	480 grains.
Sulphite of iron	30 ,,
Acetic acid	60 ,,
Alcohol	30 ,,

The shade of the design depends upon the strength of the solution, being lighter when the solution is stronger and darker when the acid solution is weaker. The design can be transferred upon the stone in the ordinary manner, and the picture or the like can be reproduced by lithography.

IMPROVEMENTS IN APPARATUS FOR STORING AND CONVEYING DEVELOPING AND OTHER CHEMICALS REQUIRED FOR THE PRODUCTION OF PHOTOGRAPHIC PICTURES.

THE following is the specification of GEORGE DUNCAN MACDOUGALD, chemist, Dundee, in the county of Forfar, North Britain:—

The object of my invention is to enable a photographic operator to produce, in a rapid and convenient manner, a developing or other chemical solution of adjusted strength, and at the same time to preserve in a more efficient manner the chemical reagents used.

In carrying the same into effect, according to one part of my invention I construct envelopes or vessels made either of glass, paper, gelatine, gum arabic, or a compound of gum arabic and gelatine, or other suitable material, according as I wish to preserve the chemicals in a wet or dry condition, and having one or more spaces inside, in which are placed adjusted quantities of chemical reagents in a solid or liquid state. The envelopes or vessels are constructed in such a manner, hereinafter described, as shall preserve the chemical or chemicals, and at the same time enable the operator at will to discharge their contents, in order to form an adjusted photographic chemical solution.

According to the second part of my invention, and with the same object in view, I impregnate pieces of bibulous material, such as asbestos, ordinary cloth, felt, bibulous paper, or such other substances as are porous in their nature or construction or other material with adjusted quantities of chemical reagents, and afterwards I dry these pieces completely in order to prevent atmospheric action. By soaking one or more pieces of the impregnated material in water a solution of chemical reagents may be made of adjusted strength.

Having thus in a general manner set forth the nature of my invention, I now proceed to describe more particularly the method of working or carrying the same into effect.

According to the first part of my invention a convenient form of the new apparatus consists of a vessel made of glass and provided with two projecting tubes. The chemicals are introduced into the body of the vessel, and the tubes thereafter completely closed or sealed in any convenient manner.

In the event of the vessel being made of glass, the sealing is conveniently performed by melting the ends of the tubes and thus closing them. Other methods of sealing may however be adopted, such as filling the ends of the tubes with wax, pitch, or other substance of a like nature, or by placing small caps on the ends of the tubes, or sealing stoppers into the tubes. A short distance from the ends of the projecting tubes slight indentations or incisions are made, so as to facilitate the rupture of the vessel. In this form of my invention, and in the event of the projecting tubes being made of very small diameter, the incisions or indentations may be dispensed with, as the tubes may be easily ruptured without an indentation. When about to be used the ends of the projecting tubes are broken off. A clear passage is thus made for the escape of the chemicals, which may be allowed to flow out by gravity, or the mouth may be applied to one end and the contents blown out at the other, to form the adjusted chemical solution. By the use of this device a photographic chemical or chemicals may be preserved for any length of time uninjured by air or climate, and at a moment's notice be discharged to form an adjusted, developing, or other photographic solution.

Another convenient form of my invention consists of a vessel made of glass or other material, but without projecting tubes. An incision or indentation is made in any position on the vessel in order to weaken its walls. When about to be used the vessel is ruptured by force applied to its weak part or parts, and the chemical or chemicals thereby liberated to form the adjusted solution.

Another convenient form of my invention consists of a thin bulb or bulbs to contain the chemical or chemicals, and of such material and thickness as may easily be ruptured by pressure.

Another form of my invention consists of an envelope of cylindrical or other form, provided with one or more partitions, for the separation of the various chemicals. These envelopes may be made with a material soluble in water, or with a material insoluble in water and provided with a seam of gum arabic, or other soluble and adhesive substance, which opens by the action of the water, or they may be made of materials altogether insoluble in water. The partitions may be made with a piece of string applied as a ligature, the surplus string being left attached for convenience in after manipulation; or the partitions may be made by the insertion of a piece of paper, cardboard, cotton wool, or other material into the interior of the vessel. When about to be used the envelope is placed in water. If of soluble material the envelope then dissolves, discharging the chemical or chemicals. If of soluble material, and provided with a soluble seam, the seam opens and allows of the discharge of the chemicals to form an adjusted solution. Whether the envelope be made with a seam of soluble material such as gum arabic, or altogether of soluble material, or altogether of insoluble material, a very quick and convenient method of releasing the materials is to rupture the various compartments with the finger nail previous to putting the apparatus into water.

Another convenient form of my invention consists of a paper cylinder with an opening or openings into it, covered with a flap or flaps, which remains closed while the apparatus is not in use, and keep the contained chemical or chemicals in position. When about to be used the apparatus is put in water, when the flaps open, discharging the chemicals.

According to the second part of my invention, and with the same objects in view, I saturate the pieces of bibulous material, such as asbestos, ordinary cloth, felt, bibulous paper, or such porous material as loaf sugar, with adjusted quantities of a chemical or chemicals.

To use this form of my apparatus, the bibulous portion is dipped in water when the chemicals dissolve out, producing an adjusted solution.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is—

1. Vessels made of glass or other material, and provided with one or more projecting and sealed or closed tubes, substantially as and for the purposes described.
2. Vessels made of glass or other material, and provided with one or more incisions or indentations, substantially as and for the purposes described.
3. Vessels made of paper or other material, and provided with incisions or partitions, substantially as and for the purposes described.
4. Soluble envelopes, or such as open by the action of water, substantially as and for the purposes described.
5. Vessels having an opening or openings covered with a flap or flaps, which open by the action of water, substantially as and for the purposes described.
6. Pieces of bibulous material, such as asbestos, ordinary cloth, felt, bibulous paper, or porous material, such as loaf sugar, substantially as and for the purposes described.
7. The combination of two or more of the forms above described, substantially as and for the purposes described.

[From the foregoing we have omitted certain drawings of forms in which the tubes and other appliances may be made, together with references to them, such not being necessary to the understanding of the principle of the invention.—EDS.]

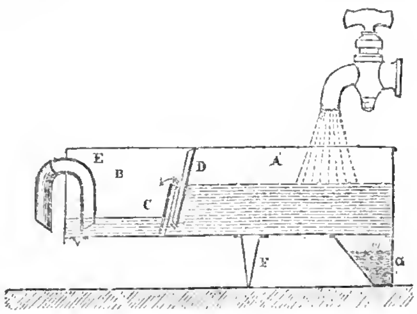
IMPROVED APPARATUS FOR USE IN WASHING PHOTOGRAPHIC PRINTS AND OTHER ARTICLES OR MATERIALS.

THE following is the specification of FREDERICK HAZELDINE, of Lant-street, Borough, in the County of Surrey:—

My invention relates to a simple construction of trough for washing photographic prints, negatives, or chemical compounds, whereby the whole body of the washing water, and particularly the portion containing the salts dissolved out, is changed at frequent intervals with the least necessary waste of water, the operation of the washing trough being entirely automatic without the use of any mechanism.

The trough is divided into two compartments, of which the first or washing compartment receives a constant stream of water that flows from the one compartment to the other, whilst the second compartment is provided with an outlet syphon or valve. The trough is so balanced that when the second compartment fills to a certain height the trough assumes suddenly a tilted position, thereby violently agitating the water among the prints or materials being washed, separating them and starting the syphon or opening the valve. The arrangement is such that the outflow shall gain on the inflow, so that the water will be run off from the second compartment faster than it flows into the first, until the second compartment having been almost emptied the counterpoise preponderates and returns the trough to its horizontal position, again agitating the water, &c., whereupon the trough refills and the same operation is repeated.

A and B are the two compartments of the trough separated by a partition C, which rises from the bottom to within a certain distance of the top of the trough. The compartment A is the larger of the two, and in it are placed the prints or substances to be washed. D is another partition dipping into compartment A at a short distance from partition C, and reaching from the top of the trough to within a short distance of the bottom, so as to compel the water at the lower part holding in solution the salts washed out (and which being of greater specific gravity sink to the bottom of the trough) to pass out through the space between the two partitions C D into compartment B. E is a syphon of which the short leg dips into compartment B, and reaches within a very short distance of the bottom, whilst the bend of the syphon is sufficiently below the top of the trough to ensure the syphon being started automatically when the trough assumes the inclined position. The longer leg of the syphon extends sufficiently below the bottom of the trough to ensure the action of the syphon continuing until the compartment B is sufficiently emptied. The trough oscillates on a transverse fulcrum formed by a downwardly projecting rib or plate F, fixed or hinged to, and extending across, the bottom of the trough, and in its normal position the trough rests partly on the fulcrum F and partly on a downwardly projecting part G at the end opposite to the syphon, which part G is sufficiently loaded to preponderate and to bring the trough back to its horizontal position when



the compartment B is nearly empty, but is overcome when the compartment B fills up to about the top of the partition C, the relative position of the partition C and of the fulcrum F being such as to enable this action to take place by the alternate preponderance of the weight G and the full chamber B. The compartment A receives a constant supply of water so regulated that the inflow is somewhat less than the outflow through the syphon E. A valve may be substituted for the syphon.

The apparatus may be made of tinware or other suitable material, such as earthenware or ebonite, and if of metal should be protected on the inner surfaces against the action of the chemicals.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

A photographic or chemical washing trough or tray divided by partitions as described, and provided with a syphon or valve outlet and counterweight, and arranged to rock automatically upon a fulcrum, substantially in the manner and for the purpose herein described and illustrated in the drawings.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

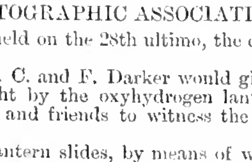
Date of Meeting.	Name of Society.	Place of Meeting.
March 11	Great Britain	5A, Pall Mall East.
,, 11	Bolton Club	The Studio, Chancery-lane.
,, 11	Newcastle-on-Tyne	College of Physical Science.
,, 11	Glasgow Amateur	Institution Rooms, Buchanan-st.
,, 12	Cheltenham Amateur	
,, 12	Bury	Temperance Hall.
,, 12	Photographic Club	Anderton's Hotel, Fleet-street.
,, 13	London and Provincial	Mason's Hall, Basinghall-street.
,, 13	Manchester	Mechanics' Institution.
,, 14	Ireland	Royal College of Science, Dublin.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the weekly meeting of this Society, held on the 28th ultimo, the chair was occupied by Mr. W. H. Prestwich.

It having been announced that Messrs. C. and F. Darker would give a demonstration of the polarisation of light by the oxyhydrogen lantern, there was a full attendance of members and friends to witness the proceedings.

Mr. A. Cowan showed a carrier for lantern slides, by means of which two subjects could be rapidly and smoothly changed. It differed in principle from the one lately introduced by Mr. Macdougald, in that the slide was horizontal, and therefore applicable to any lantern. The movement was to and fro, and will be found described in our last number in the report of the meeting of the Photographic Society of Great Britain. He (Mr. Cowan) also described some further experiments with green glass and yellow paper as the



media for illumination for photographic dark rooms, and showed some results, from which it appeared that, starting with one thickness of paper, the addition of the green glass did not stop quite so much photographic action as an additional thickness of paper, but that when four or five papers were used the glass prevented photographic action quite as effectually as two or more additional thicknesses of paper.

Mr. W. E. Debenham said that a medium of one colour let through certain rays of light, having a photographic power which further thicknesses of the same colour would still let through. A medium of another colour, however, would stop these rays. In this instance the green glass stopped the orange or red rays, and rendered the light pleasant to work with as well as safe.

Mr. W. Ackland agreed with Mr. Debenham as to the effect of two media of different colours.

A question from the box was read—"Why are not large heads taken direct in the camera instead of by enlargement?"

A Member said that the question would form a subject for an entire evening.

Mr. A. Haddon remarked that the members were now doubtless anxious to see Messrs. Darker's demonstrations, and, as Mr. Debenham was in a few weeks to give a lecturette on lenses, the subject of the question would then, probably, receive attention.

Mr. C. Darker said that it gave great pleasure to himself and his brother to demonstrate before the Society some of the phenomena of polarisation. Many of the slides which would be shown were prepared and lent for the occasion by Mr. Lewis Wright. He would invite particular attention to the effects produced upon bodies by molecular forces, such as attraction, expansion, and crystallisation. Some of the effects of these forces were either made visible or brought into much greater prominence by the use of polarised light, and the appearances so produced could, except as regards colour, be reproduced by photography. Images of crystals—benzoic acid, salicine, and citrate of soda—were thrown upon the screen, with and without the intervention of a plate of selenite, to show the effect of polarisation in displaying the forms of their crystallisation, and photographs of the same subjects taken under the same conditions were handed round. Amongst other substances illustrating the effects of polarisation, there were shown slides of zanthonine, salicylic acid, chloride of morphia, double sulphate of copper and ammonia, tartrate of soda, urea, cinnamonic acid, chlorate of potash, and tartaric acid. Hyposulphite of soda was also shown. In this case a little gum had been added before crystallisation.

Mr. A. J. Brown here remarked that gelatine altered the form of the crystals deposited from its solution.

The subject of the biaxial system of crystallisation was then gone into, and a crystal of nitrate of potash was first shown with its two sets of coloured rings in illustration. Carbonate of lead, with its axes farther apart than those of nitre, arragonite, sulphate of iron, bichromate of potash, borax, and sugar followed. After the exposition of the effect of a right and left crystal of quartz when used together, and an exhibit of amethyst and selenite, the effect of expansion from heating one edge of a plate of glass was shown, and that of pressure upon the same substance whilst in the lantern; and it was mentioned that a photographic lens which was too tightly screwed down into its cell would show a similar effect. Sections of various substances were then shown, and the brilliant glow and change of colour evoked frequent applause. Amongst the subjects giving the most striking effect were perthite, zeolite, and graphic granite.

A display of symmetrical figures from pieces of selenite concluded a most successful and enjoyable evening, and on the motion of Mr. Debenham, seconded by Mr. Haddon, a hearty vote of thanks was accorded to Messrs. Darker.

On the 14th instant Mr. T. Bolas will deliver his lecture on photo.-block printing.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

The ordinary meeting of this Association was held at the Free Library, on Thursday, the 28th ult.,—Dr. Kenyon, President, in the chair.

The minutes of the January meeting were read and confirmed, and Messrs. Sharp and Swinton were elected members of the Association.

The Librarian announced the receipt of a donation to the library of the American *Photographic Times*, and of eight lantern slides, on Cowan's plates, from the Rev. H. J. Palmer.

The Hon. Secretary read a letter from the Hon. Secretary of the Sheffield Photographic Society, thanking the Liverpool Amateur Photographic Association for their contributions to the recent Sheffield photographic exhibition.

The Chairman read an addition to bye-law No. 5, which had been made by the Council—"That all prints for competition, or for the exhibitions of the Society, should be mounted on separate mounts, not less than seventeen and a-half by thirteen and a-half inches." This received the sanction of the meeting.

Mr. H. Rutter exhibited some of the cathedral-tinted glass recently brought to the notice of photographers by Mr. W. E. Debenham.

Mr. J. A. Forrest said that this glass, on submission to the test of the spectroscope, proved to be most unsafe for transmitting light to the developing-room. If good pictures were obtained where it was in use it was the result of the merest accident.

Mr. J. H. Day passed round a beautiful transparency which had been developed in a room lit by a naked gas flame, and yet without a trace of fog.

Mr. Rutter differed from Mr. Forrest entirely, and thought that plates might be safely developed where the light passed through glass of the kind described. In practice, however, he preferred to use a sheet of orange paper in addition.

Mr. W. H. Kirkby said that, in his opinion, no glass whatever was absolutely safe for the development of exceedingly-sensitive bromide of silver films; but he thought that the safest combination was that of light ruby glass and a sheet of orange.

The Chairman thanked Mr. Rutter for exhibiting his specimens of the glass in question, and also for introducing the subject. He (the Chairman) proceeded to say that discretion was necessary in the use of light, and when this was employed almost any mode of illumination might be used in the dark room without danger. He then called the attention of the members present to some extremely-beautiful snow pictures, by Mr. Valentine, of Dundee, which he had been good enough to send for exhibition.

Mr. W. Rogers exhibited and described one of Steinheil's new lenses.

Mr. Morris showed some ferns artistically arranged on mounts for photographing.

Mr. J. H. T. Ellerbeck exhibited a number of light and portable frames, invented and constructed by himself, for the display of mounted photographs. These frames were filled with a large collection of prints by Mr. Ellerbeck, as well as with the productions of the Rev. H. J. Palmer, Messrs. Crowe, Forrest, Kirkby, and other members of the Association.

The presentation print of *Chartres*, enlarged by the Woodburytype Company from a negative by the Rev. H. J. Palmer, was on view, and also a fine enlargement by Messrs. Goodall and Steven, on enamelled gelatino-bromide paper, of Mr. W. H. Kirkby's picture, *Tired*.

An exceedingly-interesting comparison of the brilliancy of the discs given by lanterns by different makers then took place. The Rev. H. J. Palmer showed Mr. Medland's Pentaphane; Hughes' Pamphengos was exhibited by Mr. Watts; Archer's Photinus, by Mr. Phillips; and the Triplexicon, by Mr. Knott. The result of the trial showed that the Photinus was greatly superior to the others. This is a new four-wick lantern, with a reflector of a special curvature invented by Mr. Archer.

The Rev. H. J. PALMER called attention to a feature in the Pentaphane, by which enlarged negatives could be taken direct from an ordinary photographic print.

The members then adjourned to the lecture hall to enjoy a large number of views shown by Mr. Knott with the oxyhydrogen lantern. The transparencies were the work of the Revs. H. J. Palmer and Scott, and of Messrs. Beer, Day, Ellerbeck, Kirkby, Maycock, Watts, and others. Mr. Ellerbeck's series of views among the Hartz mountains and on the rivers Rhine and Lahn were much enjoyed; and his comic pictures illustrating Longfellow's poem "Excelsior," which was read by the Hon. Secretary as the pictures passed in succession over the screen, caused much amusement.

BRISTOL AND WEST OF ENGLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE ordinary monthly meeting of this Association was held at the Studio, Portland-street, on Wednesday, the 27th ult.,—Colonel Playfair, Vice President, in the chair. The minutes of the previous meeting having been confirmed,

The HONORARY SECRETARY proposed Mr. Edward Walsh as an ordinary member, and he was unanimously elected.

The CHAIRMAN then read his paper entitled *General Notes*. [See page 152.]

Mr. E. BRIGHTMAN remarked that Mr. Bennett, in the early days of gelatine, did much to popularise the use of gelatine by the introduction of his rapid plates.

The CHAIRMAN said that, although they were practically using the same plates now as in 1873, still the modification of the formulæ, the additional aids to development in the direction of reducing or increasing density, and the increased experience gained had placed them in a vastly-advanced position and given them a control over the results which were in the early days eagerly sought for.

Mr. PHILLIPS inquired if it were generally considered a *sine quâ non* to use the developer recommended by the maker of the plates being used.

Mr. DANIEL replied that such was undoubtedly the case, as the maker, if a reliable one, would have experimented and found what developer gave the best results with his plates. Of course, the particular mode of using the developer preferred by the operator might ultimately be adopted, the quantities suggested by the maker being brought to bear upon the operation of making up the developer.

Mr. BRIGHTMAN expressed his belief in the absolute necessity for different plates being differently treated.

Mr. DANIEL, in support of Mr. Brightman, remarked that for weakening his own plates he found dilute cyanide of potassium acted admirably and was perfectly under control, and yet, when trying it with commercial plates, some were not affected at all by it, while in others the picture was most rapidly destroyed.

Mr. PHILLIPS suggested that one would hardly follow the maker's advice so far as not using sulphite of soda, when so many found it a great assistance. One maker recommended its not being used.

Mr. BRIGHTMAN stated that, although he did not mean that it *always* caused "green fog," still sulphite of soda did so undoubtedly with some makes of plates; and he was so convinced of this in the case of some plates he had used, that when developing a batch not long since he cut plates in half before development and dodged the other plates about, using sulphite of soda with some and not with others, and found most conclusively that in the case of those developed with that salt "green fog" was most apparent to a greater or less degree.

The CHAIRMAN recommended the treatment of the sulphite of soda as recommended by Mr. T. Furnell, and which he had found a perfect preventive of evil results.

Mr. PHILLIPS asked if anyone present had experienced the extraordinary opalescent appearance which was seen on the surface of a negative during development, sometimes appearing like the top of a river where a freshly-tarred barge has passed along.

Mr. DANIEL said he had often seen it, and found that the effect on the film was to "tan" it and make it very horny. He had discovered it more often when a plate had had ammonia and pyro. added somewhat largely during development, and had been immersed therein for a rather long period.

After some further discussion a vote of thanks, on the motion of Mr. BRIGHTMAN, seconded by Mr. PHILLIPS, was unanimously accorded to Colonel Playfair for his interesting paper, after which the meeting was adjourned till the 26th instant.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

THE ninth ordinary meeting of this Association was held in the Religious Institution Rooms, on Thursday, the 21st ultimo,—Mr. John Parker, Vice-President, in the chair. The minutes of last meeting having been read and approved of,

The CHAIRMAN called upon Mr. Andrew Duthie to reopen the discussion on *The Cause of Fading in Silver Prints*, which had been left unfinished at the last meeting.

Mr. DUTHIE said:—The subject for discussion this evening is one of such importance that I would have been glad to have seen it in the hands of some one with much greater experience than myself—some one who would, therefore, be better able to handle it as it deserved. However, if unable to actually solve the question, I trust at least to show some reasons for the fading of silver prints. It is usually said that insufficient washing after fixing is the cause of fading, but this I am not prepared to admit, especially as we find unmounted prints by our best photographers are all liable to the same discolouration as mounted portraits. With those firms who deal largely in scrap photographs the washing receives special attention. Messrs. Wilson, for example, finish the washing in nearly boiling water. This would ensure the removal of the last trace of hypo. In 1849 Sir John Herschel recommended dabbing the back and front of the print with a soft sponge. This is to be repeated three or four times. He said if the washing was properly carried out photographers would be troubled no more by fading of prints. Of course the photographs he referred to were on plain paper, such as Whatman's drawing-paper. Nearly all of us, I think, have seen the books of calotype photographs exhibited by the Secretary at our last *conversazione*. They seem to bear out Sir John Herschel's statement, for they show no signs of fading. These are also on plain paper. This, I think, brings us a point nearer a solution of the difficulty. From what I have heard about prints on plain paper, and some experiments I have been making lately, I am inclined to think fading is, to a great extent, due to the decomposition of the albumen. I mentioned this the other day to a manufacturer of albumenised paper, and was assured that they treated the paper somehow with an acid to prevent decomposition taking place. If I am not mistaken it is citric acid that is used. This is very likely—indeed, almost sure—to be washed out by the time the print is finished. The albumen is, therefore, left without any preservative, and is a substance which would very likely succumb to the influence of a damp atmosphere or a hot sun. This seems probable, as we often hear of prints hanging on the walls for fifteen or twenty years and showing little signs of fading. All these years they have been pressed close to the glass of the frame, which is rendered nearly air-tight by being pasted over the back with brown paper. In the old frames the paper was only put round over the tacks, and this, I think, was more completely air-tight than the present mode of stretching it right across the back. I regret that the month which has elapsed since I undertook this subject has been too short to allow me to complete my experiments. I trust, however, towards the end of the year to have something to show in support of my opinion about the albumen. We shall now consider another cause of fading, which is not, I think, generally known. On inquiry I learn that hundreds of tons of hypo. are annually used by paper manufacturers. In fact, a friend of mine was told by a member of one of the largest firms that it was impossible to do without hypo. Napoleon I. once said that there was no such thing as an impossibility; still the paper makers seem to find one here. I mentioned at the last meeting some of the results I had got with about sixteen faded cabinet portraits with which I had provided myself. I omitted to state that they were taken by the leading London photographers. They were all portraits of celebrities, and had been shown in our windows in Renfield-street. They were exposed to the full blaze of the sun all afternoon and to the effects of gas at night. Some of them had been in stock three or four months; others twelve months. In every case I found traces of hypo., and in several free sulphuric acid was present. Three mounts were analysed. The first contained in an aqueous solution hypo., sulphates, and starch. In an acid solution there were traces of iron and lime, a considerable quantity of potash, and a good deal of soda. In this mount there was no excess of acid. In an aqueous solution of the second were found faint traces of hypo., sulphates, and chlorine. In the ash were iron, lime, potash, soda, strontium, and alumina; also a considerable quantity of free sulphuric acid. The last—the only one which resisted all tests—was a black one. It was free from hypo. and sulphates, although subjected to more severe tests than any of the others. It was neutral to test paper. I might also mention that I have tested a number of sample mounts belonging to various London and local dealers. I found that they all contained the same impurities, although varying in quantity. Before sitting down I would like to ask some of those present for their experience of gold bevelled-edged cards. There seems to be something in the colouring matter of the chocolate which is almost fatal to silver prints. The black mounts are the same, though in a less degree. The gum alone does not seem to injure the prints. In one case I had a *carte* photograph which faded so completely that the faces were flat and pale—so much so as to be unfit for use. All this took place in about three weeks. It was mounted on a chocolate card. In conclusion: I may just mention that white and yellow cards appeared to contain most free acid, while those of darker colours were mostly neutral to litmus paper.

An interesting discussion followed, and the meeting terminated with a vote of thanks to Mr. Duthie and the Chairman.

COVENTRY AND MIDLAND PHOTOGRAPHIC SOCIETY.

THE ordinary monthly meeting of this Society was held at the Coventry Dispensary,—Mr. Danks in the chair. After the usual business,

The Chairman called upon Mr. Arthur Seymour to read his paper on *Old Dry-Plate Processes*.

Mr. SEYMOUR said he began photography about the year 1858 by the successful dry-plate process of Fothergill, which was first introduced on the 18th May in that year. He then went on to speak of the troubles of a beginner, &c., and gave a general description of the process. A strong neutral silver bath, an old collodion, a careful washing, and extreme cleanliness seemed to be the chief points upon which success depended. The developer he used was the pyro.-acetic, with the addition of a few drops of a weak solution of nitrate of silver. The exposure in a fair light was from two to three minutes, and Mr. Seymour spoke feelingly of the bygone pleasure of seeing the image grow under the developer—a pleasure which is lost in the newer gelatine process. He also showed some negatives taken on oxymel plates, and also some on the meta-gelatine plates of Dr. Hill

Norris, which were much admired. He regretted he could not stay longer that evening having another appointment, and apologised for leaving so early.

A vote of thanks was unanimously passed to Mr. Seymour for his interesting paper.

The SECRETARY then asked each member present to accept a box of Mr. S. J. Lloyd's new mountant, whose qualities for sticking, keeping, &c., were known by several members present to be excellent. He also handed round some German sensitised paper for trial.

Mr. H. MOUNTFORT said he could recommend chloride of iron for reducing over-printed proofs (to be used after toning and fixing).

The meeting adjourned in the usual manner about ten o'clock.

LOCHEE PHOTOGRAPHIC CLUB.

ON the 29th ultimo, the Lochee Photographic Club held their first annual exhibition and *conversazione* in the Victoria Hall. The room was elegantly set off for the occasion, the platform being fitted up with all the draperies and machinery of a stage, in a most complete and effective manner. The walls were hung with a variety of specimens of the work of the members of the Club, including portraits, from the ordinary *carte* to the "life size" picture, many of them being splendid specimens of the art, both for minute accuracy of likeness and artistic pose and finish. The landscapes were numerous and formed a fine collection.

BAILIE OGILVIE, the President of the Club, presided, and, in opening the proceedings, said that the Club, whose first annual *conversazione* they were holding that night, was only originated in April last year, and although their existence had been but brief, still there had been diligent and persevering application to work, with what effect the audience could judge from the examples hanging around them. The Bailie then gave a *resumé* of the history of photography from its invention, forty-five years ago, by M. Daguerre, tracing its gradual but rapid development from then till now.

During the evening a number of photographs was shown by means of the magic lantern, which were much admired. A select programme of music was gone through by several accomplished amateurs. A dramatic sketch, entitled "Photographers in a Fix," was performed by members of the Club. The piece was capitally got up, and the various characters were delineated with marked ability and success. The performance excited most exuberant merriment among the audience, and proved thoroughly enjoyable. The whole entertainment passed off with the greatest *eclât*.

Correspondence.

DARK-ROOM ILLUMINATION.

To the EDITORS.

GENTLEMEN,—After the exhaustive correspondence and discussions on the subject of colour medium for illuminating the dark room, it seems to me time to inquire what practical conclusions may be drawn from the recent investigations. Experimentalists seem pretty well agreed that we may safely, and with advantage to our eyes, discard the ruby medium, and that yellow alone, or with the addition of green, is now recognised as "the happy medium."

I agree with one of your correspondents who considers that the safest colour for a medium should be the *complementary* of that which is most active in chemical force upon our sensitive plates. Admitting the latter to be violet, its complementary yellow, which is well represented in canary medium, should be all-sufficient as to quality; and so in practice it appears to be, where the quantity and direction of the light are properly regulated.

In my opinion Mr. H. S. Starnes is correct in advocating the practice of cutting off direct light and working by reflected light. I have long worked upon that principle, by setting up an opaque screen between the source of light and my developing dish, so that all the light falling upon the plate is weakened by reflection and diffusion. One may thus have abundance of light in the room, and yet controlled from doing mischief.

Those who develope by daylight require some arrangement capable of ready adjustment to the varying strength of the light outside. Even upon a window in an aspect free from sunlight the amount of light varies so much at different times and seasons that it requires a convenient means of control. To the amateur who has but one room for all operations the means of admitting more or less light according to circumstances is most important. To accomplish this end I would suggest having a frame to fit the window, or the upper portion of it, covered on the outer side with canary paper, mounted with rotating laths—in fact, a Venetian blind—so set that no direct light should pass through it, but be thrown upwards, with, if necessary, a yellow screen overhead to catch and reflect the light down again. The lower part of the frame for about a foot above the level of the developing-dish should be made opaque. The advantage of such an arrangement is that the amount of light would be under control by opening or closing the apertures, and, when more light is required for the subsequent operations, it may be instantly secured by reversing the laths.

With these few hints to all whom they may concern I must leave each operator to adapt the details of arrangement to his own special conditions and requirements.—I am, yours, &c., G. S. PENNY.

Cheltenham, March 3, 1884.

SODIC SULPHITE.

To the EDITORS.

GENTLEMEN,—"Free Lance" says he gets a stain on his fingers notwithstanding the use of sodic sulphite. I am glad to have his countenance in its use; but really if he used an old kitchen or pocket knife to raise up his plates for inspection he need not soil them. Fortunately the stain is readily removed. Let him add a few drops of acid—either hydrochloric or sulphuric—to a little water, or put in a few crystals of citric acid until acidulation is produced, and on dipping the fingers in and rubbing it over the stains will disappear.

I have already said I differ totally from Mr. B. J. Edwards on his assertion that inferior pictures are produced by sodic sulphite. Had this been so, it would have been found out and commented on before now. So far is this from being the case, that pictures of the most exquisite qualities are produced rapidly by persons who would at once give it up if quality were lacking. I have only found one make of plate unsuited to it after trying almost all known brands.

On the question of whether sodic sulphite does or does not preserve the developer clear and prevent the usual muddy precipitate, any one can test it by pouring into a glass measure for examination the fluid used in developing. I should not have conceived it possible to call it in question.—I am, yours, &c., SAMUEL FRY.

Kingston-on-Thames, March 4, 1884.

To the EDITORS.

GENTLEMEN,—I should be glad to learn the best way to mix the sulphite of soda so as to make up a stock solution after the manner of Edwards's formula. Mr. H. B. Berkeley says:—"Mix the citric acid in water, then the sulphite of soda, and add to the pyro."

To make up a stock solution I dissolved sixty grains of citric acid in seven ounces of boiling distilled water, then two ounces of sulphite of soda, and when cool enough I poured it into a one-ounce bottle of pyro.; but by the time I had used one half of it the rest had become discoloured almost like claret. Is there any remedy for this?

As regards the amount of citric acid used to preserve the pyrogallic *without sulphite*: it seemed to me that the negatives were more brilliant with a full dose of the acid. Of course as little as twenty grains will preserve an ounce of pyro. a reasonable time; but are the resulting negatives as good? I think not. Perhaps Mr. A. Cowan might have something to say on this matter. His opinion would at least be valued by—Yours, &c., H. W. B.

Edinburgh, March 3, 1884.

LANTERN SLIDES.

To the EDITORS.

GENTLEMEN,—In your report of the last meeting of the Photographic Society I am credited with having shown some slides prepared with "*wet collodion.*" The statement is a little unfortunate, as the slides in question were upon slow commercial gelatino-bromide plates; and the only object I had in exhibiting them was to show what results could be obtained with these convenient materials even by unskilled hands.

The subject is well worth further experiments; for, as a rule, negatives taken by amateurs will not permit them to use direct contact printing with the great advantages this offers. A great number of gelatine bromide slides were passed through the lanterns last Tuesday; and, so far as I could judge, they would fully meet the requirements of an amateur. When thrown on the screen these pictures were very clear, soft, and vigorous, and of a warm black colour; but it was proved that a great range of tints could be obtained by altering the developer.

My own specimens were reduced from whole-plate negatives by camera with artificial light; and from a good negative it is easy to secure absolutely clear lights and a warm black transparency. I found it necessary to give a full exposure, and to use a rapid developer (sulpho-pyrogallol), followed by Cowell's clearing solution and a final rinse in dilute nitric acid.

No doubt, much depends upon the plate. I have tried four lots, but can only get good results from those by one particular maker.—I am, yours, &c., H. A. MONCRIEFF.

March 4, 1884.

SINGULAR LUMINOSITY OF THE ARGENTIC-BROMIDE GELATINE FILM.

To the EDITORS.

GENTLEMEN,—Allow me to point out to Mr. H. H. Cunningham the probability that the greenish-blue light he refers to is nothing more than the *complementary colour* of his two thicknesses of orange-coloured paper produced on the retina of the eye.—I am, yours, &c., A. S.

March 3, 1884.

BIRMINGHAM AND MIDLAND INSTITUTE SCIENTIFIC SOCIETY: PHOTOGRAPHIC SECTION.

To the EDITORS.

GENTLEMEN,—I beg to inform those correspondents who have been inquiring for a photographic society for Birmingham that the Birmingham and Midland Institute Scientific Society has a photographic section open to all persons connected with the Institute, and, therefore, at a nominal cost to anyone interested.—I am, yours, &c., C. J. WATSON.

34, *Smallbrook-street, Birmingham, February* 29, 1884.

GREEN FOG.

To the EDITORS.

GENTLEMEN,—A very singular fact in connection with green fog in gelatine plates came under my notice a few days since, which, being quite beyond my comprehension, I will, with your permission, briefly describe in the Journal, as it may tend, perhaps, to throw some light on this unwelcome phenomenon.

I was asked, on going into a professional friend's studio, to look at some negatives that he had lately taken on some plates of his own make, and developed with alkaline pyro. I at once said—"Well, there is, certainly, plenty of green about them." "Yes," replied he; "but look at the portion about the middle, on which the plate rested on the pneumatic holder while they were being coated." And, lo! *not a sign of it there!* He will be very happy to send you up one or two of the negatives if you would wish to see them.

Will some of my more experienced brethren kindly explain this?—I am, yours, &c., HENRY B. HARE.

Great Elm Rectory, February 28, 1881.

[We shall be interested in seeing a specimen of this curious phenomenon.—EDS.]

"FREE LANCE" AND PHOTOGRAPHIC PERSPECTIVE.

To the EDITORS.

GENTLEMEN,—In reply to "Free Lance," in your issue of February 29th, permit me to thank him most cordially for his good opinion of my lecture, *Camera Lucida*, &c., and also to own my mistake regarding that misleading passage to which he refers. The fact is that I was mislead through seeing so many photographs out of perspective as regards the lines of buildings—objects thrust too close to the camera, &c.

Since writing my lecture I have seen instruments which correct all these errors, and also some expedients. These I thought impossible in the art of photography, which increase my wonder and speculation as to the future of the science, so convinced am I that we are but at the gateway of photographic discovery and utility.

Tonight, when coming home, a botanical friend informed me that he has been taking some microscopic specimens with the camera, thus:—He unscrews the ordinary lens and inserts his microscopic glass instead. In this way he is able to make photographic enlargements direct from nature. Before long we shall hear of some great spirit discovering the art of photographing the *blues* in nature with the *browns*, and this will be the "beginning of the end."

Again thanking "Free Lance,"—I am, yours, &c.,

72, Princes-street, Edinburgh, March 3, 1884. HUME NISBET.

To the EDITORS.

GENTLEMEN,—In your last issue "Free Lance" criticises Mr. Hume Nisbet's paper in your Journal of January 18, 1884, but he did not explain how far his ("Free Lance's") picture was to be from the eye to cover the whole of the landscape or part. I suppose that the focal distance of the lens which he used for his picture and the axis of both picture and landscape are what he means when he talks of exact superposition.

The foot-note of Mr. Nisbet is, I consider, perfectly illogical, inasmuch as he states:—"The photograph is most to be relied upon for truth in all except perspective;" that is to say, that the smaller details are useful to him.

Now, if the perspective of the *whole* be defective, it is very evident that the perspective of the *smaller parts* will suffer proportionately; and it is a pity that an artist should lose himself by copying such, as they would only teach him to err.—I am, yours, &c., COLESWEGEN.

March 4, 1884.

Notes and Queries.

NEGATIVE wishes to know how to make negative varnish by the aid of white hard spirit varnish. Let him dilute it with an equal volume of strong alcohol, and add two or three drops of castor oil per ounce.

I WANT information as to the tariff or duty on the importation of dry plates in America; also relative cost of plates and general materials in America compared with Britain; and, lastly, whether English plates are used there.—R. CAMERON, Maryhall-street, Kirkcaldy.

H. RICKETTS desires to know if a certain card mount (a specimen of which he encloses) is likely to cause a print to fade. We think not. He also inquires why the burnisher leaves a mark in one place more than another. This arises from his having made a temporary stoppage at the place in question.

G. O. MARR sends us a list of views of Westminster Abbey and other public buildings in London which he would like to obtain if he knew to whom to apply for the same. This list also includes a view of Dover from Folkestone. Had he not better specify his wants in our advertising columns, giving his name and address? He would meet with many responses.

WILL some experienced photographer kindly advise me as to the best way to pay a landscape operator; also a fair salary for a good one? I also want to know the best way to heat a printing and storing room, with work-room above, which I am building; and a good way to arrange the printing-room which is a large one. Also the best and easiest way to name and number landscape negatives, to show well on the prints.—A BEGINNER.

T. D. says:—Will you kindly inform me of the best publication on retouching and enlarging for amateurs, and oblige?——In reply: Let "T. D." consult our ALMANAC for 1878, and in it he will find a series of chapters entitled *The Modern Practice of Enlarging*, in which is given all the necessary information. As regards the subject of "retouching," we shall have to refer him to the previous volumes of this Journal, there being no work at present in the market devoted to it. A treatise by Burrows and Colton was the last that was published, and although out of print, in the commercial sense of the term, a spare copy may possibly still be had at some of the dealers in photographic materials and literature.

G. B. inquires by what means he can get his customers brought into the habit of paying when giving their orders.——In reply: Let him place a printed announcement in his reception-room that on and after the first of next month (April although it be) no portrait will be taken unless upon the presentation of the receipt for the amount of the order to the superintendent of the operating-room.

WOULD you kindly inform me of the nature of the velvet roller used and exhibited by Mr. T. Bolas, F.C.S., in his recent lecture on *Photo-Mechanical Printing?*—1. Whether an ordinary lithographic roller covered over with velvet would do, or must it be a specially-prepared kind of roller, and if they can be had commercially?—2. Having procured a velvet roller, is the roller manipulated in the same way as the lithographic one, namely, rolled up in litho. greasy ink, and then passed over the exposed gelatine print; that is, was it simply by substituting a velvet roller for a lithographic one that the great difference between the two transfers was produced?—TRANSFERER.——Will some "expert" kindly answer these queries?

IN your next issue can you tell me how to prepare, and what medium to use, in colouring photographs? In using water colours the paint rubs off; besides, it is very difficult to get on. I have tried gum water, but on large surfaces it does not answer, and in oils I am anything but successful. Any information, with name of a work on photographic painting, will greatly oblige—W. C. HARRIS.——In reply: When water colour does not readily "take" to the surface of an albumenised print, the simple expedient of applying the tongue to the surface will effect a union. But the leading manufacturers of water colours supply prepared ox-gall, specially intended for such a purpose. We have seen a "medium" which was very useful for mixing with water colours, but have a strong idea it was composed in a large measure of ox-gall.

I HAVE a 10 × 8 rapid rectilinear lens, by Dallmeyer, and a 9 × 7 portable symmetrical, by Ross. By using a small stop would either of the above cover a plate 15 × 12? I also have a Ross' No. 3 cabinet portrait lens. Which would you prefer for taking cabinets or large heads in the studio? I find the Ross' portable very slow for studio work.—S. J. B.——In reply: The Ross' "portable" is not intended or adapted for the purpose mentioned. For cabinet portraits in the studio the cabinet lens is preferable to any others. For large heads either the rapid rectilinear or the front lens of the cabinet objective may be employed. Either of the two first lenses specified by "S. J. B." will cover a 15 × 12 plate, provided the front or back lenses alone are employed. For ascertaining the circumstances under which they do so, we must refer him to a series of articles on the *Optics of Photography and Photographic Lenses*, in our last volume.

E. J. says:—Last summer I attempted a large number of instantaneous photographs of cabinet size, with a single landscape lens of ten inches focus and George Smith's blind shutter. These views included persons walking. Three views out of four failed. If the shutter were worked quickly the negatives fogged over before the details were out. When the shutter was worked less quickly the figures were blurred. I have a new Ross' "universal" lens of ten inches equivalent focus which I propose to have fitted up with ——'s new shutter, for use on the same class of view; but before purchasing this shutter I beg leave to ask you whether any other shutter would be preferable, and whether (having the "universal") it would be worth my while to buy at the same time any other form of lens.—E. J. W.——In reply: The negatives having fogged when the shutters was worked quickly merely indicates that "E. J. W." had not acquired a mastery over the best method of developing the negatives, and he must subject himself to a course of education to prevent the recurrence of this. The "universal" lens named is capable of giving a well-exposed negative with any (even the quickest-acting) shutter at present procurable. We assume, of course, that the subject is an outdoor one, and that the light is good.

If "Inquirer," in last week's Journal, will apply a paper knife to his prints, giving them a slight curl in the direction opposite to that at which they are now, he will get his prints to remain sufficiently flat. If he desire a polish, why not surface the prints with collodion and gelatine according to the glacé process?—F. R.

Exchange Column.

No charge is made for inserting these announcements; but in no case do we insert any article merely OFFERED FOR SALE, *that being done at a small cost in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a* NOM DE PLUME *be thought desirable), otherwise the notice will not appear.*

I will exchange good English gold and other frames for good photographic apparatus.—Address, JOHN LEWIS, Gladstone-road, Sparkbrook, Birmingham.

I will exchange a tripod stand, whole-plate camera, sliding-body, and portrait lens, by Jamin, for whole-plate bellows-body camera, in perfect order.—Address, WALLACE FIDLER, artist and photographer, Cavendish-street, Chesterfield.

I will exchange an 8½ × 6½ camera, for cabinets and *cartes*, by Ottewill, a 10 × 8 ditto, a landscape lens, for 12 × 10 and upwards, by Grubb, THE BRITISH JOURNAL OF PHOTOGRAPHY and the *Photographic News* for the past year, 1,000 *carte* mounts enamelled and gilt edged, a silver watch, gold studs, and a lot of rare postage stamps, for a good second-hand lens, or anything useful.—Address, E. G. G., Sherwood Villa, New Southgate, N.

Wanted, Ross's portable symmetrical, No. 3, in exchange for a capital whole-plate portrait lens, with rack and pinion.—Address, PHOTOGRAPHER, Cambray Studio, Cheltenham.

I will exchange an English concertina, forty-eight keys, in rosewood lock-up case, perfect order, splendid toned violin, gentleman's silver Geneva watch, quite new, warranted in perfect order. Wanted, a 15 × 12 camera, Kinnear or other good maker, suitable for dry-plate work, with double slides, folding tripod stand for whole-plate Kinnear camera, backgrounds, or other useful accessories.—Address, J. B. SMITHSON, Leyburn, Yorkshire.

What offers for THE BRITISH JOURNAL OF PHOTOGRAPHY, from January, 1877, to December, 1883, clean and perfect, about half a ream of white Saxe albumenised paper, four pints Sœhneé negative varnish, and quarter-plate walnut camera with lens, fitted with Waterhouse's stops? Wanted, $8\frac{1}{2} \times 6\frac{1}{2}$ or 10 × 8 camera, in good condition, with sliding-body preferred, and good cabinet lens.—Address, G. H. E. SUTTON, 47, Crown-street, Bluebell-hill, Nottingham.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPHS REGISTERED.—

William Child, photographer, 14, Wellington-street, Leeds. — *Three Photographs, of John Barran, Esq., M.P. for Leeds.*

John Horsburgh, 131, Princes-street, Edinburgh.—*Four Photographs of Mr. John Bannister as Lord Beaconsfield and Mr. Gladstone.*

John Yeoman, The Villas, Bedale, Yorks.—*Photograph of an Address Presented to the Marquis of Carmarthen on his Marriage with Lady Catherine P. Lambton.*

NOTICE.—*Each Correspondent is required to enclose his name and address, although not necessarily for publication. Communications may, when thought desirable, appear under a* NOM DE PLUME *as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.*

WILLIAM.—We have not lost sight of the matter. All in good time.

F. EVANS.—Warnerke's standard sensitometer is supplied by Messrs. Marion and Co., Soho-square, W.

A DEVONSHIRE AMATEUR.—Any camera-maker will supply the necessary appliances. The cost will probably not exceed a couple of pounds. The apparatus is not patented.

G. B. BLIGHT.—Your best plan, for the small quantity you require, will be to purchase the indian ink in the fluid form. This you will be able to do from any artists' colourman.

NEMESIS.—Certainly, you *can* make gelatine from parchment cuttings; but we fear that it will not be worth your while to manufacture it in that way for emulsion-making.

A. S. YEOMAN.—You evidently take far too desponding a view of the situation. Bear in mind that "there are as good fish in the sea as ever were caught." Take heart and persevere.

ARTIST.—The most—indeed the only—satisfactory method of producing photographs on ivory is by the carbon process, which is by double transfer from a flexible support. You will not succeed, we fear, by silver printing.

SALOP.—There is little wonder that you cannot get fully-exposed "instantaneous pictures" with the "rapid lens" if you stop it down to the extent you have done. To succeed, you must employ the full, or very nearly full, aperture.

WILLIAM MILLER.—Yes; you will, practically, get better instantaneous pictures with the larger of the two lenses, inasmuch as on the size of plate you are working you will be enabled to employ a larger aperture; consequently, in practice, you will be able to work quicker and yet get good definition over all portions of the picture.

IMPROVER.—Your best plan will be to advertise for an appointment as assistant operator in some good house. If you can show some moderately-good work of your own we do not think the fact of your now being engaged in a third-rate studio will be any drawback to your securing employment as assistant in a first-class house.

B. C. A.—If the stains cannot be removed by either of the methods you have tried the opal glass must be reground. This is not a difficult matter. Procure some *fine* graining sand from a lithographic printers' material dealer. Sprinkle a little of this on the opal, wet it with water, and then grind it, using a small piece of plate glass as a muller.

E. BEVERIDGE.—No. 1 on your list will be the most rapid of the three, and, if you wish to take instantaneous views as well as landscapes, certainly it will be the most generally useful. For the size of plate you are working upon, and taking into consideration the lenses you already possess, the shortest focus (the thirteen-inch) will answer your requirements. For a sixteen-inch focus lens for pure landscape work one of the lenses in the eight-inch "rapid" will answer well if stopped down.

R. S. J.—You are, in our opinion, decidedly in the wrong. You are apprenticed to learn the business of a photographer. Surely cleaning glass, even if old negatives, is something that you require to learn; so also is mounting and rolling prints. All this is legitimate, and you certainly are not justified, in the eye of the law, in refusing to carry out your employer's instructions in these matters. If he were to take you before a magistrate for refusing to do your work you would find yourself in a very unpleasant position.

CHAS. G. WILLIAMS.—What kind of surface do you wish to sensitise? How is it possible for us to answer such a query as "how to sensitise a surface" without knowing more of your requirements?

C. A. BREWSTER.—The views are very good, but nothing at all extraordinary, as you appear to imagine. When you have had more experience we shall not be surprised if you are not so proud of them as now.

MABLE.—All will depend upon circumstances. In some cases it is better to purchase a business; but, if you are a good business man as well as a good photographer, it might possibly answer your purpose to commence a new business rather than purchase an old one. You must, however, bear in mind that to start a new concern in the modern style will, with the construction of the studio, involve a considerable amount of capital. Added to this you must be prepared at first to lose some money, as the profits cannot be expected to flow in from the commencement.

PHOTOGRAPHIC CLUB.—At the forthcoming meeting of this Club, at Anderton's Hotel, Fleet-street, on Wednesday next, the 12th, inst., the subject for discussion will be—*On Dark Room Illumination.*

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—The next meeting of this Society will be held on Tuesday next, the 11th instant, at 8 p.m., at the Gallery, 5A, Pall Mall East, when a paper on *Illumination of the Dark Room* will be read by Captain Abney, R.E., F.R.S.

CALCUTTA EXHIBITION.—A cable message has been received intimating that a gold medal has been awarded to Mr. J. H. Steward, optician to the Government, 406, Strand, London, for his exhibits of triple and biunial lanterns, telescopes, field glasses, and scientific instruments.

LONDON GAZETTE, *Friday, February* 29, 1884.

SCOTCH SEQUESTRATION.

ALEXANDER SIMPSON AND THOMAS HARIOAD DOUGLAS, trading as Simpson and Co., 34, Constitution-street, Leith, photographers.

Tuesday, March 4, 1884.

PARTNERSHIP DISSOLVED.

ALFRED EDWARD FOX, JOSEPH WALTER BUSH, AND CHRISTOPHER FOX, trading as Fox, Bush, and Fox, Commercial-buildings, Bridge-street, Bradford, and 123, Witham-street, Kingston-upon-Hull, photographers and portrait painters.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. STEWARD, Optician,
For three Weeks ending March 5, 1884.
THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

Feb.	Barometer.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max. Shade Temp.	Min. Tem.	Remarks.
14	30·14	W	50	48	—	51	46	Overcast.
15	30·03	E	42	41	—	43	40	Cloudy.
16	30·12	E	38	35	—	42	33	Fine.
18	29·90	SE	37	34	—	45	34	Fine.
19	29·78	SE	42	42	—	50	35	Raining.
20	29·88	SW	41	46	—	52	47	Cloudy.
21	29·77	S	45	44	—	53	44	Cloudy.
22	29·69	SW	47	45	—	53	44	Cloudy.
23	29·59	W	43	41	—	51	40	Cloudy.
25	29·90	W	41	39	—	50	36	Foggy.
26	29·95	W	42	40	—	47	38	Foggy.
27	30·02	SE	37	36	—	—	34	Foggy.
28	—	—	—	—	—	—	—	—
29	29·95	E	37	34	—	43	33	Cloudy.
March 1	29·98	SE	34	33	—	46	30	Hazy.
3	29·95	SSE	38	36	—	46	31	Overcast.
4	29 68	SW	46	45	—	52	36	Raining.
5	30·09	W	42	40	—	50	39	Bright & Clear.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1245. Vol. XXXI.—MARCH 14, 1884.

A NEW METHOD OF KEEPING EMULSION.

Circumstances very frequently arise under which it is desirable to make a considerable quantity of emulsion which cannot be used up at once. We speak now more especially of amateur practice, though the same argument will hold good with professional photographers who may prefer to make their own plates.

In order to secure uniformity in sensitiveness and other qualities it has been a practice, in many cases, to mix together several small batches of emulsion, and so "average" the qualities—good and bad—of all. But in proceeding on these lines a difficulty arises in the fact that, though the mixture of numerous samples of emulsion, when newly put together, may represent uniformity of character in its best degree, still that mixture must be spread upon glass and dried as soon as possible in order to utilise to the full the advantages of uniformity. In other words, the emulsion must be used up at once in order to avoid decomposition, partial or total, and alteration in sensitiveness, both of which may accrue from keeping.

The trouble involved in the operation of drying emulsion in order to make it into "pellicle"—as it has been called in the dry state—is sufficiently great to deter many or most small consumers from adopting that plan, which otherwise seems to offer a fair chance of securing absolute uniformity in different portions of the same bulk of emulsion, though they may be used at widely-different intervals of time.

The conversion of emulsion into pellicle for the purpose of commercial supply is a branch of the dry-plate maker's business which is, to our mind, greatly and unwisely neglected. Very many—both amateurs and professionals—who now decline to use "bought plates" would not hesitate to adopt a commercial emulsion if it could be placed before them in a practical form. Many and loud are the complaints which reach *us* of trivial faults in this or that maker's plates—faults which the complainants themselves acknowledge are only mechanical and not in any way connected with the emulsion itself. Bad quality of glass is the most general complaint. Inequality, irregularity, or absolute incorrectness in cutting to size is another; and defective packing arrangements and many others form a tolerably long list of faults which are beyond the control of the consumer, who would be glad in many cases that have actually come under our notice to continue using the *films* to which he has become accustomed, and found satisfactory in quality, if they were only supplied to him in a usable form—that is, on good glass and cut to proper size.

This or these difficulties would be quite met if dry-plate manufacturers would supply a guaranteed emulsion — such as they themselves employ in their own practice—in such a form that, while it has keeping qualities, it is ready at any moment for the photographer himself to apply to whatever quality of glass he may choose to employ and in any fashion. Such a system would be an actual advantage to the plate-maker, inasmuch as, provided the emulsion be all right, he will be absolved of all mechanical sins.

It is possible, however, on the smallest scale, to prepare an emulsion which will keep for any reasonable time, and thus dispense with the aid of the professional plate-maker if he decline to adopt the system; indeed, if amateurs could only, by (as it were) making "one bite at the cherry," get over the difficulty of preparing emulsion for a season's work with one expenditure of trouble and upsetting of ordinary arrangements, there would be many more amateur plate-makers than there are at present. The method we propose describing in brief will enable this to be done on either the small or large scale.

Everybody nowadays is familiar with the famous (or infamous) "graph" printing surfaces, composed simply of gelatine and glycerine. Most of us if not intimate at the present day at least remember at some period of our existence the form of confection known as "jujubes," which will be also found to be composed mainly of gelatine, sugar, and glycerine. Now, neither of these preparations—the chromograph mixture or the jujube—shows the slightest tendency to decomposition or loss of strength in the gelatine, however long they may be kept; hence we may calculate that the preservative action of the glycerine and saccharine matter is worth consideration from a photographic point of view.

As a matter of fact—led in that direction by the ideas given above—we have been experimenting with an emulsion for keeping purposes with results that we venture to think will commend the process to many more than those who merely want to save trouble in the preparation of their plates. There are many possible applications of the principle or principles involved, but we shall deal only with one in the present article, namely, the preparation of a "keeping" emulsion in a portable form.

This preparation, whatever may be the actual shape in which it is finally moulded, is practically a "chromograph" mixture *plus* bromide of silver; that is to say, a mixture of gelatine, glycerine, and bromide of silver, with as small a quantity of water as possible.

The sensitive salt is formed by one or other of the "precipitation" methods. We do not recommend any special one, all being equally applicable. The bromide, having been prepared in a fine state of division and washed free of all soluble matter, is mixed with the gelatine and glycium, so as to form a very strong jelly (if the form in which we are accustomed to find jujubes can be called "jelly"), in which state the preservative or antiseptic action of the glycerine will suffice to render the preparation practically indestructible.

Here is a formula briefly given, as we shall have to return to the subject in different phases subsequently:—

Silver nitrate	480 grains.
Potassium bromide	360 „

Mix and precipitate by any of the well-known methods. To the precipitated bromide thus obtained add—

Gelatine	1 ounce.
Glycerine	1 „
Water	2 ounces.
Alcohol	1 ounce.
Salicylic acid	5 grains.

Shred the gelatine very finely, and throw it into the vessel containing the silver bromide. Mix the glycerine and water, pour into the same vessel, and allow to soak, stirring at intervals in order to bring every portion of the gelatine into contact with the aqueous glycerine. After an hour or two apply heat, and liquefy with constant stirring in order to render the mixture homogeneous. When all the gelatine is dissolved and the bromide equally spread throughout the solution heat the alcohol in a glass flask, and, having dissolved the salicylic acid therein, pour it gradually into the gelatino-bromide mixture, stirring vigorously for some time. Then allow the whole to "set," and the preparation is complete.

When quite cold this will be found to form a hard, solid mass, which presents a slight tackiness and may be handled with as little inconvenience or danger as if it were perfectly desiccated. The preservative action of the glycerine suffices to keep it for practically any length of time, and it is ready for use in a very short period when required.

The method of use and other applications we must postpone until next week; meanwhile we can fully recommend our readers to try this method in view of the approaching season.

THE PHOTOGRAPHIC USES OF A NICOL PRISM.

In an article in our last issue, on *Polarised Light*, we spoke of a bundle of nine or ten glass plates as the most effective source of polarisation, when the object to be attained is the projection of crystalline or other structures on the screen by means of the lantern.

It will readily be understood, however, that the formation of an image, when such an obstacle is interposed in the path between the object itself and the objective, will be, practically, impossible, on account of the great number of reflections and refractions to which it is necessarily subjected by a series of transmissions through nine plates almost indefinitely multiplied. For this reason, although the bundle answers quite well for polarising a beam of light, it cannot be admitted as a factor in the transmission of those rays which are *en route* towards the formation of an image, or as part of an optical system engaged in such formation.

This will be well understood from the following:—Let a bundle of nine plates be interposed at the polarising angle between the eye and any well-lighted object of a marked character, and it will be found that, apart altogether from the loss of light sustained, distinct vision cannot be obtained.

Quite contrary to this is the nature of the image observed when employing the Nicol prism as a means of observation. No displacement and consequent confusion are created by its agency, and hence it may be fittingly interposed between an object and its image without affecting the formation of the latter, except as regards the polarisation of the rays by which it is formed. It thus becomes, in the present state of our knowledge of the properties of substances, the most perfect means by which photography is capable of being employed in connection with polarised light. We may here state that the included angle in all photographs of the character under consideration is necessarily very small. Although subject, however, to this drawback, they possess a utility difficult to over-estimate. A few of the services capable of being rendered to photography by the Nicol prism will now be described.

In referring to the means by which certain classes of foliage may be photographed we may, first of all, direct attention to the fact that when looking upon a mass of foliage having smooth, shining leaves, which reflect light freely, this tendency is found to predominate to such an extent that all attempts to photograph them result only in total failure in representing them as they really exist. The photograph will show them as if the leaves were covered with snow. Now look at them through a Nicol prism, and rotate it slowly until the polarised rays reflected from the leaves are stopped by or absorbed in the prism, and then the glitter and the reflection are lost, and the surfaces of the leaves become as if formed of green velvet, the other portions of the vegetable structure undergoing no change.

To apply this to the photographic lens: the best form of objective to which we have yet attached a prism is the ordinary landscape combination, consisting of a single achromatic plano-convex or meniscus lens, having a diaphragm in front and a tubular projection in front of the diaphragm in which to insert the prism, the fittings sufficiently loose to permit of the prism being easily rotated. The prism must be large—certainly of larger dimensions than the diaphragm. Having focussed the foliage, rotate the prism until the reflected light from the leaves has been depolarised, and then let the exposure be made. For purposes of comparison a second negative should be taken immediately afterwards without depolarising the light. The difference between the two will be found most marked.

The glare reflected from the surface of water will, under most conditions, be found to consist of polarised light. We need scarcely remark that under certain circumstances, when walking by the side of a stream from which light is brightly reflected, it is impossible, because of this reflection, to see not only the bottom but, even below the surface to any extent whatever. Now let the services of the Nicol prism be utilised as an eyepiece (we may here say that this prism neither magnifies nor diminishes the object examined), and upon rotating it slowly, as before, a point is reached at which the reflected light becomes extinct, and the surface of the water no longer forms a barrier to the investigation of the contents of the water and of the bottom. Fish, where present, along with other objects previously quite invisible, are plainly seen through the pellucid water now deprived of the power of interposing its reflections between the eyes of the observer and the treasures held in its depths. What the eye here distinguishes, that can the camera photograph under the circumstances of depolarisation described as being necessary in connection with foliage.

It is well known to all who are familiar with the phenomena of polarisation that the pure blue sky in the north, when viewed at a height of about 45°, radiates polarised light in rich profusion. If an examination be made by means of the Nicol prism this portion of the sky will appear dark to a degree more or less marked according to the special part examined and the rotatory position of the prism. Now repeat this examination when a small fleecy cloud (so feeble in its luminous radiations as to be scarcely visible) moves across that portion of the sky, and the curious phenomenon of a nearly pure white cloud upon a black ground is witnessed. We have here merely to repeat that what is thus discerned by the observer's eye may, by the means previously described, be delineated upon the sensitive photographic plate.

Not to speak of selenites and the numerous crystallisations which can be properly seen only by polarised light, there are innumerable objects in both the vegetable and animal kingdom which would defy the utmost skill of the scientist to photograph were he not aided by polarisation. Let him, by way of example, try to reproduce photographically, by means of ordinary light, a thin section of a rhinoceros' horn, a pellicle of the skin of an onion, a thin crystal of hyposulphite or carbonate of soda produced by evaporating upon glass a weak solution, sugar, hippuric acid, tartaric acid, silver nitrate, and other articles which could be enumerated by the hundred, and what a signal failure must he experience! These articles have form and richly-varied internal structure, but the eye of the most skilled observer and also the eye of the camera are blind to their beauties. Let but a ray of polarised light illumine them and instantly they undergo a change—not in their nature, but in their visibility. Their wonderful structure stands revealed, each portion in colour differing from another, their backgrounds being black, blue, red, green, purple, orange, or one of the many bright hues capable of being obtained by the agency of selenites. Any colour or ground may be produced at will without affecting the object itself, and this affords the photographer an opportunity of selecting that which contrasts best with the character of the object being photographed.

A SAFE LIGHT.

At one of the monthly technical meetings of the Photographic Society of Great Britain, when Mr. W. E. Debenham's exceedingly-interesting proposal that has of late been so much before photographers was under discussion, we noted a remark made by Mr. Payne Jennings which recent experiments strengthen us in believing to be as true as it was pithy. He said:—"I think that there is not any light which is perfectly safe; therefore, if a valuable negative is being developed, my advice would be not to go too near any light until the image is well out." The gist of the whole discussion is contained in the first part of the sentence, whatever views may be held as to its practical application in the latter half. We have lately been experimenting with a very large number of "safe" lights, and the results have uniformly shown that a safe light does not actually exist. We, of course, refer not to plates specially prepared to register the action of rays of low refrangibility, but to ordinary commercial dry plates, such as would be found in the dark room of any photographer in the kingdom. We unhesitatingly state that we have not yet tried a single one of the so-called "safe lights"—or, more particularly, we should say "light filterers"—which would fail to allow a plate to be acted upon if placed in the most suitable position to receive any actinic radiation, if such were present.

The subject is complicated by many side issues, which, after describing our experiments, we may treat in turn in the endeavour to indicate the practical conclusions that may be drawn from them.

That ruby glass alone is not a safe light has long ago been definitely testified; for the spectroscope proves that it allows some of the blue rays to pass, so that the old two thicknesses of ruby glass would simply slightly lessen the amount passed through. With regard to the effect of different layers of the same coloured light filterer, Mr. A. Cowan's experiments, as narrated in our pages last week, do but give a useful practical exemplification of a well-known fact. Thus Professor Tait, lecturing upon the subject of absorption, &c., says:—"If I take a number of pieces of glass, light which has passed through one of these is capable of passing in greater part or percentage through the next, and what has been sifted through two of them will in still greater percentage pass through the third, and so on." Thus Mr. Cowan proved that when yellow paper had performed its sifting functions upon the light a piece of glass of different colour had far more effective action than two extra thicknesses of paper, while before the light had been sifted it did not equal one sheet.

Our own experiments have been with a large number of aniline dyes, and they were designed so as to assimilate in practice the experience of those who work with artificial light. We tried to find not what was a safe-working distance, but what medium (if any) was safe at any distance. Our coloured screens were placed four inches from a No. 6 bat'swing burner, and gelatine plates of various types were used.

An opaque screen, provided with a small aperture having an arrangement for holding various pieces of coloured glass, was placed in front of the light. We may here say that for coating glass with dyes we found collodion, though giving so fragile a film, far preferable to varnish, as the latter had an unpleasant trick, when strongly coloured, of losing its cohesion and drying in clots—"sessing," as the painters term it. The gelatine plates were placed immediately in front of the flame and one inch from this aperture, which was provided with different glasses, obscured with paper, &c. Leaving on one side the results of the many other dyes we used we will confine our details to the effects of those made with aurine and roseine, they being well known and as effective as any.

It may be well to observe that in all cases we judged of the effect by placing a plate in an ordinary developer for an average length of time, and observed the effect *before* fixing, as a slight impression is more easily seen before than after fixing, and time also is saved.

Plain ruby glass gave a strong impression; double thickness a similar result. The same glass with one thickness of orange tissue paper was plainly impressed in one second; with two thicknesses also strong action was apparent. We then, leaving *in situ* the ruby glass and the two thicknesses of paper, placed a screen of aurine glass, and gave four, ten, and twenty seconds' exposure. The four seconds' exposure gave sufficient proof of action to have utterly ruined any negative.

Next, the paper was removed and ground glass substituted, when, as before, a "snap" exposure gave an impression. Not to make our details too wearisome, we may say we added successively to the screen of ruby and ground glass one screen of aurine, one of roseine, two of aurine, two of roseine, two of aurine, and one of roseine; two of roseine and one of aurine; two of aurine and two of roseine. The colour of the screens was very deep. In every case, if a plate were held before the aperture for such a length of time as an operator working by lamp- or gas-light might hold a negative to ascertain if a face (for example) were "sharp," the light acted sufficiently to produce a decided impression sufficient entirely to mar the brilliancy of a negative if developed out.

It will thus be seen that, so far as our experiments carry us, no screens obstructed all the actinic light, and that, therefore, a "safe" light was not given by them. In practice, however, the negative could never be developed in such a glare; and, if it were held up close to the light to examine it for sharpness or density, it would be nearer the conclusion of the development, when, if even any effect were produced, it would not be allowed to develope out, the negative itself being fully developed, perhaps, at the time when any light-stain produced would only be faintly indicated, if at all. The old idea that light will act slightly or not at all upon a plate wetted with the developing solution is entirely untenable (as anyone can ascertain in a moment by comparison), so that no immunity from fog, when using unsuitable light, can be expected on that account.

It is, therefore, obvious that when daylight is used the suitability, or the reverse, of a screen depends entirely upon the position of the window with regard to the light of the plate and to the window. On placing a gelatine plate (say) two feet from a gas flame it would be found that if ruby glass were placed on the negative it would be some minutes before a plate was impressed; but if the glass were placed almost close to the flame a few seconds only would be required. It is simply a question of the amount of light the plate received, and similar conditions prevail in daylight illumination.

Then, again, in fixing upon a safe light, even at a working distance from the flame, it must be remembered that though safety would be secured under ordinary circumstances it might not under slightly unusual conditions—as, for example, when a plate required a long time to develope and an extra quantity of ammonia. The stray light that would give a developable impression in a couple of minutes might develope into a highly-injurious stain after the lapse of a long and forced treatment with alkaline pyro. We have before us as we write a conspicuous example of this from the hands of a well-known professional photographer. He used a light which he considered perfectly safe; but on one occasion, having a very interesting negative which required tedious development, he from time to time held it before the light to examine its quality. When finished it was observed to be fogged in patches, and after a long examination it was discovered that the patches were caused by the light acting upon the plate through breaks in the backing of coloured collodion with which it was coated.

The plain conclusion to be derived from these experiments is that every photographer should test the suitability of the light he employs, or proposes to employ, by the touchstone of practice. Let him expose a plate under a mask (say) for four and for twenty minutes in the position it would occupy during development, and also for a briefer period in the favourite position for examining it for density or sharpness: the appearance it exhibits after development for (say) five and for ten minutes will be a sure guide as to whether or not he is working under a "safe" light.

OLD PRINTS.

Again the fading of silver prints has been prominently brought forward at the meetings of two of our photographic societies. At the last meeting of the Glasgow Photographic Association the cause of the fading of silver prints was the topic discussed, the subject being opened by Mr. Duthie, who expressed his opinions at some length, as will be found in our issue of last week. At the last meeting of the South London Photographic Society, our old friend and contributor, Mr. E. Dunmore, read an excellent paper entitled *Old Photographs* (a portion of which will be found on page 169), on which a highly-interesting as well as instructive discussion followed; as also did an adjourned discussion on whether prints made on ready-sensitised paper are more or less permanent than those on paper of home preparation.

At the latter meeting a large collection of old paper photographs, toned by different methods, were shown by the reader of the paper, the Chairman, Messrs. Foxlee, Ayres, York, and others, the date of the production of some of them being so far back as the year 1851. The oldest ones were a couple of small prints (evidently calotypes) shown by Mr. Ayres, which are still in a good state of preservation. So also were some salted paper prints, thirty years' old, believed to be toned by the old *sel d'or* process, exhibited by Mr. Foxlee. Others of a more recent date were in different states of preservation; the majority of them, however, it may be mentioned, although twenty years' old and upwards, were in a far better state of preservation than many we have seen which have not been produced as many months. In some of the examples (although they were said to have been mounted with gum, and had evidently been kept in a damp place, so that the mounts had become mouldy) the prints themselves were unchanged.

Although such an interesting collection of photographs of ancient date were shown, and an animated discussion upon them ensued, we regret that very little new light was thrown upon the subject of fading generally. However, one point—and an important one, too—appears to have been established, namely, that the larger the quantity of reduced silver is which forms the image the more permanent the picture is likely to prove. Also, that with strong negatives and strongly-sensitised paper a larger amount of silver is reduced, and, consequently, greater stability may be anticipated than when the conditions are reversed. This was tolerably well exemplified by one of the examples shown. It was an unmounted stereoscopic picture, taken some thirty years ago in a single-lens camera with two exposures. Owing to a difference in the exposures in the two halves they were of different density; hence one had apparently been shaded in the printing, for it was explained that from the first one side had been more vigorous than the other. The vigorous half is in a fair state of preservation, while the other has faded decidedly.

It will be remembered that, for a long time past, we have expressed a very decided opinion that prints which are made on strongly-sensitised paper from vigorous negatives are those which are always the most likely to prove permanent, and this notwithstanding that they may have had less care bestowed upon their production. Both before the meeting and since we have had the opportunity of closely examining in daylight a number of the specimens exhibited, as the yellowness is always more palpable in this than in artificial light.

Some of the sulphur-toned prints had not faded at all, in the literal interpretation of the term; for all the detail and vigour still existed, but the lights had become a sickly yellow. If this yellowness could be removed without otherwise altering the tone a rich, vigorous picture, full of detail and half-tone, would remain. This remark applies equally well to many of the prints which had been toned and fixed in the old gold and hypo. bath.

The fading of mounted photographs is frequently attributed to the mounting boards containing hyposulphite of soda. Mr. Dunmore appears to be of the opinion that the presence of this salt, pure and simple, in the print is not of necessity a source of fading. In his paper he describes an experiment he made to determine this point, which is worthy of note. He took a print that had been thoroughly washed and cut it in two. One half was then immersed in fresh hyposulphite solution and afterwards dried, the other half being kept for comparison. The half which contained the hyposulphite proved on keeping to be quite as permanent as the other, which was free from it. From this experiment, Mr. Dunmore is inclined to infer that much of the fading of mounted photographs is due to the presence of chlorine or some other deleterious material in the mounts rather than to hyposulphite of soda.

We may here mention a somewhat similar experiment we tried sometime since. A print was taken from the fixing bath and just drawn through a dish of water to remove the superfluous hypo., in order to prevent its crystallising out on drying. This brief washing, however, proved insufficient for the purpose; hence the crystals had to be rubbed off after the print was dry. We mention this circumstance merely to show that the print was thoroughly saturated with the salt. The print was then pinned up in a damp upper room. In warm and dry weather the print was dry and crisp, and in wet it absorbed moisture and became damp and limp. At the end of six months it showed no change whatever. In nine months (except that it had become very slightly yellow) there was no perceptible alteration. At the end of a year, however, there was a very marked change; for, not only had it become very yellow, but it had faded badly and only the darkest portions remained. One curious circumstance in connection with this experiment was that for nine months there was practically no change, but at the end of twelve months the picture had almost disappeared, showing that when once the fading set in it had proceeded very rapidly. This experiment, however, differs materially from that of Mr. Dunmore's, inasmuch as we took our print direct from the fixing bath and dried it, while he washed his thoroughly after fixing, and then submitted it to a perfectly-fresh solution of the hyposulphite.

During the discussion great stress was laid on the strength of bath upon which the paper was floated, particularly with regard to the "ready-sensitised" paper; and the opinion was expressed that the ready-sensitised paper of commerce is not so highly sensitised now as it used to be when it was first introduced, some fifteen years or so back. In connection with this subject Mr. York remarked that a great deal of the ready-sensitised paper now made is blotted off when it is removed from the silver bath; consequently it must necessarily contain less free nitrate than if it were allowed to dry spontaneously.

In the discussion on the strength of the silver bath as affecting the permanence of the prints one fact appears to have been overlooked, or it did not receive the attention it deserved, namely, that little or no real advantage is gained by increasing the strength of the silver solution unless at the same time the quantity of chloride in the paper be correspondingly increased.

A certain excess of nitrate of silver in the paper over and above that necessary to convert the whole of the chloride in the albumen into chloride of silver is required, but beyond that no material advantage is gained by a further addition. By increasing the quantity beyond a certain point we only get so much more free nitrate of silver in the paper which is washed out prior to toning; but, if the chloride in the albumen be augmented at the same time that the strength of the nitrate of silver bath is increased, a material advantage will be gained, as a greater body of chloride will be produced. It is this, and not the nitrate, which is necessary to form the image.

We learn that it has been decided to hold the next convention of the Photographers' Association of America at Cincinnati, the proceedings to commence in the Music Hall on July 29 next.

From a report of a meeting of the Chicago Photographic Association we find that the value of the combined green and orange light is being recognised in the western capital. Mr. Gentilé—an eminent photographer in that city—says that he has used this light in his dark room for some time and is much pleased with it. He has proved it to be all that has been claimed for it by writers in the English journals.

From a review of Dr. Liesegang's work on carbon printing in one of our American contemporaries, we find among those who are credited (whether by the author or the reviewer we cannot tell) with aiding in bringing carbon to its present state, the name of "Mungo Park." As the intrepid Abyssinia traveller is understood to have "shuffled off this mortal coil" long antecedent to the first inception of carbon printing we imagine that there must be some misunderstanding existing. Presumably, our lately deceased Scottish *savant*, Mr. M. Ponton, is meant. He, at anyrate, had some small claim to be mentioned in such connection, whereas Mr. M. Park is not known to have had any.

It is lamentable to find that any professional photographer can entertain such contracted ideas as to close his account with a respectable firm of dealers in photographic materials solely because they also supplied their goods to photographic amateurs. But it stands on record in several American photographic journals. The name of the photographic firm is given as L. M. Melander and Bro., Chicago. Has any reader ever heard of this firm before, especially in connection with advances of any kind whatever in photographic art or science? They write—"We have found the practice of amateurs to work positive injury to our business, and we are compelled to do what we can to discourage this amateur business in order that we may protect ourselves." The other Chicago professionals apparently reprobate such sentiments, as the foregoing enunciation only excited amusement.

One of the most singular facts in connection with explosions of the mixed gases at magic lantern exhibitions is the rarity with which a fatal accident is the direct consequence of the explosion, and the sad affair at Chadderton appears to offer another instance in the same direction. In this case, as our readers are aware, it was ether and oxygen that were being used; but Mr. Lewis Wright (an expert in all lantern matters), in a communication to a contemporary, states that the apparatus could not have been one made by the inventor of the "ethoxo." He writes:—"I cannot imagine an accident with proper apparatus properly used; but it is necessary to state that a great deal of ether apparatus is being offered to the public which contains elements of great danger." It is well to call attention to this statement of opinion, as it would be a great pity that a useful apparatus should unjustly be credited with a terrible accident.

No one could speak on such topics with greater weight than the gentleman to whom we refer. He has devoted much time to perfecting of plans for exhibiting on the screen all kinds of optical effects and arrangements. The class of phenomena exhibited at the London and Provincial Photographic Association at the end of last month is his especial study; indeed, many of the slides then shown were made by him. Those of our readers who do not possess his work on *Light*, published some little time ago, cannot do better than provide themselves with a copy. It is not very expensive, it explains many phenomena having the closest relation to photography, and enters into the fullest details of the best manner of projecting on the screen all phenomena of polarisation, interference, and other chromatic effects.

The present—the fifty-fourth—year of the British Association for the Advancement of Science witnesses a novel departure, the meeting, as our readers will remember, taking place at Montreal, on the 27th August. Naturally, all arrangements, election of officers, and soforth, have to be made earlier than usual on this occasion, and already a complete list of officials, headed by the President-elect, the Right Honourable Lord Rayleigh, D.C.L., F.R.S., Professor of Experimental Physics in the University of Cambridge, is published. Amongst them we notice few names connected with photography. It is expected that the gentlemen who will deliver public lectures, which form so popular a feature of the week's entertainment, will be Mr. W. Crookes, the Rev. Mr. Dallinger, and Professor Ball. One of the subjects selected by the committee for special discussion is the "Connection of Sunspots with Terrestrial Phenomena." Most liberal arrangements have been made by the railway and steamship companies; indeed, one company—the Canadian Pacific Railway—offers free travelling to all members of the Association from August 1st to the period when the excursion to the Rocky Mountains takes place, and for this it offers a free ticket to one hundred and fifty members.

We need not inform our readers that photographic work of the highest quality is done in Canada, and we do not doubt that all photographers joining the meeting will be welcomed by their *confreres* across the water. If they should be inclined to take cameras and plates they will be able to enrich their albums with views entirely different in character from such as they would be likely to obtain at home.

The addition of only one per cent. of ammonia to water lowers its freezing point about two degrees, while potash only reduces i slightly over one degree, and soda a little over a degree and a-half. t

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We extract the following full details of M. E. L. Aude's mode of refining shellac. Three and a-quarter pounds of soda are dissolved in nine and a-half gallons of water contained in a small boiler or kettle. Eleven pou ds of crude shellac are added in small quantities at a time, giving a turbid solution possessing the characteristic odour of shellac and a violet-red colour. The liquid is boiled for a few minutes, and, while hot, a wooden air-tight cover is cemented on the vessel. When the liquid is quite cold the cover is removed, and the thin cake of fat which is found on the surface is separated. The solution is filtered through linen, the clear filtrate slowly decomposed with dilute sulphuric acid, and the resulting precipitate washed with water till no acid reaction remains. The washed resin is now pressed and melted in boiling water, when it can be shaped with the fingers. This shellac is cooled in water containing glycerol, and, when hard, is dried. The refined shellac forms yellowish-white, glistening tufts which, when dry, are yellowish-brown. It should entirely dissolve in alcohol.

The value of photography for educational purposes—using the word in its true sense—is well seen in a communication from Mr. C. T. Gatty, the Curator of the Mayer Museum, Liverpool (who is now travelling in Greece), to Sir James Picton, Chairman of the Committee. Mr. Gatty says:—"Although it is impossible by means of photography or drawings to give any complete idea of the beauty and grandeur of the position of these ancient buildings, it is not difficult by such means to give the student a very fair notion of their architectural features, their respective dates, their various purposes, and their sculptured decorations. I have, therefore, made a selection of photographs illustrating some of the more interesting matters suggested by the above-mentioned points." With such noble monuments around, telling him of the intellectual advancement and the artistic culture of those who erected them more than two thousand years ago, Mr. Gatty must have had an *embarras de richesse* to select from, but he would appear to have chosen well. He alludes to a connection, or resemblance, in style shown in the earlier Greek ornaments as instanced in those found at Mycenæ, with the Anglo-Saxon at one extreme and the Maoris at the other, and links them with Egyptian, Assyrian, and Phœnician results. One collection of photographs is to illustrate these points. He has a photograph of the Theatre of Dionysius and other views as interesting as they are instructive. Altogether, when collected in one spot, there can be no doubt that Mr. Gatty's small collection will draw many visitors and be of great value.

The celebrated Portuguese amateur, Carlos Relvas, has just appeared in a new *rôle*. In the last number of *La Nature* is described and figured a new lifeboat, of which he is the inventor, and which presents such novel and ingenious features that it has been the subject of a special Government trial, through which ordeal it has passed very satisfactorily.

The continually-increasing number of advertisements of photographic apparatus for amateurs is a most striking feature of the progress photography is making. There must be thousands of amateur photographers throughout this country alone, and in America the desire to photograph seems to have become almost a craze. The *New York Times* has a very droll article on *The Real Cause* (that is, of great increase of insanity)—which it gravely proposes to set down to the rage for amateur photography, and the state of mental vacuity caused by the never-ceasing variety of dry plates and the formulæ for developing them. The article concludes by saying that—"It is estimated that the different combinations of chemicals which may be used as 'developers' amount to 37,218, and the unhappy man who begins the search for the very best 'developer' is on the high road to insanity. What is said of plates and 'developers' applies also to 'fixing baths,' 'toning baths,' and the countless processes which various photographers have adopted. Each photographer has his own pet processes, and looks with scorn on all others. If the beginner knows only three photographers these are quite enough to overthrow his mental balance. No matter on what question bearing on photography he may consult the three photographers, each one will give him an answer totally different from those of the other two. There are few men strong enough to preserve their serenity in this conflict of opinion. The intellect of the ordinary amateur reels under it, and he becomes a hopeless mental wreck. Our lunatic asylums are now crowded with men who rave of developers and toning baths, and who solemnly conjure a visitor by all he may hold sacred never to use Smith's or Robinson's plates, but to stake his eternal soul on the supreme excellence of Thompson's plates and Jackson's 'developer.' Every amateur who has tried dry-plate photography and preserved his reason will have no difficulty in attributing the recent growth of insanity to the introduction of dry plates. We need search no further to find out why our lunatic asylums are crowded. The insidious dry plate and the plausible developer furnish the explanation that medical men have sought in vain."

MR. W. B. WOODBURY.

Few names, probably, are more familiar to photographers throughout the world than that of the subject of our illustration. Not only has Mr. Woodbury's name been permanently identified with an important printing method of which he was the inventor, but in many other departments of photography he has been well known for many years past as an ardent and indefatigable worker. To give anything like a complete list of his achievements as an inventor would require more space than we could afford in a single number, but the processes by which his name will be specially handed down to posterity are the Woodburytype, photo-filigrane, and the Stannotype, all three involving the same principle but with different applications. Not only as an inventor is Mr. Woodbury known, for he is also a skilful practical photographer, and no one who has had the privilege of inspecting his Italian series of landscapes will be inclined to deny him the right to the title of artist as well as photographer.

The number of medals and other awards that Mr. Woodbury has gained is very large. A portion only of them fills a goodly-sized frame, forming a trophy of which any one might be proud. Curiously enough, until comparatively recently, England was almost the only civilised country that had failed to recognise the merits of her own son; but this defect has been remedied by the award of the progress medal of the Photographic Society, and, again, a medal for the Stannotype process at the last exhibition.

A VESSEL FOR LIQUEFYING EMULSION AND COATING PLATES.

Various devices and means for retaining gelatine in a fluid condition while being employed in the coating of plates have been brought under public notice. That which we are now about to describe will, we venture to affirm, approve itself to most readers as fulfilling in every essential feature the requirements of an effective pouring vessel for this purpose. It was exhibited by Mr. A. L. Henderson at a recent meeting of the London and Provincial Photographic Association, where it was received with much favour.

A porcelain vessel—of a shape suggestive of a rather narrow marmalade jar, but having a suitable lip for pouring from and with a species of flange round the upper edge—is made to fit into a tin jug having a handle. This jug is so much deeper than the interior porcelain vessel as to permit of a space of a few inches between the two at the bottom; that is to say, the bottom of the porcelain vessel when *in situ* is a few inches above that of the metallic jug. In this space is fitted on gimbals a tiny lamp of the night-light *genus*, which always preserves its level position like the card of a mariner's compass, no matter to what extent the vessel in which it is contained may be tilted; even if laid on its side or turned bottom up the lamp will not be affected in the slightest degree. The heat from this little lamp is sufficient to ensure the gelatine being retained in a fluid form during the period it remains lighted. In so far, therefore, as its functions of heating are concerned the appliance is a success.

But the lamp has a still further use. In front of the tin vessel is a square aperture glazed with non-actinic glass; and the lamp, in addition to giving sufficient heat to keep the gelatine in a fluid state, through this pane also gives light enough to permit of the operation of coating the plate being conducted with perfect safety.

Inside of the porcelain pouring vessel is a tubular funnel reaching from top to bottom, over the lower end of which is tied a piece of filtering material. Into this funnel is thrown from time to time lumps of unmelted emulsion which, from contact with that still remaining in the vessel, soon become liquefied, and the emulsion filters out into the larger vessel by which it is surrounded.

The apparatus thus briefly described has much to recommend it. It is easily and cheaply constructed, and is said to perform its work well.

A FRENCH *LITTÉRATEUR* ON MR. CECIL V. SHADBOLT'S BALLOON PICTURES.

In the current number of *La Nature* is an interesting and appreciative article, founded on the now well-known examples o balloon photography executed by our esteemed correspondent, Mr. Cecil V. Shadbolt; and, knowing the interest taken in the subject by so many of our readers, we here present it in full:—

Is it necessary (asks M. Tissandier, the editor) to dwell upon the interest attaching to this problem of balloon photography, which has already attracted the attention of aëronauts, photographers, and military engineers? To collect plans high up in the air, to impress upon the negative the images of clouds and the beautiful optical effects one admires in higher regions of the atmosphere, or in time of war to bring down to the earth photographs of a fortress or of the enemy's camp—how marvellous!

M. Nadar long since made many essays to take photographs from a balloon, and obtained encouraging results in the car of the captive balloon moored in the Hippodrome, in 1868. The photographic apparatus was suspended at the extreme limit of the cable, two hundred metres high. The view taken showed the Arc de Triomphe and the streets leading to it; but the picture leaves much to be desired in the matter of sharpness. M. Dagron succeeded in taking a panorama of Paris from the car of the captive balloon of 1878 at a height of five hundred metres. In 1880 M. Paul Desmarets, at present Director of the Meteorological Observatory at Douai, greatly advanced this question, and our aërial colleague published in *La Nature* an interesting article upon the experiments, with an engraved reproduction of the pictures he obtained—one representing the earth from a height of eleven hundred metres, and the other the clouds and sky at thirteen hundred metres. The originals of these curious engravings are now at the Museum of Arts and Manufactures.

At a more recent period fresh experiments were undertaken in America, and Colonel Laussedat was lately good enough to send me a photographic view of the city of Boston taken from a balloon, with regard to which he stated Mr. Glaisher, the learned English meteorologist, had written to him. The proof is certainly very curious, but, like the others, fails in the point of sharpness, and, further, appears to have been taken at a low elevation.

During the last exhibition of the Photographic Society of London, the attention of visitors was drawn to a magnificent photograph taken from a balloon at the height of about six hundred and fifty metres, by a clever English operator, Mr. Cecil V. Shadbolt. This photograph is, beyond doubt, the most remarkable obtained up to the present time from the car of a balloon. Its author has, at our request, kindly sent us a copy, which we reproduce below with the utmost exactitude of which wood engraving is capable.

The negative was obtained by the gelatino-bromide process with an apparatus fixed by a kind of movable hinge to the ledge of the car of the balloon "Sunbeam." This balloon has already been used for five photographic ascents by Mr. Shadbolt and his assistant, Mr. William Dale.

We have received five aërial photographs from the clever worker. The first was executed at a height of eight hundred and fifty metres, the second at about five hundred, the third at nine hundred and twenty-three, and the fourth close upon a thousand metres high. The photographs resemble maps of great delicacy, in which may be recognised houses, roads, fields, and the Thames; but certain difficulties still remain to be faced.

The fifth proof—the one we reproduce—on the contrary, borders upon perfection, and must be described as a great step in advance. It was taken at a height of six hundred and fifty metres near Stamford Hill, in the North of London. The railway represented shows the junction of the Enfield line upon the Great Eastern with that of Tottenham and Hampstead. A railway bridge crossing the road is seen, the shadow of the bridge being clearly visible and giving remarkable relief to the picture. The railway station is seen and a train in motion with the smoke of the engine. A house appears beautifully sharp in the print; we can plainly see with the aid of a lens its chimneys, back yard, &c., while we are also enabled to recognise passers-by arrested in the act of locomotion. Finally, the tramway. The other parts of the photograph represent roofs of houses in regular rows, side by side, with similar gardens all of the same size, after the English fashion. To the left may be seen trees clearly delineated. We again add that we allude to the *photograph* itself, and that our engraving can only give an imitation by no means closely approaching the original.

We congratulate Mr. Cecil V. Shadbolt upon the beautiful results he has obtained, which, we trust, will soon lead to still further advances.

STANNOTYPE.

No. VI.

The photometer scale described in the last article may be used in two different ways. If upon glass, the various tints may be marked with opaque ink, with figures representing their different values, so that, as in the Warnerke scale, the last—or, in this case, the desired—reading will be given by the representative figure in white upon a slightly-tinted ground. But this system necessitates constant reference to the photometer, which must necessarily par-

W. B. WOODBURY.

INK-PHOTO, SPRAGUE & Co LONDON.

take of the character of an ordinary printing-frame, each examination requiring the opening of the hinged back. It has this advantage, however—that a number of frames may be watched at once by its means.

Thus, supposing that we have a number of reliefs to make at one time, and that we know the printing value of the different transparencies and the number on the photometer scale that best suits each individually, we have only to put them out along with the photometer, and as each tint is registered the corresponding frames are taken in, and so on until all are finished.

But this is a somewhat troublesome method upon which to work. The system involved in the Woodbury photometer is far preferable—that is, the colouration of the sensitive paper to a tint or scale of tints visible without any interference with the apparatus. The graduated scale, described in the last article, is perfectly applicable to this purpose. If printed by the stannotype process upon paper in the ordinary manner, with ink of a suitable colour to represent the changes that occur in silvered paper under the action of light, we have all that we require. If a small aperture be cut or punched out of each "tint," so that a portion of the sensitive paper is fully exposed to light, we have only to watch the moment when the colouration reaches the same depth as the surrounding tint bearing the number which we know to correspond with the transparency or negative we are using. The cheapness and the ease of preparation of such scales will recommend them to all who work either the stannotype or carbon process.

It was mentioned in the last article that each printing-frame might have its own photometer; but, preferably, we should say that each transparency or negative should have that distinction. The printing-frame may be used for *clichés* of all types and all densities, and will thus require a range of tints to suit all. But in the case of a transparency or negative, with its own photometer attached and its printing value or requirements known, a single tint of known value or, at most, two or three are all that are requisite.

Here we may accept a suggestion of M. Leon Vidal to provide each *cliché* with its own photometer of three tints only, the centre one of which represents the exposure necessary; and when the sensitive paper is coloured to that tint the two outer ones will be respectively lighter and darker, and, in fact, form a sort of marginal reference. Such scales in paper can be readily made either by the stannotype or carbon processes. A very handy form of photometer scale of this kind was described by Mr. W. E. Debenham, we believe, in our ALMANAC a few years ago. It consists of a scale of tints, printed in carbon tissue, with an aperture in each to permit of the exposure of the slip of sensitive paper; and we can answer that it has served remarkably well for a variety of purposes in connection with carbon printing.

But, for the longer exposures necessary to the production of printing reliefs, it is scarcely possible to arrange either a sufficiently-elastic scale of tints or a sufficiently-slow printing paper to suit the purpose; it is, therefore, necessary to resort to special means—such as those adopted in the Woodbury photometer—for attaining the same result, namely, the interposition between the sensitive paper and the light of a coloured medium in the shape of a piece of yellow or orange glass, or, preferably, a thin sheet of coloured gelatine, several of which of varying depths of colour may be kept at hand. For ordinary carbon printing the range of tints will be found quite sufficient when used in this manner; but if placed upon glass and employed after the manner of the Warnerke screen, any depth of colour may be obtained and utilised by merely changing the character of the ink.

So much having been said of the photometer and its use, we have little more to add in connection with the printing operations, unless it be to point to the desirability—if not absolute necessity—for the employment of a backing of sheet india-rubber behind the tissue. The presence of so large a proportion of hygroscopic matter, in the shape of glycerine and sugar, renders the tissue particularly prone to absorb moisture during a long exposure; and, as the conditions which favour such absorption are generally more prevalent on a dull day when long exposures are more particularly necessary, the value of this suggestion will be appreciated. If it be neglected various defects may ensue, which will be dealt with under the head of failures. We shall next week proceed to describe the development of the relief.

THE EFFECT OF SHEARING STRESS ON A SENSITIVE SALT.

AT the last meeting of the last session of the Photographic Society I gave a paper on the above subject, which, at the time, was commented upon both in the *Photographic News* and in THE BRITISH JOURNAL OF PHOTOGRAPHY. In the latter journal the effect was laid to an abrasion of the film, and not to stress on the particles of silver bromide. Since that time I have carried on a few experiments on the subject, the results of which seem to point to a different conclusion.

When writing-paper was placed between the film and the writing point, though an image of the markings developed with apparently no abrasion, yet it might be due to two causes—one to organic matter from the paper pressed into the film, or to the fact that an abrasion might have taken place imperceptible to the eye. In order to test what effect abrasion really had, a gelatine plate was marked with a point, and a small amount of abrasion could be seen. It was then placed in water and soaked for a few minutes, after which it was placed near a hot-water bath till the surface of the gelatine had melted, and no trace of any rupture in the gelatine could be traced. It was next allowed to set and dry and then developed. The phenomena I have described in my last paper presented themselves as before; but a remarkable thing occurred, viz., that the developed writing was as sharp as if the surface had remained unaltered by melting. This pointed to the fact that the real effect was produced *below* the abrasion.

To test this a plate was written on as before, the gelatine melted to the very surface of the plate, and a gentle rocking given to it to displace the sensitive salt next the glass. The gelatine was allowed to set again, and then developed. In this experiment the writing was *thickened* and *distorted*, showing that the seat of the phenomenon had been reached. I may remark that in the first-described experiments the plate was also rocked when the surface gelatine had melted, and this gave me an idea in what direction further search ought to be made. The destruction of the writing took place, as in my before-described experiments, by the application of bichromate of potash to the plate.

We have here, then, a further step in tracking this curious phenomenon to its source, and is in support of shearing stress exercised on the sensitive salt of the film, as against mere abrasion, since the altered sensitive salt was below the abrasion. W. DE W. ABNEY, F.R.S.
—*Photo. Journal.*

HALATION.

[A communication to the Dundee and East of Scotland Photographic Association.]

NOT being able to see in what way Mr. Geddes could reduce halation by placing a blackened card behind the sensitive plate during exposure, I, nevertheless, thought it only right to make a trial of the plan before coming to a conclusion on the matter. One little experiment led to another, and I will briefly state the results at which I arrived.

I have here a simple, non-achromatic lens of bi-convex form. If you catch the reflection of a bright object (such as a jet of gas) upon it you will find that there are two images to be seen—first, an erect image from the front surface of the lens; and, second, an *inverted* image from the back surface of the lens. A piece of ordinary glass would have done just as well, but the curves of the lens giving an erect image from the front and an inverted image from the back allows the back image to be at once recognised.

One quarter of the back surface I have covered with carbon tissue *in optical contact with it*; another quarter I have covered with a backing of starch and "deep orange chrome;" the rest of the back surface is uncovered.

Now, you will find, if you stand so as to catch the *inverted* image upon the uncovered part, that this back reflection is almost as powerful as the erect image thrown by the front surface. Turn the lens in your hand so as to bring the *inverted* image upon the orange backing, and you will now find the back reflection is only half as powerful as it was. Turn the lens further and bring the *inverted* image upon the carbon tissue, and you will find that it has all but vanished. Once more bring the inverted image upon the uncovered part of the back surface, and while there place behind and in contact with the glass a blackened card. You will find that this has not the slightest effect upon the back reflection.

From this demonstration I conclude that carbon tissue is a better backing than the orange chrome, and that the blackened card has no effect in reducing back reflection. Actual experiment with the camera confirmed these conclusions, the orange chrome giving slightly better results than might have been expected, but in no way equal to the backing of carbon tissue.

That halation is not entirely cured by backing the plate, even with carbon tissue, may be due either to the fact that the back reflection is not entirely obliterated by the backing, or that other causes are to be found for what is not explained by this cause.

If you examine the inverted image reflected from the surface of the lens *backed by tissue* you will find that it is very faint; and, since in actual practice the light is still further reduced by first having to penetrate the film, it is reasonable to suppose that any little light reflected from such a backing must be very weak indeed.

From these and one or two other experiments I conclude there are other causes at work; and, stating what appear to me to be the chief causes of halation in order of importance, I would place:—First, reflection from the back of the plate (not entirely obliterated by any backing). Second, reflection from the illuminated particles of bromide of silver acting upon adjacent particles. Third, reflection from particles of dust floating in the camera in the vicinity of the plate, as can be proved by filling the camera with dust and exposing a properly-backed plate. Fourth, a certain *chemical* condition of the plate—halation being often very pronounced where the physical conditions seemed to be entirely against its production. J. K. TULLOCH, M.D.

EXPERIMENTS WITH A PYRO.-SULPHUROUS DEVELOPER.

"NECESSITY" is, according to the old proverb, "the mother of invention," and out here in Lucerne, after buying much experience as to the difficulties and delays in getting parcels from London, my stock of sulphite of soda ran out all but a few crystals, placing me in a difficulty, as I did not care to adopt any other than this clean working developer. However, it had often occurred to me that sulphurous acid was the active principle of the developer so far as its clean working was concerned, a trace of that acid being used with iron developers in some transparency-making processes, and in bringing out the image by development on Hutinet's paper, extra brilliancy being the result of its employment.

The few crystals of sulphite of soda left out of my stock contained, of course, plenty of sulphurous acid, which ought to go much farther in its free than in its combined state. This sulphurous acid is easily liberated from the crystals by adding sulphuric acid to a solution of them. The latter acid unites with the soda; the evil-smelling sulphurous acid gas is set free, and for the most part is held in solution in the liquid. On previous occasions I had put a trace of sulphuric acid in my sulphite of soda developer to set free a little sulphurous acid, and it was found that the sulphuric acid must be added with moderation; so that some undecomposed sulphite of soda is always present, otherwise the surplus sulphate of soda produced by the decomposition gives to negatives the well-known yellow stain produced also by the carbonate of soda developer, and cleanliness is lost.

A solution was accordingly made consisting of—

SOLUTION A.

Water	1 ounce.
Sulphite of soda	20 grains.
Sulphuric acid	6 minims.

The presence of free sulphurous acid became evident from the smell. The proportion of sulphite of soda to the ounce generally in use for developing is rather under 200 grains, making a saturated solution the quantity of the salt in which varies with the temperature of the air. Consequently in the experiment now under notice an attempt was made to cause twenty grains of sulphite of soda to do the work usually allotted to about 200 grains.

To some of Edwards's developing (D) solution, which chanced to be at hand, consisting of pyrogallol, water, glycerine, and alcohol, I added enough bromide of potassium solution to act as a restrainer, and then thirty minims of the above solution (A), making two ounces of developer in all. The exposed plate was subjected to the action of this solution for a minute, and brushed while under it to clear away possible air-bubbles; then a little ammonia was added in the measuring glass to the same pyro.-sulphurous solution, which was poured back upon the plate. The result was a clean transparency, as if the developer had contained sulphite of soda in the ordinary way. The edges of the plate which had been protected from light by the frame were like bare glass after the development.

Over landscapes there is usually no trouble from want of light, and, whether it may be wrong or not in theory, I find it saves trouble, in mixing, to add the bromide of potassium to the stock pyrogallol solution once for all, and to add it rather liberally, for the power of bromide as a restainer is very much weaker than that of ammonia as an accelerator. The ammonia must be added very cautiously in the earlier stages of development, or mischief is easily done. It is not quite so easy to do mischief with erroneous proportions of bromide, of which it is better to have too much than too little. Of ammonia it is better to have too little than to much.

A developing solution was next made as follows:—

DEVELOPING SOLUTION B.

Solution A.	1 ounce.
Bromide of potassium	15 grains.
Pyrogallol	50 ,,

In developing thirty minims of this were added to two ounces of water, and used in the manner already described, care being taken not to overcharge with ammonia in the developing operations. The results proved that the object had been attained, and that the class of negatives usually obtained by means of sulphite of soda can be produced with one-tenth the quantity of that salt ordinarily employed, if the above pyro.-sulphurous developer, as it may be christened, be substituted.

There was more tendency with this developer to throw down an apparent deposit after the addition of the ammonia than is the case with the ordinary sulphite developer; this had no practically injurious effects, but nevertheless presented a problem, as it does with many other pyro. developers, for examination. In broad daylight two ounces of the diluted-for-use developer were made in the ordinary way, and the usual quantity of ammonia added. The mixture was made in a flat-bottomed glass tumbler, standing on a sheet of white paper on the ledge of an open window. The best method of observation was to look down upon the liquid, rather than to examine it through the sides of the glass. A series of very beautiful phenomena was then presented. At once it became evident that the dark deposit was not a solid one, but consisted of portions of the liquid darkened by the action of the air, after absorbing the oxygen of which they sank in the surrounding solution. A dark little star usually first forms near the centre of the surface of the solution, and sends down a dark shaft to the bottom of the liquid, forming a kind of stem, from which branches next spread along the top of the liquid, every now and then sending down a new shaft, as in the growth of the banyan tree. Gradually a most beautiful design is thus traced in liquid veins—a design more to be contemplated with satisfaction when produced in a glass tumbler than when produced over a plate in course of development.

On the supposition that the well-known freedom of the old sulphite of soda developer from this common class of irregular decomposition might be due to its viscosity, because of the large proportion of the salt it contains, I next thickened my ounce of pyro.-sulphurous developer by adding sixty grains of lump sugar to it. The experiment with the glass tumbler was repeated, and it was found that the irregular decomposition took place, but more slightly than before. Sixty grains more sugar were then added, with still greater retardation of the irregular decomposition, which always begins at points where the liquid is in contact with the air. By thus increasing the viscosity of the liquid its developing powers were made to closely resemble those of sulphite of soda, the proportion of which, with the sulphuric acid, can no doubt be reduced with safety; for it is not likely that the most economical proportions have been discovered in a first experiment.

The stock solution of developer B is of a golden yellow colour, just the colour of a weak solution of chloride of gold. Herr Brunck, of Lucerne, tried a few experiments with it, to see if the colour were due to free bromine. He found that chloroform would not dissolve the colouring matter, and after some further research we came to the conclusion that no free bromide is present, and that the tint is wholly due to some feeble discolouration of the pyrogallol.

After two drachms of sugar had been added to the stock developer it became evident, in the tumbler experiments, that the diluted developer was more subject to air-bubbles, so as to render brushing the plate under the unaccelerated developer all the more necessary. With but sixty grains of sugar this objection was not so apparent. Therefore, if sugar be used at all, it is best to keep the preparation low enough to just produce the desired effect and no more. When a viscous developer is used, and the normal amount of rocking of the plate is given, the surface decomposition has its irregular nature as to locality more masked, but it is probably always present in all pyrogallol developers, more or less.

When it came to actual developing I could see little or no advantage from the addition of sugar, so I scarcely recommend its use for practical purposes. The streams of partially-decomposed liquid in various pyrogallic developers seem to do no harm; the darkened liquid is not more active than the rest on the plate, but more inert, having already absorbed oxygen. It may be asked why sulphurous acid is not used at once, instead of producing it in the developer by the decomposition of sulphite of soda. This has not been tried by me, since a bottle of solution of sulphurous acid would be an unpleasant thing to carry in baggage, especially should any breakage occur; this objection does not apply so strongly to its use in immovable photographic establishments. I have not seen that excess of sulphurous acid has a perceptible effect in slowing the plate, although sometimes enough of it has been liberated by sulphuric acid, in my experiments, to produce a developer covered with smoke after the addition of the ammonia, because of the dry decomposition set up in the air, between free ammoniacal gas and sulphurous acid gas.

A gelatine plate directly after development is practically a swelled sponge, with its pores full of decomposing developer, the surface only of which can be quickly washed. Fortunately the dark product is very soluble in water, and by successive washings of the film in clean water can for the most part be removed in ten minutes. This is the part of the operations where thorough work gives the cleanest negatives. If the fixing or the clearing solutions acquire more than a trifling tint of yellow the washing after development has not been well done, the colour of the two solutions just mentioned being a safe index.

Will you allow me to suggest that writers for the photographic press who recommend the use of alum shall henceforth always print which of the many alums they mean. "The common alum of the shops" is meant, say some; but Mr. A. Spiller has published that common alum is usually potash alum, while two large London chemists told me that common alum is ammonia alum. Then, again, what are the merits and demerits of chrome alum—which, by-the-bye, is called alum because it contains no alumina? Alumina inadvertently precipitated in a gelatine film is so insoluble that there is no getting it out again, so possibly chrome alum may be greatly superior, if any accidental deposit from it can be dissolved out by reagents. Added to this, its powers of hardening the film are much greater than those of common alum—whatever that may be—so that weaker solutions of chrome alum can be used. In future our literature would be more exact and scientific if those who recommend the use of alum would say whether they mean potash alum, ammonia alum, cæsium alum, chrome alum, iron alum, Roman alum, rubidium alum, soda alum, or thallium alum, instead of allowing the reader to try to guess which alum they mean.

Without some experiments of a strictly scientific and comparative nature it is difficult to be certain whether by the sulphite of soda developer details are lost in the highest lights and deepest shadows, as Mr. B. J. Edwards believes. At first I thought this was so, especially when I photographed a castle, and discovered its magnificent backgrounds of the Rigi to be absent on the developed plate. But that plate was exposed in a bright light at midday, under which conditions mountains blue and white in the distance are as difficult to catch as clouds, when the foreground has to be good. With better conditions of lighting I obtained the view all right, and with the sulphite developer. If some of the few well-known photographers alluded to by Mr. Edwards will come forward with their names and say that after a few months' constant use they abandoned the sulphite of soda developer, and why they did so, such practical testimony must carry great weight. If a stained negative give a double chance of printing well, that might as well be brought about by staining a sulphite negative as by bleaching a discoloured one. W. H. HARRISON.

Lucerne, Switzerland, Feb. 16, 1884.

OLD PHOTOGRAPHS.

[A communication to the South London Photographic Society.]

THE title of my paper having been chosen I am in a measure compelled to suit the subject to it. "Old photographs!" There is a ring about the words "old photographs," sentimental as well as scientific—perhaps more so. I question much if there are any other old existences, save and except old letters, that have the power to flood the memory with pictures of the past in the same degree as will "old photographs." Generally "old photographs" convey pleasant expressions, and are reminiscences of bygone hours of excitement, enthusiasm, and expectation. They remind one of glorious rambles, genial companionships, and pleasant friendships—the golden and happy side of a lifetime.

I now particularly allude to landscape work, than which no occupation could be devised more conducive to health and pleasure—combining as it does active bodily exercise with a reasonable amount of mental occupation. With portrait photographs it is somewhat different. The actors may have passed away, leaving but old memories behind, fused in the crucible of time which by the magic of an "old photograph" separates. The originals once again stand before us vivid and distinct, as though it were but yesterday the portraits were made. One memory awakens another. Incident upon incident crowd the imagination, spirits of the past rise at its bidding, and that one—maybe a poor, weak, inartistic presentment—exerts an influence (painful or pleasant as the case may be, but all softened by the alchemy of time, the glow of pleasure veiled, the sting of pain removed) which, in all probability, is possessed by no other existing entity.

The occupation of looking through a collection of old works and comparing them with recent ones is far from labour thrown away, especially if they have been one's own work. We may recal an experiment the results of which were thought little of at the time it was made, but which now, a new light being thrown on it by experience, becomes a valuable hint. The extreme importance of making notes of our experiments, if carefully performed, can scarcely be overrated. Memory is apt to play us tricks if not supported by written notes, especially if a good number of similar experiments are made—generally the case in working up a new process. A very little variation may mean success or failure, and it is just as well to be on the safe side by reference to methodically-kept memoranda. Since photographs we call "old" were made photography itself has assumed a new garb and an importance in the arts and sciences that could hardly have been anticipated. Therefore, early experiments, viewed by the light of modern knowledge, may be of considerable use in assisting the solution of some present difficulty.

PIONEER SERVICES RECOGNISED.

The thanks of photographers of the present day must be accorded to those persevering pioneers and experimentalists who, when the art was in its babyhood, so nearly bit on the ways and means we now adopt, and which, even after a lapse of over thirty years, still form the foundations of our process. In a measure we seem to be reverting to the original plans. Paper was most successfully used in the old calotype process—one of the earliest processes discontinued—to give place to its diaphanous and brittle successor—glass. Now, again, paper is being used extensively for sky negatives and also as a support for gelatino-bromide films for landscape work on roller slides, and also in compressed blocks. Pyro. development has again come to the front in place of iron, with this difference—alkali is added instead of acid. All through the processes of negative-making changes continue to be rung on similar materials, and no absolutely new departure made. With mechanical processes wonderful improvement has been effected. The working of them is, however, in comparatively few hands. I believe Swan produced carbon prints commercially as far back as fifteen years—perhaps earlier; but it is comparatively of late that carbon and mechanically-produced prints have become so much used, especially for book illustrations. Chemical processes of production are, and in all probability will, continue to be the kind with which the majority of photographers will occupy themselves.

The very fact of continuing the work so much on old lines suggests the question—In what manner and degree is a modern superior to an "old photograph?" The answer is somewhat difficult to give. Is it in permanency? Surely not; for here we have prints that have proved their claim to be called "permanent" by the fact of some twenty, thirty, or more years of existence, and are still bright, good, and apparently unchanged. Is it in delicacy or quality? No; we may fairly say some photographs were produced of as good quality in the early days as at the present time, judging from the examples we have the opportunity of examining. Then what is the improvement obtained by thirty years' experience if it be not in permanence, delicacy, or quality? No other conclusion can be drawn but that the superiority, where any exists, is entirely outside the chemical qualities or the actual making of the photographic print, instead of which it rests altogether in the artistic treatment and feeling imparted to the subjects, aided by skill naturally acquired through familiarity and practice.

MANIPULATION AND ARTISTIC SKILL.

I said "some" photographs were equal in quality to those now produced. It must be borne in mind that thousands and tens of thousands of photographs are made now to one made formerly. Manipulative skill is possessed by thousands where one was skilled in the early days, and the consequence is excellent photographs are exhibited wherever we turn—from the London shop windows to the country cottage. We can scarcely go anywhere where good photographs are not. In the early days it was a rare thing to see a thoroughly good photograph—not because they could not be produced, but by reason of their limited number and there being so few to produce them. Beginners or unskilled persons generally turned out that kind of effect called "soot and whitewash." This, with the very imperfect fixing and washing, owing to the but partially understood reason why it should be different, soon translated the "soot-and-whitewash" effect into a colour wash and fade, and upon the evidence of such imperfect productions the public have concluded that the photography of the present day has become a wonderfully-improved *process*.

The improvement, as I have already suggested, is in the artistic treatment rather than anything else, and this I believe to be the line upon which improvement will run in the future. Gradually photographers will perceive the inartistic faults in their otherwise perfect work to which they are now blind; for it is naturally a somewhat difficult thing for a man to see faults in his own photographs—perfect in a manipulative sense, but seriously or slightly defective in composition or the arrangement of light and shade. As a fact, to him the faults do not exist. He, therefore, cannot be expected to see them; and it is only by art-education, no matter how acquired, that he will at length cast off this manipulative blindness, so to say, and make his works as well as judge of them by the higher standard.

There is no doubt that the extra sensitiveness of our films will do much to alter the character of future work. This, with the unquestionable advantage of having plates ready for use at a moment's notice, instead of waiting for the completion of the many preparations necessary to be made in the old wet-plate days, must exercise considerable and favourable influence in securing negatives. EDWARD DUNMORE.

(To be concluded in our next.)

LECTURES AT THE ROYAL INSTITUTION.

PHOTOGRAPHIC ACTION.

THE second lecture of the series was given on Saturday, the 8th inst., to the same audience as attended last time. Captain Abney commenced by showing the two molecular states of gold—the one being larger than the other, as shown in the prints developed with chloride of gold on uranium and iron salts respectively. On the former the gold had a decidedly ruddy tinge, whilst on the latter green. A reference was next made to the action of light on organic bodies—such as the tanning action of sunlight on the skin—and also on the fading of dyes, which he showed to be due to their absorption of oxygen.

This part of the subject was also illustrated by the action that light had had on a deal board on which had been laid a paper of printed matter, and which had been exposed to the sun for some time. The juices contained in the wood had been darkened by the light penetrating through the paper, the parts beneath the printed matter alone remaining undarkened. A reference was also made to the change effected in glass by the continued action of light. The lecturer next touched upon the number of molecules existing in chloride of silver of an inch in area and the one-thousandth part of an inch thick, which, for purposes of a rough calculation, he assumed would be blackened in one minute in the bright sunshine. He stated the number to be 1,728 with twenty-four 0's placed after it. A calculation was next made as to the energy of sunlight in separating the atoms of chlorine from silver chloride. This was founded on the fact that the heat resulting from the melting of nine cubic inches of ice was equivalent to the production of one-horse power. Herschel, it was stated, had found that sunlight would melt $\frac{7}{1000}$ of an inch of ice per minute, which was equivalent to being able to raise 255 pounds one foot high.

Supposing $\frac{1}{1000}$ part of this energy of radiation was absorbed by the chloride, that was equivalent to raising one-quarter of a pound one foot high. The weight of the chloride of silver of $\frac{1}{1000}$ of an inch thickness and one inch area was stated to be about four grains, of which one grain was chlorine. As only one half of this was released the energy expended was equal to raising the liberated chlorine 2,900 feet against gravity, so that had only gravity acted each atom of liberated chlorine could have been raised that distance, but as the molecules were only some $\frac{1}{12000000}$ to $\frac{1}{2500000000}$ of an inch apart it followed that the chlorine must have been held to the molecule of silver with a much greater force than that of gravity.

The next subject touched upon was the action on silver chloride and silver salt by short exposure. The developing action he attributed to the energy of molecular attraction acting on the slowly-depositing silver. This he enforced by showing the magnetic curves produced by the action of a magnet on iron filings; by a silver tree twenty-five years' old, which had been started by Faraday, at Woolwich, who was lecturer on chemisty at the Royal Military Academy. The spicules of this tree were three inches long in some cases, and beautifully showed the molecular attraction, which was effective only when slow deposition of silver took place. A third experiment in proving this was shown by the molecular deposition of lead under the influence of an electric current in a solution of acetate of lead. The formation of crystals was well shown, and was stated to be similar to that which existed in building up the photographic image. A calotype print was partially developed to explain the method of development. A wet plate was exposed in the camera, and it was endeavoured to develope it in the light of the lantern, but the yellow glass used was evidently of such a non-actinic kind that instead of an image the plate fogged. The matter, however, was subsequently remedied by developing a negative in a dish.

The effect of viscous bodies, such as glycerine and acids, in retarding the reduction of silver nitrate was next alluded to, and pointed out to be a necessity for proper development.

The alkaline development and ferrous citro oxalate developers were also touched upon; the slow reduction of silver chloride and silver bromide being shown when a physical restrainer, such as gelatine, or a chemical restrainer, such as bromide of potassium, was used.

RECENT PATENTS.

PATENT APPLIED FOR.

No. 4,404.—"Method or Process of Colouring Photographs, Drawings, Printed Subjects, or the like." B. P. Stockman, C.E., 3, Poet's-corner, Westminster, Middlesex.—*Dated March 5, 1884.*

PATENT SEALED, March 7, 1884.

No. 4,471.—"Improvements in Means for and Method of Producing Designs upon Paper or other Fibrous or Soft Material." R. Brown, R. W. Barnes, and Joseph Bell, Liverpool.—*Dated September 19, 1883.*

NOTICE TO PROCEED.

No. 5,204.—"Improved Method of Producing Surfaces for Mechanical or Ink Printing by Means of Photography." Harrison Garside, Manchester.—*Dated November 2, 1883.*

SPECIFICATION PUBLISHED DURING THE PAST WEEK.

FRAMES FOR PHOTOGRAPHS AND OTHER PICTURES.

This invention, which received provisional protection only, is by John Frederic Cooke, of 6, Oxford-court, Cannon-street, London. The specification is as follows:—

It is especially adapted to cases where the photograph or picture is seen through a piece of plate or other glass having a bevelled edge, and nothing outside such bevelled edge; but it can also be readily adapted to other styles of frames. To hold the photograph or picture against the glass I take a flat sheet of metal or other suitable substance of the size required, and I so bend over two of the edges opposite to one another that the said sheet of metal or other substance will slide over two of the edges of the glass, and so hold the photograph or picture securely against the back of the glass through which the photograph or picture is seen. The edges so bent over, being seen when the photograph or picture is looked at through the glass, are not necessarily left visible along the whole of those sides of the frame, but the edges so turned over may be in parts cut away, provided enough of them is left to hold well on to the edges of the glass. I also vary the shape of the metal or other substance where it is turned over in such way as to make it ornamental. The frame thus made stands by means of a projecting strut or foot attached to its back in the ordinary way in which a foot or strut is attached.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
March 18	Bolton Club......................	The Studio, Chancery-lane.
,, 19	Photographic Club	Anderton's Hotel, Fleet-street.
,, 20	London and Provincial	Mason's Hall, Basinghall-street.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

The ordinary monthly meeting of this Society was held at the Gallery of the Royal Society of Painters in Water-Colours, 5a, Pall Mall East, on Tuesday evening, the 11th instant,—Mr. James Glaisher, F.R.S., F.R.A.S., President, in the chair.

The minutes of the last meeting having been read and approved,

The Chairman read a letter from Dr. Eder, expressing his satisfaction at having received the progress medal of the Society.

Mr. George Murray was proposed as a member of the Society and duly elected.

Captain Abney then read a paper, entitled *Illumination of the Dark Room and Some Optical Experiments.* He said that it would appear that M. Claudet was the first to employ coloured light for affording illumination for photographic manipulations, the photographic laboratory having been apparently, before 1844, literally a "dark room." The subject of various media for modifying the colour of light had recently been discussed, and he (the speaker) had been experimenting in the matter like others. At the last meeting of the Society he had brought some samples of what he supposed to be canary medium, and showed the results obtained with them. The samples were made by coating glass with a gelatine emulsion of chromate of lead. This gave a very good modification of canary medium. Using this medium he had obtained in three and a-half minutes a fully-exposed transparency by the light of a candle, the negative and plate being held a foot away from it. The illumination was brilliant. With an orange paper, which was shown, he had got but the faintest impression after five minutes' exposure. Since then he had experimented with the true canary medium. The paper was very thick. He (Captain Abney) here exhibited a lantern—one side of which was coated with canary medium, another with orange paper, whilst the third consisted of a piece of stained red glass. He then described a set of photometrical experiments, whereby he had concluded that the amounts of visual light given by the three sides bore the following ratios:—Canary medium, 1; orange paper, $1\frac{1}{2}$; stained red, $4\frac{1}{2}$.

Mr. C. Ray Woods had repeated the experiments, and had brought out the ratios as—canary medium, 1; orange paper, 1·86; stained red, 4·9.

Mr. J. Cadett had brought them out—canary medium, 1; orange paper 1·39; stained red glass, 2·70. The variations in these results showed that the eyes of different persons were not sensitive in a like ratio to different colours of light. With a piece of tissue paper in front of the stained glass the light given still bore to that through the canary medium the ratio of 2·93 to 1. An exposure of a minute and a-half at a certain distance from the canary medium or the orange paper gave an image, whilst there was none through the stained red. It was, therefore, evident that the red was the best. Canary medium was better than he had expected with candle light, but with daylight was not so good as the orange. A set of photographs of the spectra obtained through the various media were shown by the lantern.

Captain Abney could not recommend the use of green glass, as it only cut off such rays as were harmless. In conclusion, Captain Abney said he had no bias either one way or another. He would have no hesitation in using certain canary media for development, but would not prepare very sensitive plates by the light got through them. The red-stained glass he considered much better, and he would use a large quantity of the light filtered through it.

Mr. W. E. Debenham said that Captain Abney talked of the question as one recently reopened, and that as he (Mr. Debenham) had reopened it he would say a few words. The results which he had obtained he considered of some importance. He thought that with canary medium far more light having action on a sensitive plate was cut off than by the orange paper shown, by two thicknesses of ruby films, or by almost any ruby fabric, whilst the same amount of illumination was given. Some time ago he had made experiments in his own room. He had found red a very unsatisfactory colour to work by, and had tried strips of different-coloured glass, and had simultaneously exposed plates to the light passing through them. He found that those which gave the best light with the least photographic effect were a combination of light yellowish-green glass and pale yellow paper. Some of his friends had fitted up their rooms with light given by these media, and the result had been exceedingly satisfactory. The light was less fatiguing to the eye, and more satisfactory and safe in use than a red light. Suppose that if the three lights—red, orange, and yellow—each produced the same visual light, it was desirable to use that which gave the least photographic action. Suppose they gave the same photographic action, it was desirable to use one which gave most visual light. He did not lay great stress on the green glass. He used it because if he superimposed several layers of yellow medium he got a red light, or at least an orange one. The green glass reduced the light very little. Mr. Cowan had shown a lantern which demonstrated this—one half having green glass, the others not. He had not based his experiments on the results of spectrum work, because he found there was considerable divergence in the opinions of those who made spectrum work a study as to the relative photographic powers of different parts of the spectrum. He based his results on practical experiments with various media, and he had come to the conclusion that with either orange or yellow media he got less photographic action with the same visual power than with red, whilst yellow was the more pleasant of the two first-mentioned colours by which to work.

Mr. C. Ray Woods had tried some experiments. He thought there was very little to choose between orange paper and canary medium. He had pointed out at a technical meeting that cathedral green glass was of little value, and had shown a better kind. On examining the lamp shown by Mr. Cowan with a pocket spectroscope he had seen a certain amount of blue in the light. The reason why this question had come up so often was that photographers had used ruby glass instead of red stained. They had proved the light very unsafe, and had found it necessary to block out a great part of it to get safety. He (Mr. Woods) thought red light was comfortable to work by, but this might be peculiar to himself. He considered the injurious effect of dark room work to the eye was not due to the colour but to the rapid passing from a very dull to a bright light.

Mr. John Spiller recommended the use of aurine in the form of a varnish spread on glass plates. It was very effectual, and it should be considered that from a merely physical point of view there was objection to an emulsion in which the particles were always of measurable size.

Mr. A. Cowan felt inclined to give his opinion in favour of the canary medium. He had seen extraordinarily quick plates prepared in brilliant light which was procured through canary medium. One of these was afterwards exposed for twenty minutes to the light and was not fogged. The green glass and yellow paper had also given very good results, but he did not lay much stress on the green glass.

Mr. Debenham said there was no such thing as cathedral green glass. The term "cathedral" simply applied to the roughish surface of the glass, which could be had of all shades. He had spoken of "green cathedral glass." He used a yellowish-green. Mr. Woods had spoken of seeing blue by the spectroscope in the light he recommended; but as sensitive plates had been exposed close to the light for fifteen minutes without a developable image being produced, whereas five seconds close to a ruby light had procured an effect, this was of little consequence. As to the injurious effects of ruby light to the eye he had the testimony of Mr. H. Harben, who had found that after two hours' work in red light he was quite unable to read, whilst after many hours' work with pale yellow light he was.

Mr. Herbert B. Berkeley mentioned that, in 1877 or 1878, Mr. Henry Cooper had suggested the use of green and yellow glass for dark-room illumination.

Mr. Ince said that the evil effects produced by the sudden change from dull to bright light might be greatly reduced by using coloured glasses when out of the dark room.

Mr. W. Ackland, being called upon by the Chairman, said if many were examined there would be discovered a much greater variation in the sensitiveness of the eye to different colours than Captain Abney had discovered. He knew of many cases where distinct harm to the eyesight had come from working in ruby light. He now used pale yellow light in his dark room, and recommended it to every one.

Mr. W. S. Bird said there certainly must be a discrepancy somewhere, and thought it might arise from a want of absolute knowledge of the chemical effects of the spectrum. He mentioned that horses kept in very dark stables turned blind. This was simply from the rapid transition from dull to bright light and showed that the ill effects occurred apart from colour.

Captain Abney asked Mr. Ackland whether he considered it to be the red colour of the light in the dark room or simply the strains on the eyes which produced ill effects.

Mr. Ackland was not prepared to say.

Captain Abney objected to aurine that unless the coating were thick a trace of violet light penetrated. He had not stated that canary medium was not safe, but more light came through orange paper or stained glass with the same amount of photographic effect. Ruby glass was not safe, as it lets through blue light. He thought experimentalists on the chemical effects of the spectrum were pretty well agreed.

The Chairman said the experiments could not fail to lead to good results. He proposed a vote of thanks to Captain Abney which was carried by acclamation. He (the Chairman) read a communication from Mr. Jabez Hughes, stating he was seriously ill.

It was announced that the next technical meeting would take place on Tuesday, the 25th instant, when there would be an exhibition by lanterns of slides prepared by various methods.

The meeting was then adjourned till April 8th.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

A meeting of this Society was held at the Rooms of the Society of Arts, John-street, Adelphi, on Thursday, the 6th instant,—the Rev. F. F. Statham, M.A., occupying the chair. The minutes of the last meeting having been read and approved,

The Chairman announced that Mr. Macbeth had awarded the medal for the best picture of those exhibited by members to Mr. F. A. Bridge for a picture entitled *River View*. The pictures exhibited would be kept in the Society's album, as also would Mr. Macbeth's letter, which was very instructive. He (the Chairman) asked if any members had tried the canary medium distributed at the last meeting.

Mr. A. Cowan could speak very highly of canary medium. He had recently seen Mr. W. Cobb's dark room, which was about twelve feet long, and which was lighted by one bat's-wing burner behind one thickness of canary medium. The light was brilliant, but a plate was not fogged at the further end of the room by an exposure of twenty-two minutes.

The discussion as to whether ready-sensitised paper gave prints more or less permanent than ordinary paper should have been taken up at this stage, but it was decided to postpone it till after Mr. Dunmore had read his communication, as the subjects were so similar they might be discussed together.

Mr. E. Dunmore then read his paper on *Old Photographs*. [See page 169.]

The Chairman said the subject would stand even more than Mr. Dunmore had read on it. It was a useful one, and he thought it would be particularly beneficial if failures were considered, as then photographers might learn what to avoid. Mr Dunmore had laid great stress on the matter of permanency, and certainly some of the specimens appeared to prove that permanency was possible. They should not lose sight of the fact that they had now better machinery and appliances than they had some years ago, and that by this might be explained any superiority to be seen in photographs of the present day over those of the past. He hoped that different processes would be represented. The Society once had a committee of experimentalists who tried various processes and reported on them. He had brought a few specimens of different processes—amongst others a carbon print by Mr. Johnston; also a few specimens of wax-printing and some chromolithographic prints. He proposed a cordial vote of thanks to Mr. Dunmore. This being passed,

Mr. E. W. Foxlee said he had brought down a few old prints. They had been in a very good state of preservation two years ago, but since then had been standing against a damp wall, and had suffered somewhat thereby. One was on salted paper taken in 1854, the toning bath being that known as the *sel d'or*. A pair of stereoscopic views were shown to demonstrate the fact that the density of a negative has much to do with the permanence of the print. One of the negatives had been denser than the others, and the half of the print which bore the impressions from the dense negative was in good condition, whilst the other had faded. Specimens were shown demonstrating that prints, both mounted and unmounted, went faster at the edges than at the centre. One print which had been toned with sulphur, no gold being present, was found to be in good condition.

Mr. F. York showed a print taken in 1856, which was growing very yellow. One that had been mounted over another print showed the part round the edge which was in contact with the mount to be faded, whilst that over the print was not. This seemed to point to the fact that something in the paper of the mount tended to fading.

Mr. T. Parkinson (Vice-President of the Bolton Photographic Society) had prints toned both by the *sel d'or* bath and in the hyposulphite bath which had kept well. He thought prints on the paper prepared at the present day would not keep so well as those on the paper prepared some years ago.

Mr. W. M. Ayres exhibited prints taken in 1851, which were in fair condition. He also showed prints on double-albumenised paper taken many years since. He thought prints mounted on glass with isinglass, and with paper pasted on the back of them, were permanent.

Mr. F. Howard remarked, with regard to prints fading first at the edges, that when they were kept in books the edges were more subject to atmospheric influences. When a photograph was mounted, carefully framed, and placed in a dry room, fading took place equally all over it.

Mr. Foxlee said another theory of fading at the edges was that in mounting the print was pressed into closer contact with the mount at the edges than in the centre.

Mr. Ayres remarked that mounted prints faded more rapidly than unmounted ones.

Mr. H. P. Robinson, of Tunbridge Wells, sent a portfolio of prints taken in 1855, 1856, and 1857.

Mr. Foxlee said that the most permanent prints were taken on very slightly-albumenised paper.

The Chairman thought this might be attributable to galvanic action, and cited the case of iron rails which were eaten away at the contact with solder, and referred also to the sheathing of ships. He said there was an American photographic journal of 1856 with photographic illustrations which were very much faded.

Mr. W. M. Ashman said that the effect of time was to diminish the lustre of the surface of prints. He instanced some prints which had been in a show-case for only a few months, the surface of which had deteriorated very much.

Mr. Foxlee believed that this was due to alternate condensation of vapour on the prints and the re-evaporation of it. In 1856 pure albumen was seldom used for paper. Water was always mixed with it.

Mr. York could not see why ready-sensitised paper should give prints less permanent than other paper. The silver salt was the same, and the citric acid could be neutralised in the last washing water before toning. Some time ago it was stated that the silver sensitising bath might be used at half strength by adding nitrate of soda to it. Two prints produced on paper—one sensitised with a sixty-grain silver bath, the other on a bath of thirty grains of silver and thirty grains of nitrate of soda—showed great difference in permanency. The prints on the sixty-grain bath lasted much better than those on the other; he, therefore, thought it important to use a strong bath. He wished to ask Mr. Dunmore in what did a solution of hyposulphite of soda deteriorate.

Mr. Dunmore said that the hyposulphite turned to sulphite if it stood long.

Mr. York suggested that the prints sent in for competition should be each marked to indicate whether or not ready-sensitised paper had been used in their production, and that thus in time the question would be solved.

Mr. Dunmore said that many of the prints sent round had been sensitised in a bath of forty grains of silver and forty grains of nitrate of soda

Mr. York stated that there was a great difference between forty grains and thirty grains. Ready-sensitised papers were generally blotted off and not drained, so that there would be less free silver nitrate; and for that reason the image might be less permanent.

Mr. Dunmore had prints done on Durand's paper when it first came out some fifteen or sixteen years ago, and they had not faded.

Mr. T. Bolas said the question was a difficult one, and required more time than could be devoted to it in one evening.

Mr. Ayres considered that the surface of the paper was injured by the citric acid in ready-sensitised paper.

Mr. Parkinson thought that ready-sensitised paper gave less permanent prints than other paper.

Mr. W. K. Burton said that at anyrate in the case of prints on ready-sensitised paper there was a difference in the permanence according to whether or not the free silver was well washed out of the prints. If it were not they toned very quickly, but lost part of their tone in the fixing bath and faded in a few years.

Mr. Foxlee agreed with Mr. York that the more silver there was in the paper and the more of this there was reduced in the print the more permanent was the image. It was, therefore, necessary, in comparing the two kinds of paper, to take into consideration the amount of silver contained. Probably Durand's paper was once sensitised on a stronger bath than at the present day. In 1856 a ninety-grain bath was frequently used.

Mr. Ayres had found that a few sheets of Durand's paper spoiled a toning bath containing forty-two grains of gold chloride.

Mr. Mackay said that there were such great differences between different kinds of ready-sensitised paper that it was as impossible to class them all under one head as it would be to class ready-sensitised paper and that prepared in the ordinary way together. Some ready-sensitised papers printed red and others purple.

The conversation here became general, and, after a vote of thanks to the Chairman, the meeting was adjourned.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society, held on Thursday, the 6th instant, Mr. J. Barker occupied the chair.

Mr. F. W. Hart showed an arrangement of an Argand gas burner enclosed in a glass tube of about two inches larger diameter than the chimney. This tube was closed at the bottom, so that the air for feeding the flame passed between the two glass surfaces and became strongly heated before reaching the flame. The glass chimney was continued by an iron tube, so that the products of combustion could be led away. It was considered that it could be usefully employed in photographic dark and work rooms, as it would ventilate instead of vitiating them.

Mr. J. B. B. Wellington exhibited a lantern with yellow paper and green glass similar to the one previously presented by Mr. A. Cowan, except that it was made of wood, which was a material that many could use who were not experienced in metal working. There was one point in connection with it that would be sometimes a convenience—the front slid in a groove and could be easily opened, and the bare flame utilised when printing transparencies.

Mr. Hart inquired whether there was any difference in the safety of the light when the glass or the paper was outside.

Mr. Wellington thought not.

Mr. A. L. Henderson showed a changing-box that was made for him by Messrs. Dale and Hare, on the principle which has been previously described. Certain alterations had, however, been made in accordance with his (Mr. Henderson's) instructions. The plates would only work in one direction, and, therefore, could not be put backwards by carelessly turning the box the wrong way round. There was also—and in place of the small piece of ruby glass through which the number of the slide was examined, and which might be thought in a bright light to be the cause of some fogging—a contrivance by which the plate in being changed moved an index, visible on the outside and marked with the number of the plate ready for exposure.

Mr. Hare thought Mr. Henderson's alteration complicated the construction, and that with the original formation there was no danger of the evils to which reference had been made.

Mr. W. E. Debenham considered Mr. Henderson's alterations an ingenious improvement.

Mr. Wellington showed some negatives on plates coated with an unwashed emulsion. There were mottled markings on these plates, which, however, could be removed (as shown on the half of a plate that was exhibited) by dilute hydrochloric acid.

Mr. Henderson thought the action of the hydrochloric acid was partly to swell the gelatine, and that it was by this action that the markings had been removed.

Some discussion then arose on the subject of polarised light.

Mr. A. Haddon recommended the work of Mr. Lewis Wright on the subject to those who wished to make a study of it.

In obedience to the strongly-expressed wish of the members Mr. C. Darker promised to give another demonstration on the subject of polarised light, dealing particularly with the scientific side of the question.

AMATEUR PHOTOGRAPHIC ASSOCIATION.

A council meeting of this Society was held on Thursday, the 28th ult., at 12, York-place, Portman-square,—Lieutenant-General the Right Hon. the Lord de Ros in the chair. The minutes of the last meeting having been read and confirmed,

The following members were elected:—Major-General C. F. Arbuckle, R.A., Sir. W. T. Thompson, C.B., Lieut.-Colonel S. Micholl, Messrs. P. H. Emerson, B.A., M.R.C.S., H. R. Moiser, F.G.S., W. H. Sedgewick, E. G. Burls, L. F. Reichling, W. D. James, T. H. R. Salmon, H. E. White, M.A., F. C. Borckhardt, J. T. Black, R. G. Bellringer, and C. A. Gilder.

The Secretary then laid before the meeting the following prizes, which had been awarded at the annual meeting:—First prize, an oil-painting in frame, by Carl Frisch, Mr. R. Leventhorpe. Silver goblet, Mr. S. Norman. Silver goblet, Mr. W. S. Hobson. Water-colour drawing in frame, Mr. R. O. Milne. Oil-painting in frame, by J. W. Waterhouse, Mrs. Abbott. Silver goblet, Mr. W. Muller. Silver goblet, Mr. G. Western. Water-colour drawing in frame, Mr W. Adcock. Water-colour drawing in frame, Mr. P. Gunyon. Landscape album, Mr. T. Brownrigg. Portrait album, Mr. F. S. Schwabe. Portrait album, Mr. G. Brook, Jun.

These prizes were approved, and the Secretary was directed to deliver them to the members to whom they had been accorded.

A vote of thanks to the Chairman was passed, having been proposed by Mr. Glaisher and seconded by Captain Lewis.

MANCHESTER PHOTOGRAPHIC SOCIETY.

The ordinary meeting of this Society was held at the Mechanics' Institution, on the 14th ultimo,—Mr. J. Pollitt, President, in the chair. Messrs. Barlow, Lomas, and Hadfield were elected members of the Society.

The Chairman referred to the relative plates exhibited at the previous meeting by Mr. Chilton, showing insensitive marks in pictures, and said he thought the marks were caused by the precipitation of Ag Br to the edges of the plates.

Mr. R. Atherton said he had met with a similar trouble, but had traced the defect to the emulsion being short of gelatine.

Mr. Smith brought some plates showing similar markings, which, in his opinion, were caused by imperfect removal of the decomposition salts.

Mr. J. Schofield contended that this explanation could not be correct, or the marks would occur all over the plate. He further stated, in support of his belief (expressed at the previous meeting), that faulty drying arrangements were the cause, and that he had made an arrangement in his drying-box which permitted the plates to be inspected during drying, and was confirmed in his opinion.

A somewhat lengthy discussion ensued on the same subject, Messrs. Schofield, Atherton, Chilton, and Smith advocating their own theories.

Mr. J. W. Leigh showed a negative developed by the light of ordinary gaslight screened with canary medium, and decided to adopt this illuminating medium in his dark room. The negative was perfectly clean.

Mr. Richton read a paper *On Swing Backs* versus *Rising Fronts*, illustrating his remarks by means of an ingenious model of a camera in section. The paper was warmly received.

The Chairman expressed his pleasure in hearing the communication, and complimented Mr. Richton on his ingenuity in designing the model. He stated that his objection to the swing-backs was that he thought that placing the plate at too great an angle to the axis of the lens must have a distorting effect, and showed a photograph of a rectangular figure, using swing-backs and then with rising-front, thus proving by measurement that there was some distortion arising from the use of swing-backs.

Mr. J. Y. McKellan advocated a swing-front as doing all that could be done with swing-backs without any distortion.

Mr. Schofield considered that the best way was to combine the rising-front and swing-backs.

Mr. Watts expressed himself much pleased with Mr. Richton's paper, and moved a vote of thanks. Mr. Blakely seconded the same, which was carried.

The Chairman suggested that, as the subject had evidently excited a good deal of interest, members should study the matter before the next meeting.

Mr. Watts was requested to read a supplementary paper, and the meeting was adjourned.

LEEDS PHOTOGRAPHIC SOCIETY.

The usual monthly meeting of this Society was held on Thursday, the 6th instant, in the large lecture hall of the Leeds Philosophical and Literary Society. The hall was well filled by the members and their friends. In the absence of the President, Mr. J. W. Ramsden, Vice-President, occupied the chair. After the transaction of a little formal business the meeting proceeded to the election of new members, and Messrs. Law, Lloyd, Whitehead, and Professor Rücker were declared duly elected.

The Chairman then called upon Mr. W. Teasdale to conduct the lantern exhibition.

Mr. Teasdale expressed his pleasure at seeing so many members and friends present, and also at the large number of slides which had been sent in for exhibition. Lantern work was new to most of the members; but the slides which he and the Hon. Secretary had had the opportunity of examining were very good, and quite equal to those generally seen. In selecting from such a large number preference would be given to those produced by the members, and if time allowed the very fine slides by professional makers would be passed through.

Mr. Pocklington exhibited a series of fourteen slides, taken on gelatino-bromide plates, and illustrating the various effects produced by using such developers as ferrous oxalate and ammonium chloride, hydrokinone and carbonate of soda, pyro. and carbonate of soda, ferrous oxalate and nitrate of potash, &c.

Mr. H. Rodwell showed transparencies on gelatino-bromide plates developed with pyro. and toned with mercury.

Mr. Thompson exhibited an instantaneous view of a tramway car.

The Chairman showed slides on gelatino-bromide plates reduced from 8×10 negatives, some of which were taken thirty years ago. He also exhibited two slides of each subject, one being developed with tartaric acid and ferrous oxalate and the other with pyro. and pearl-ash—fifteen grains of the latter to one ounce of water.

The Hon. Secretary presented a series of slides on gelatino-bromo-iodide plates and gelatino-chloride plates (own make), showing on both bromide and chloride plates the difference in tone, varying from blue black to bright red, that could be obtained by variations in the exposure and development, the exposures to the same light varying from four seconds to forty-five minutes.

Mr. Kidson showed transparencies on gelatino-bromide (Ramsden's) plates.

Mr. W. Denham exhibited a number of very fine transparencies—shipping and landscapes in the Isle of Man—on Ramsden's, Nelson's, and Cowan's plates.

Mr. W. Teasdale presented some slides on gelatino-bromide plates, and also on plates by Chapman, Cowan, and England. He (Mr. Teasdale) also exhibited transparencies of Muybridge's animals in motion, and a very fine selection of slides by the Woodbury process.

Mr. J. W. Reffitt showed some very fine instantaneous views of *Swans, Boy Sailing Boat*, &c., and a number of continental slides.

The lanterns (oxyhydrogen), fitted with Dallmeyer's lenses, were lent by Messrs. Reynolds and Branson, and were manipulated by Mr. White, a member of the Society.

The meeting was then adjourned.

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION.

The sixth monthly meeting of this Society was held in Lamb's Hotel, Reform-street, on Thursday, the 6th instant,—Mr. J. C. Cox, President, in the chair. The minutes having been read and approved,

Dr. J. K. Tulloch then proceeded to make some remarks on *Halation*. [See page 167.] A lively discussion followed, and Dr. Tulloch promised to extend his experiments and give some more particulars at the next meeting.

The adjourned discussion on Dr. Tulloch's previous paper, *Shortcomings of Photography*, was then resumed, and a very animated discussion ensued.

The nomination of office-bearers for the ensuing season was then proceeded with, and it was arranged to ballot the names at next meeting.

The question-box contained the query—"Whether is collodion or varnish the best protector of gelatine plates?" The inquirer was recommended to use a coating of each, applying the collodion first and the varnish above it.

The subject for next monthly meeting was announced as *Still Life*.

It was arranged to hold a competition for lantern slides within a fortnight, each member to send only three slides for *competition*, although at liberty to send as many as he chose for exhibition.

Mr. G. D. Macdougald exhibited his new instantaneous lantern slide carrier, which, by an ingenious but simple arrangement, instantly substitutes one slide for another.

A vote of thanks to the Chairman brought the meeting to a close.

BOLTON PHOTOGRAPHIC SOCIETY.

The usual monthly meeting of this Society was held on Thursday, the 6th instant, when there was a very fair attendance. Mr. Heaton was elected a member of the Society.

It was decided that the third annual open meeting be held in April next, and the evening was spent in discussing the arrangements.

Owing to the unavoidable absence of Mr. R. Harwood, the usual lantern exhibition was not given.

SHEFFIELD PHOTOGRAPHIC SOCIETY.

The regular monthly meeting of the above Society was held in the Freemasons' Hall, on Tuesday, the 4th instant,—Mr. J. H. Rawson occupying the chair. There was a very large attendance.

Mr. W. B. Hadfield introduced the subject of lantern slides, and exposed and developed several plates before the members. He succeeded in producing by contact printing, by gas and candle light, several good transparencies on Chapman's gelatino-albumen plates. He also exhibited a variety of slides made at home, both by contact printing and through the camera.

Mr. J. Turner exhibited some excellent slides made on ordinary gelatine plates developed by the alkaline pyro.

Mr. W. Dakin brought a brilliant transparency developed with pyro., and gave very practical arguments in support of the ordinary pyro. developer being all that was necessary to produce perfect transparencies. He suggested that the use of the alum, acid, and iron clearing and intensifying solution was very valuable in slide making.

Mr. Ainley also gave some useful hints in the exposing of transparencies, and argued that a long exposure to a weak light was much better than a short exposure to a strong light, and in favour of a quick development. Many other members took part in the discussion.

Mr. Dickenson brought an excellent burnisher of his own make, which was highly commended for its construction and cheapness.

Messrs. Nillington and Walker were elected members of the Society. After further discussion and various announcements relating to the monthly competitions, a most interesting and practical meeting was brought to a close.

NORTH STAFFORDSHIRE PHOTOGRAPHIC ASSOCIATION.

The monthly meeting of this Society was held at Hanley, on Wednesday the 5th instant,—Mr. C. Alfieri in the chair.

The Chairman exhibited an instantaneous shutter made by himself for a stereoscopic camera, and constructed to work behind the lenses; also, some dark slides his own make, a novel feature in them being that each slide held four quarter-plates, each of which could be exposed separately.

On Wednesday, the 12th instant, Mr. Alfieri invited a number of the members to his residence at Northwood, and placed a good lantern and his laboratory at the service of those present. He proceeded to give a demonstration of a method of enlarging upon Messrs. Goodall and Steven's enamel paper, plain paper, and opals. Several enlargements were successfully made from half- and quarter-plate negatives, a large three-wick burner being used; the exposures given varied from one to three minutes. The resulting pictures were developed with M. Audra's modification of the ferrous oxalate developer. The pictures, and the simple process by which they were produced, were much admired, especially a vignetted enlargement of a child's head on opal from a negative taken by Mr. Allison, six enlargements having been made without a failure in any case.

The members congratulated Mr. Alfieri upon his skill, and Messrs. Goodall and Steven upon the high quality of the materials supplied. All the pictures were remarkable for freedom from any defect and for the preserved purity of the whites.

A vote of thanks was passed to Mr. Alfieri for his kindness.

It was resolved to engage a suitable room in Hanley, where chemicals and apparatus might be stored, and demonstrations of any kind given.

The Hon. Secretary offered the use of his studio and dark room to any of the members during the coming summer.

After some interesting conversation upon technical topics and thanking their host the meeting separated.

Correspondence.

March Meeting of the Photographic Society of France.—M. Sauter on Development of Gelatino-bromide of Silver Emulsions.—M. Boscher and the Electric Light.—Instantaneous Photography in the Studio.—Rapid Shutter with Electric Trigger.—A New Stretcher for Films in the Dark Slide.—Presentation by Professor Stebbing of Reconstructed Negatives by Means of Transparent Films.—Presentation of Microbes in Tuberculose Microscopic Preparations by MM. Perrot de Chaumeux and Londe.—M. Vidal's New Stand.—M. Gauthier-Villars' New Photographic Publications.—M. Balagny's New Transparent Paper Films.—Obernetter's Etching Process.

The monthly meeting of the Photographic Society of France was held on Friday evening last, the 7th instant,—M. Péligot in the chair.

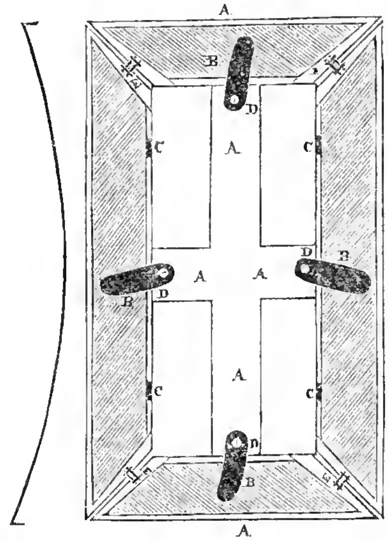
M. Sauter, of Geneva, sent a communication to the Society on the development of gelatino-bromide plates. He said that whatever the exposure a good negative may be obtained by careful development. A proof was sent round, of which the negative had been over-exposed at least four times. He had so controlled the development as to get a good proof. It appears that he plunges the over-exposed plate into a ten-per-cent. solution of potassium bromide. The plate is then developed in the ordinary ferrous oxalate bath, to which has been added a little citric acid. A few drops of a five-per-cent. solution is all that is necessary. M. Sauter appears to have succeeded in obtaining great control in developing—probably because he has been experimenting upon plates which he has over-exposed from one to four times. Thus he has been able to know how much restraining solution to employ to get a certain result; but it may be very empirical to try it upon plates of which the proper exposure is not known, for if it act well upon over-exposed plates it probably would have the opposite result upon under-exposed ones.

M. Boscher advocated the use of the electric light for portraiture. He employs, he says, with success, four arc lights, the carbons of which are burnt in proximity to marble pillars. A number of proofs (*carte* album) were passed round. They did not secure the approval of the members, as they were inferior to those obtained by the orb of day, and the remark was passed that it was of no avail in placing electricity in competition with our old friend the Sun if results were not better, or at least equal, to what was obtained by his agency, &c.

M. Haincque de St. Senoch (one of our most enthusiastic amateurs) has been experimenting in order to obtain instantaneous portraits in his studio. He presented an album to the Society, in which is portrayed the image of a clown going through all his fantastic and ludicrously-wild antics. Summersaults and all his Merry-Andrew tricks were faithfully seized by the photographic plate. The album showed a decided success, and the author was complimented by his colleagues for his perseverance.

M. Trevaux presented an instantaneous shutter with an electric trigger. A small electrical battery is carried in the pocket, and is connected by means of wires to the trigger. M. Trevaux said that this system was far preferable to the air-ball and tube, as the latter required complicated fillings in the interior, which, when put in motion by the pressure of the hand upon the ball, caused the apparatus to vibrate, whereas the electric trigger gave none. There is nothing new here so far as I can see. A good "dodge," however, is that when the electric current is not wanted the battery is turned upside down and no electricity is generated.

M. l'Abbé Raboisson, in his voyage to Africa, employed photography, and in order to make his luggage as light as possible he employed films instead of plates. To work the same without the aid of a fixed glass plate, and to have them perfectly flat in the dark slides, he invented a stretcher which did good service. The stretcher is made of thin brass, exactly of the size of the film required. The film must be cut to a quarter of an inch larger than the frame. The film is laid upon the table, and the stretcher is placed upon it. The edges of the paper touch the film but the middle does not, as the edges form a curve. We shall soon perceive the object of this. To fix the film in the stretcher one of the buttons D is turned round, the shutter B is lifted up, and the quarter of an inch of film is brought over. The shutter B



A, thin brass frame. B, four brass shutters. C, hinges fastening shutters to frame A. D, buttons keeping the shutters B in close contact with frame A. E, sliding bolts to keep corners of frame A in their place.

is dropped down upon it, the button is put in its place, and so on with the three other sides of the film. The stretcher is placed in the dark slide, the back of which, coming in contact with the centre of the stretcher, cannot be shut without a certain pressure being given. This pressure forces the stretcher to become flat, and thus the frame A gains about one-eighth of an inch or more in length and width, and the film is stretched like the head of a drum. This apparatus is very ingenious, but has two faults—first, being heavy and expensive; and second, requiring films larger than the proof obtained.

The simple method adopted by M. Vidal, of putting diachylon plaster upon the two sides of a sheet of ebonite for double frames, is both easy and cheap, and offers no difficulty whatever. After exposure the exposed film is torn from the sticky surface and another put on in its stead. If the diachylon become too hard it can be softened by a little benzoline, and if too soft a little French chalk is sifted over it.

I had the honour to present the Society with some film negatives which had been obtained from paper prints. The object of the presentation was to show the ease and facility photographers now have to make reproductions of valuable negatives. A good print is obtained from a negative, and it can be retouched, clouds put in, &c., if the view be a landscape. The print is placed in a printing-frame, image upwards, and the sensitised side of the film is put upon it. The padding is placed in the frame, closed, and firmly screwed up with iron screws, if possible. The more pressure the better will be the results. The frame is now exposed to gaslight from five to ten seconds. The light goes through the back of the positive print, the paper of which acts as a screen of ground glass. When developed a magnificent negative is obtained—quite as good as, if not better than, the original one. The preservation of film negatives is a very easy matter. Thousands can be laid one upon the other without any fear of their weight breaking down the house or their being destroyed by any other agency than damp. This, indeed, can be diminished to a minimum by coating the film negatives with collodion.

M. Jubert forwarded a long letter to the Society on the composition of commercial bromides.

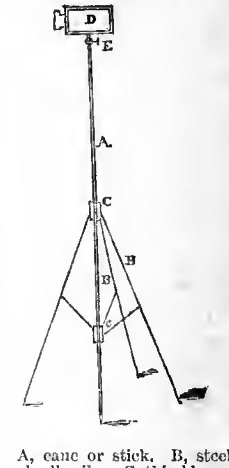
The Chairman said as it was very long it could not be read that evening, and gave instructions that it should be inserted in the *Bulletin*. A scientific analysis of the different bromides as an easy means of discovering frauds would be a great boon to emulsion makers, as adulteration is not unknown in these most necessary chemicals.

MM. Perrot de Chaumeux and Londe have made some very interesting experiments, in a medical point of view, on the microbes of the tuberculosis. The expectorations of persons afflicted with the "phthisic pulmonaire" have been photomicrographed, and the animalcules were clearly seen by enlarging the image by projecting it upon the screen.

M. Mourlot exhibited a new substance partaking of the qualities of india-rubber and gutta-percha, at about half the price. This substance will be of great service in making trays for baths and different solutions used in photographic manipulations.

The Secretary announced that the yearly banquet of the Society would take place on Saturday, the 15th instant, and that the Society would welcome the members of any foreign society presented by one of the members.

M. Vidal completed his presentation of a pocket apparatus by exhibiting a very light stand for the same. The stand is composed of a light stick, like the handle of an umbrella. The resemblance goes further, as in the centre of the stick is attached to a thimble three steel umbrella ribs. These ribs, when opened and placed upon the ground, form a triangle, the stick going through. The ring or thimble at their point of junction falls upon the ground, and, having a steel point, it penetrates a little into the soil. The three ribs now keep it perfectly steady, and, notwithstanding its extreme lightness, the apparatus when put upon its top does not vibrate. An ordinary tripod stand has three points of support in the ground. M. Vidal's has four—the three legs and the centre stick—which give solidity to the whole. The camera-stand goes into an ordinary hollow walking-stick. M. Vidal was highly complimented. That gentleman then passed round a number of negatives and paper positives obtained by his pocket camera. The large negatives were, he said, obtained upon Professor Stebbing's new expanding films, manufactured at his request for his pocket camera. The small ones were upon M. Balagny's new transparent paper films. Both gave good results, but M. Vidal preferred the expanding films, as the image was much larger.



A, cane or stick. B, steel umbrella ribs. C, thimbles or rings to which are attached the ribs. D, pocket camera. E, universal socket joint.

M. Gauthier-Villars, the well-known editor of scientific books, has just published two new works which will render great service to photographers and amateurs. One, translated from the English, is Mr. Arnold Spiller's *Twelve Lessons on Elementary Photographic Chemistry*, and the other a translation from the German of the second edition of *The Theory and Practice of the Gelatino-Bromide of Silver Process*, by Dr. J. M. Eder. The name of Dr. Eder is well known to the readers of The British Journal of Photography, so it would be superfluous to speak of the value of the work, because Dr. Eder has given proof of his remarkable activity, high intelligence, and deep research—all of which he has devoted to the progress of the photographic art. I can only counsel all who practice photography to have this interesting and scientific work in their laboratories. M. Gauthier-Villars must also be commended for placing this valuable and instructive book in the hands of all who understand the French language.

M. Balagny—another of our distinguished amateurs—presented a new gelatino-bromide of silver film supported upon paper. He names it—"*Papier transparent a pellicule reversible au gelatino-bromure d'argent.*" The paper film is exposed in the camera or employed to obtain positives by transparency. The emulsion of which it is made is excellent, and the whites are clear and no sign of fog can be detected; it adheres firmly to its proper support and never frills. The development goes on without any difficulty, either by the pyro. ammoniacal or the ferrous oxalate systems. M. Balagny informed the members that the paper when once in the developer has no tendency to roll or curl up, and as the film of gelatino-bromide of silver is very thin the development is rapidly terminated, the negatives or positives obtained being free from faults and very intense. As soon as the hypo. is eliminated the film can be transferred (on either side) upon a sheet of glass or transparent gelatine, or can be made into a transparent film by collodionising the two sides of the film. M. Balagny demonstrated this transfer before the members. One of the most interesting experiments had for its object to obtain film transparencies for the magic lantern. The film is made to leave the paper, and when put upon the glass it has a very pretty, neat appearance, as if it were placed on ground glass. This brings out the positive in all its details, and is caused by the starch paste employed to hold the film upon the paper. For positives this appearance is very harmonious, but for negatives it would not be beneficial. The author explained that by washing the film the paste was dissolved and the film could be made perfectly transparent. M. Balagny then showed how easily stereoscopic pictures could be obtained by his process. He took proofs out of the water, cut them of the proper size, placed them, image downwards, upon the glass plates, and with a squeegee drove out all the water and the air-bells. He then took some dry ones, and the paper left the film with the greatest ease. Some negatives were then shown upon paper, and in order to strengthen or thicken the film a piece of the commercial gelatine films was placed in water and then affixed to the film with the greatest ease. To sum up: when an image is obtained upon this film paper it can be transferred to any object and re-transferred as often as wished for. A great desideratum has been accomplished by M. Balagny by obtaining films which can be printed from on either side. Mechanical printing can now go on at full swing, being no longer fettered by the necessity of turning the negative, &c. Any of the known means of fixing films in the dark slide can be employed, such as glass support, diachylon, and the Abbé Raboisson's new stretcher. Amateurs will be the first to welcome this new paper, which is so precious for those who travel far from their homes. Breakage is no longer to be feared, not to speak of a notable diminution in weight and facility of manipulation. M. Balagny, during his experiment, crushed up a film in his hand. The negative was not injured in the least by this rough treatment. M. Balagny was felicitated for the very great progress he had made and the perfection he had attained in his transparent paper films.

Herr Obernetter's method of engraving plates was discussed. A journal publishing the method as a new discovery has wakened up other inventors. The same process has been worked for years in Manchester, and was patented by Mr. Sachs, in England, on the 11th of February, 1880. Herr Obernetter now employs a new patented process, which consists in coating a sheet of paper with bitumen and gelatine. The back of the paper is bichromated, and then exposed to light under a positive or a negative. The paper is then put into warm water, when the gelatine unacted upon by light swells up and raises with it the coating of bitumen. This washes away, while, on the contrary, the parts acted on by light maintain the bitumen, and an image is thus formed. When dry the paper bearing the bitumen image is pressed upon a block of metal. The back of the paper is damped with perchloride of iron, and this passes through the paper in every part where the reserve of bitumen is absent, eats into the metallic plates, and engraves the image. A more simple process could not have been thought of. I have myself seen this process in full work in this city. E. Stebbing, *Prof.*

25, *Rue des Apennins, Paris, March* 11, 1884.

SINGULAR LUMINOSITY OF THE ARGENTIC-BROMIDE FILM.

To the Editors.

Gentlemen,—I have very carefully read the letter by "A. S." in your last issue, and I can hardly think he means seriously what he seems to say, which, read with my article, amounts to this—that the evolution of a greenish-blue light is the result of the presence of an orange-coloured one.

The theory of complementary colours and the retention of the retina would, no doubt, account for the light I produced being apparently greenish-blue; but "A. S." would seem to go further than this, and say that the existence of one source of light accounts for the production of another. This proposition seems hardly worth combating; but I would ask if it be seriously advanced? Why are such appearances as my "silent discharge" not more common—indeed general—with all using such a very common form of lamp as the two thicknesses of orange paper mentioned? Why should I only have seen them when the disruption was forcible, and not when there was no adhesion of the pieces of paper to the film?—I am, yours, &c., H. H. Cunningham.

Notes and Queries.

S. S. B. asks—"What is the date of Swan's carbon patent, and is it still in force?"——In reply: The patent was obtained on February 29, 1864, and has long since expired.

How can brown tones be obtained in transparencies made by the wet collodion process?—G. Henry.——In reply: An application of a solution of sulphide of potassium will give the tones desired, but this toning agent is a treacherous one.

J. P. T. inquires whether gelatino-bromide plates of English manufacture can be procured in Switzerland—by preference, in Geneva.——If he be about to visit that country he would act prudently in taking out with him a supply of the particular class or make of plates to which he has become accustomed. Perhaps some reader familiar with the state of the plate supply in Switzerland will answer the query.

A New York Citizen.—This correspondent addresses to us a very singular query. He says:—"Is there anything either legally or morally wrong in being a vendor of a photographic process?"——Certainly there is not; but, on the contrary, there *may* be much that is commendable in process-vending. If an individual know of something he believes to be good that would prove beneficial to photographers he would act a rather churlish part in withholding it from them. On common business principles, however, he is not necessarily entitled to give it to them without remuneration. But he is wrong if he show as the result of a certain secret process something not produced by it, and then sells the process under this false impression. This is both morally and legally wrong. Otherwise it is an ordinary business transaction, in which one obtains a sum of money from another for imparting to him certain knowledge of which he was previously ignorant.

A lens in my possession, which hitherto had proved to be as near perfection as any single landscape lens I have yet seen, has during the present winter shown indications of the disintegration of the balsam by which its components are cemented. I have on the advice of a friend exposed it to heat in the expectation of the balsam becoming melted and re-spreading itself between the surfaces. But this result has not followed, although I have heated it by placing it in water not far below boiling-point—in fact, hotter than I could bear when incautiously inserting my fingers. I have tried when thus heated to effect a separation of the lenses by sliding one upon the other, but the cement does not yield to heat. Kindly say how I am to proceed. I have uncemented many lenses, but this one defies my best efforts.—J. A. B.——In reply: Procure a round tin box of sufficient capacity to contain the lens, which place inside, and fill up with benzole, allowing it to stand for one or even two days. The benzole will very slowly penetrate between the lenses and dissolve (or at anyrate soften) the cement, and thus enable them to be separated.

Vita.—This correspondent sends a specimen of his photographic work. His experience is confined to the past twelve months, and his knowledge has been derived exclusively from books. The specimen is not only creditable, but superior to much that not unfrequently emanates from establishments of good reputation.

T. W. A. says:—"I have read with much interest the article on *Polarised Light* in last number, and am induced to inquire if the polarising angle, as existing between the light emerging from the condensers and the intercepting parcel of glass plates, be the definite one we are led to suppose. If 57° be the correct polarising angle, only one portion of the light, and that a very small portion too, will be polarised, seeing that the light is projected forward in a converging beam, not one ray in which is parallel to any other. The angle, therefore, mentioned above cannot be maintained unless for the axis of the emerging and converging beam. If this reasoning be correct, then there is not a very large amount of light lost, in the sense of very little of it becoming polarised?"——In reply: Our correspondent is quite correct in his reasoning. This particular topic was, several years since, brought prominently before the notice of the British Association by the then editor of this Journal, who provided a remedy for the evil. It consisted in interposing a small concave lens in the luminous cone just previous to its impact upon the bundle of glass plates by which it is to be polarised. This has the effect of converting the converging into a parallel beam, every ray of which falls upon the glass plates at the proper angle, improving the effect in a marked degree. After reflection from the polariser the parallel rays are once more rendered convergent by a plano-convex lens, the counterpart of that previously employed in effecting parallelism. But for practical purposes there is a certain degree of latitude allowable in the determination of the angle, and this in some measure compensates for the convergence of the light.

Photographic Piracy.—Samuel Rosenthal, 12, Partridge-court, Houndsditch, was summoned before Sir Thomas S. Owden by Mr. M. B. Huish, Secretary of the Fine Arts Society (Limited), for offering for sale a photographed copy of a painting called *The Return from the Battle of Inkerman*, of which they were the proprietors of the copyright. He was also summoned by Mr. B. Brooks, publisher, 121, Strand, for a similar offence with regard to two pictures of which he held the copyright.—Mr. W. H. Burgess said he was an inquiry agent to the Fine Arts Society, and others. On the 4th instant he was on the City side of London Bridge, when he saw the defendant carrying what appeared to be photographs. Witness asked him to let him look at the pictures, and saw that there were nine photographs which had been pirated from pictures the copyrights of which were vested in different publishers. After mentioning further details, witness added that summonses were granted against the defendant. Witness had communicated with the publishers, and they appeared to press the charge.—Mr. M. B. Huish said that he was the Secretary to the Fine Arts Society. They were the registered proprietors of the picture called *The Return from the Battle of Inkerman*. He did not give the defendent consent to offer photographed copies of that picture for sale. The photograph produced was a copy of that picture.—Mr. B. Brooks said he was a publisher, at 121, Strand. He was the registered proprietor of the copyright of two pictures called respectively, *Can't You Talk?* and *Which do you Like?* He did not give the defendant consent to offer for sale any photographed copies of those pictures. The two photographs produced by Mr. Burgess were copies of his pictures.—Mr. Burgess was re-called, and said that the defendant had given him information which was correct. The man who induced the defendant to sell the photographs also induced him to pawn his goods to pay one-half their value, and they divided the receipts. The makers would not do business on any other terms. He had a wife who was very ill, and they were very poor.—Sir T. S. Owden said he wanted, if he could, to prevent the defendant going to prison. He could fine him £10 on each summons; but if he could not pay it there would be no alternative for it, for he must go to prison.—After conversation on the matter, Sir T. S. Owden fined the defendant 10s. and costs on each summons, with the alternative of five days' imprisonment on each, the terms to be consecutive.—*Standard.*

Exchange Column.

I have a rolling-press, two rollers, $6\frac{1}{2} \times 3$ in. diameter; also, *Bigelow's Album* (with key) *of Lighting and Posing*. Wanted, anything in exchange in photography.—Address, NEWTON, 276, Ribbleton-lane, Preston.

What offers for Ross's No. 2 quick-acting *carte* lens and posing-chair? Wanted, half-plate bellows-body camera and dark tent, portable; difference adjusted.—Address, SULPHITE, 52, Goldsmith-road, Peckham, London, S.E.

What offers for seven valuable books, best works on photography, chemistry, retouching, &c. (list on application); also retouching-desk, and four-wheel dark carriage, suitable for pony?—Address, PROTT, 18, Tacket-street, Ipswich.

I will exchange a quantity of birds (foreign), with three domed aviary (nearly new), made to partition into three separate cages, for good cabinet lens or anything useful in photography.—Address, A. HOLT, Northleigh House, Stowmarket.

I will exchange $2\frac{1}{4}$-inch portrait lens (takes a good cabinet), large waterproof fishing bag, splendid bottom tackle case, both equal to new, cost 25s., for stereographic lens or $\frac{1}{4}$-plate portable camera.—Address, W.E., 2, York-street, Covent-garden, W.C.

I will exchange a 15×13 rolling press, by Knox and Co., of Glasgow, cost £7 10s., for anything useful (lens), or will take £5 10s.; also wanted, a wide-angle Ross's or Dallmeyer's 12×10 symmetrical lens.—Address, W. WESTOBY, St. John-street, Goole.

I will exchange a 6×6 bellows-body camera, with screw to focus and folding tailboard, with carriers for 5×4 and quarter-plates, as good as new, a quarter-plate camera, a good, strong tripod stand, and a 10×8 glass bath, with case and dipper, for a 10×8 or larger Kinnear camera or other good maker, with double slide preferred.—Address, A. F. CLARK, photographer, 18, Glamis-road, Forfar.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

B. H. G.—Twenty grains to the ounce will be quite strong enough for the purpose.

GLASGOW PHOTOGRAPHIC ASSOCIATION.—Paper read at last meeting received.

R. HOLGATE.—Messrs. Nettlefold and Son, High Holborn, will, no doubt, supply all you require.

YORKS.—The apparatus is not an article of commerce. You will be compelled to make it yourself. This you can easily do with a local tinman's aid.

LANCASHIRE LAD.—Send us an example, or be more explicit in describing your difficulties, and we can then, no doubt, assist you in overcoming them.

A BEGINNER.—The "luxograph" or Moule's "photogen" might possibly answer your purpose. The electric light would probably be too expensive.

W. W.—The best plan in practice will be for you to measure the fluids and weigh the solids. This is the general custom when "parts" are given in a formula.

SYNTAX.—The better way to treat the collodion is to use it up for plate-cleaning. If it be as old as you state it will not be worth experimenting with. Better procure fresh.

MAJOR GUBBINS.—The defect arises from an inequality in the coating of the plate with the emulsion, and not from one portion being more sensitive than another, as you appear to surmise.

A. P. SHARP.—There is no such work. If one were compiled it would be quite worthless in practice, as the light is always changing, and no two makers' plate are exactly equal in sensitiveness.

W. G. M.—The enamel picture would have been very good, in all probability, if it had not been over-fired. Next time use much less heat, and do not keep the picture in the muffle for so long a time.

H. SOLTER.—The keeping qualities of the plates can only be tested by actual experiment. We have not kept them longer than six or eight months, but they showed no deterioration during that period.

S. S. S.—There is very little doubt that your failure is caused by employing too strong a solution of the bitumen, although you term it a "dilute one." Bear in mind that the thinnest possible film is sufficient to protect the metal from the action of the etching fluid, which is all that is necessary.

H. G. FOX.—There is nothing new in the fact that certain samples of paper change colour upon prolonged exposure to light. Sometimes it arises from the fibre itself becoming discoloured; at others it is caused by a fugitive pigment added to the pulp to disguise its real colour becoming bleached, and then leaving the fibre the colour it was originally.

A. WARMAN.—Yes; photographs burnt-in on ceramic ware can be produced by making a "carbon tissue" with ceramic colour instead of the ordinary pigments, developing the picture in the ware, and then firing it. The chief difficulty encountered by those who have tried this plan is that, when the heat is applied, the picture is liable to split off before the gelatine is consumed; but it has been accomplished, and some good examples have been exhibited.

G. T. FEARNSIDE.—We have no details as to how the feat was accomplished. However, it may be tried in the following manner:—The camera should be focussed for some distant object in the daytime, and then arranged so that the lens points to the sky. A plate should next be placed in the camera, the shutter drawn, and the lens uncapped. The lightning would then probably impress itself upon the plate. Of course, the experiment can only be made when it is quite dark, as the plate will be exposed all the time.

A. HICKS.—The reason that the gelatine coating does not soften sufficiently to stick to the collodion film is that you have used too much chrome alum in its preparation. Possibly half the quantity would have been sufficient for that particular sample of gelatine.

M. FRASER.—To succeed with the process it is necessary that the plates be prepared with bromide only. If iodide or chloride be present you will not be successful. There are several plans of obtaining reversed negatives, such as stripping the film from the glass, taking the negative with a prism or reversing mirror fitted to the lens, or a reversed negative may be reproduced from the original negative by the powder process. Reversed negatives may also be produced by printing a carbon transparency, and from that making a negative by superposition on a gelatine plate; also by several other methods.

PHOTOGRAPHIC CLUB.—At the forthcoming meeting of this Club, at Anderton's Hotel, Fleet-street, on Wednesday next, the 19th inst., the subject for discussion will be—*On Portraiture in Ordinary Rooms.*

AN AUTOMATIC WASHING TRAY.—Since giving a description in our last issue of the print-washing machine patented by Mr. Hazeldine, of Godstone, we have been offered an opportunity by the inventor of testing its efficacy. Although from the details given anyone possessing a modicum of mechanical knowledge must have known that it would work automatically in the manner claimed, there is always a degree of satisfaction in seeing such action in practical operation. Having placed the tray below a faucet we allowed the water to run in slowly, in the manner shown by the diagram in our last number, and no sooner had it reached a certain height than it rushed over the partition into the previously empty chamber at the end of the tray, which was thus overbalanced and caused to tilt. The syphon then operated and permitted the water to flow out, by which the tray was allowed to regain its former level position, and again to be filled with water up to a certain level, when the tilting and emptying operations were automatically repeated as before. We understand that these trays are to be manufactured in various sizes. They will, doubtless, be found very useful.

PHOTOGRAPHY AND CYCLING.—The second annual photographic lantern social meeting of the Temple Bicycle Club took place on Tuesday evening, the 11th instant, at Anderton's Hotel, Fleet-street, and was a decided success, upwards of 300 of the members and their friends being present. The programme consisted of lantern views, music, songs, and recitations. We will confine ourselves to the lantern pictures, merely mentioning that the music and singing was of the highest excellence. Some two hundred slides were put upon the screen, principally from negatives taken by members of the Temple Bicycle Club, of provincial scenery on their tours, including many well-known bicycling haunts and faces. The applause testified to the pleasure with which they were received, as well as to the skill of the photographers. The slides were specially prepared for the occasion by Mr. J. B. B. Wellington, and were shown by the Sciopticon. A new feature was the way in which the pictures were changed upon the screen, which was generally allowed to be a great improvement. One lantern only was used, and by a mechanical arrangement the picture faded away into darkness, another immediately taking its place—the short interval of darkness being practically imperceptible, and the effect far more pleasing than ordinary dissolving views. The details of the contrivance did not transpire, but we believe it will shortly be brought out by the Sciopticon Company.

LONDON GAZETTE, *Tuesday, March* 11, 1884.

ADJUDICATION.

DUNCAN JOSEPH GRANT, 53, Llewellyn-street, Pentre Ystrodyfodwe, near Pontypridd, artist, picture-frame maker, and photographer.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. STEWARD, Optician,
For the Week ending March 12, 1884.
THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

March	Barometer.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max. Shade Temp.	Min. Tem.	Remarks.
6	30·26	W	40	38	—	53	36	Foggy.
7	29·99	W	39	38	—	53	36	Foggy.
8	29·85	SW	43	41	—	50	37	Overcast.
10	30·22	W	43	41	—	52	41	Raining.
11	29·25	NE	40	39	—	46	37	Raining.
12	29·69	NW	44	42	—	49	37	Hazy.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1246. Vol. XXXI.—MARCH 21, 1884.

A NEW METHOD OF KEEPING EMULSION.

Continuing from the point at which we left off last week, we have now to consider the most convenient method of storing the emulsion we have already described, assuming, as our experience so far has led us to believe to be the case, that the emulsion itself will retain its qualities for an indefinite period.

As we left it the emulsion has simply been allowed to set into a hard mass in the vessel in which it had been mixed. This is, for obvious reasons, not a very convenient plan if the bulk is to be used up in small quantities. The quantities given last week will suffice for about twenty-four ounces of finished emulsion—more or less according to whether a thick or thin emulsion is preferred—and in its present state it occupies probably between one-fourth and one-fifth of that bulk. It is very undesirable that it should be remelted each time a small quantity is required for use, so that if it be necessary to dilute it by volume it will be needful to store it in separate small bottles (say) of one ounce capacity, each of which will suffice for about five ounces of finished emulsion.

It will readily be understood that in this concentrated form it is quite impossible to squeeze the jelly through canvas or to divide it in any of the usual ways owing to its extremely tough nature. It might probably be cut up by such an arrangement of knife edges as that described by Mr. William Bedford some time ago, and to store it in that form. A certain quantity *by weight* might then be taken and made into a given bulk of emulsion; but in any case, as will be seen later on, it is desirable to have it in a divided form.

Calculating the weight of the ingredients, the bulk should weigh a little over six ounces; or allowing for some slight inevitable loss we may set it down at six ounces. On this computation, then, we may calculate two drachms (or one hundred and twenty grains) by weight for each ounce of finished emulsion. Such proportions we have found in practice to give a smoothly-flowing and, at the same time, quick-setting emulsion.

But a better plan than this exists—the same, indeed, as that recommended some years ago in connection with washed collodion pellicle, only that in this case it is more reliable. This consists in spreading a given quantity of emulsion upon a measured surface of glass, so that each square inch of the pellicle may represent a definite quantity of emulsion. With the quantity given the area represented by a glass plate measuring 8 × 6, or forty-eight square inches, will allow two square inches for each ounce of finished emulsion, and, roughly calculating, the sheet would be about three-sixteenths of an inch in thickness—a convenient thickness for storing and for handling.

A plate of glass of the dimensions named having been edged with strips of paper, so as to form a dish, is levelled accurately by means of screws, and the fluid emulsion poured into it and allowed to set. After an hour or two it will have become so firm that it may readily be dragged or stripped from the glass in a single sheet; but before this is done it will be better to divide it with a silver knife into twenty-four pieces, each measuring 2 × 1, by making three cuts parallel with the short edge of the glass and five the other way. The sections may then be stripped separately, and each will represent one ounce of finished emulsion.

These may be placed together in a suitable jar, or, preferably, wrapped separately in clean paper first to prevent their adhesion if kept. The paper, even if it should become adherent, will be easily got rid of in the subsequent operations. By adopting this plan it matters not how long the emulsion is kept nor how much of the alcohol and water escapes by evaporation, and thus reduce the weight of the flakes; each section will continue to consist of the same proportion of gelatine and silver bromide, and will represent always one ounce of emulsion.

When required for use the desired quantity of the solidified emulsion is placed to soak in cold water. After a few minutes the wrapping paper, if that have been used, may be peeled off and the water changed. It is difficult to fix the proper time during which the pellicle should be allowed to soak, as this will depend upon the temperature, the period it has been kept, and the length of time the coated plates are likely to be retained. It is desirable to remove as much as possible of the contained glycerine, especially if the plates are to be kept long; otherwise the hygroscopic matter might be liable to cause trouble. No difficulty will, however, be experienced in this respect, as the glycerine renders the mass extremely permeable and rapidly diffuses itself throughout the water employed for soaking. Its removal may be judged pretty accurately by the gradual disappearance of the sweet taste in successive changes of water, leaving, in all probability, a slightly bitter taste from the salicylic acid.

The operation of soaking and melting the emulsion will be much quicker than would be the case if the pellicle had been cut to the same dimensions and *dried*, while the fineness of division of the sensitive salts is, we think, better preserved. The soaking will to a great extent remove the alcohol contained in the emulsion originally, though its smell will, in all likelihood, remain, so that in making up the bulk the necessary allowance must be made for an addition of alcohol, if such be desired. After filtration in the usual way the emulsion is ready for use.

As regards the question of whether the sensitiveness changes with keeping, our experience is quite in the negative. If the bromide be allowed to "ripen" during the process of precipitation, or in certain methods afterwards, and it be thoroughly freed from soluble matter, the sensitiveness appears to remain absolutely unchanged after the addition of the gelatine. If the ammonia process be used to obtain sensitiveness the alkali must be thoroughly removed by washing, though the salicylic acid would probably act as a check upon any slight trace that might remain. Any considerable quantity of alkali present, whether accidental or otherwise, is to be avoided, as it tends to induce decomposition resulting in fog. Especially would this danger be present if the glycerine employed were a sample—such as is alleged to be found in the market—made up from or adulterated with glucose. This latter substance in the presence of an alkali is known to reduce the haloids.

On a later occasion we shall probably return to the use of glycerine in other applications in connection with emulsion.*

EXPEDIENTS IN CONNECTION WITH SMALL STUDIOS.

By small studios we here mean those having low roofs. If they possess certain advantages over those of greater dimensions and height, as regards the control of the lighting of the figure, they have also certain disadvantages peculiar to themselves. When circumscribed laterally it is impossible to obtain a group in consequence of the narrowness of the background; whereas, when vertical conditions are considered, in the photographing of a tall man, taken standing, his head almost on a level with the top of the background, the obtaining of a presentable picture under such conditions borders on the impossible. Such are the adverse conditions we now wish to face, and to indicate the means by which they can be successfully overcome.

To have the sides of a background in the same picture with the subjects forming a group, and to have the top of the background with its roller, nails, or fittings vividly and sharply displayed in the immediate vicinity of the head of the tall, martial-looking figure, whose "counterfeit presentment" is being prepared for the admiring gaze of future generations, are necessities, or have been considered as such. Happily this drawback is not without its remedy.

The remedy to be here described, and which is not new even in this special application, is one based upon the principle involved in a system of vignetting introduced in the earliest days of the art. It may not be known to the majority of those photographers who have devoted themselves to the practice of the art-science within the comparatively brief period of a quarter of a century, or whose acquaintance with its history does not greatly antedate that period, that the earliest method of producing a vignette portrait consisted in interposing between the sitter and the camera a large white or light-coloured disc, in which there was an aperture having a serrated margin, through which the lens peeped at the sitter, or so much of him as could be seen through the aperture. Gentle rotation during the time of exposure ensured the serrated edges not being seen, and the result was a daguerreotype having a figure beautifully vignetted into a white ground.

This is the principle involved in the manner of extending the apparent dimensions of a background either at its sides or its head which we shall now describe. Let us suppose, therefore, that the head of the figure is so near the top of the background as to ensure both being seen in close proximity, and thus to entirely destroy the artistic effect: how is this to be obviated?

At any point between the camera and the sitter, but by preference much nearer the former than the latter, let there be interposed a screen depending from a line stretched across the studio. This screen must harmonise in colour with the background, and hang so low as only to cut off the view of the top of the background from the camera lens. The screen will thus be vignetted into the background; for being so close to the lens its lower edge will be quite out of focus. It thus forms a visually-continuous sheet with the background, and extends as far overhead as the photographer desires. It is, of course, necessary that the colour of the background and of the interposed screen be alike; otherwise there will be a want of uniformity in the tint apparent.

Desirous of seeing to what extent this joining-on of a top piece to a regular background could be carried, we carefully erected a background composed of a uniformly-even web of cloth, and at a height of twelve inches above the sitter's head we placed a black cross-bar which extended from side to side of the field of view. About forty inches in front of the camera a sheet of tinted cardboard, harmonising in colour with the background and of about two feet by eighteen inches in demensions, was suspended by the two upper corners, the "dip" being just so low as on the one hand not to interfere with the head of the sitter, while on the other hand it cut off entirely the cross-bar, which for the sake of the experiment we had meant to be very obnoxious. The degree of adjustment necessary to effect the perfect reconciliation of the main background with its subsidiary was but trivial, and when an exposure was made and the negative developed it was absolutely impossible to discover that any unusual expedient or trick had been resorted to in order to obtain the effect which was secured. In this picture there is a large space over the head of the figure—so large indeed as to lead to the belief that the background was one possessing exceptional height. What we have said will, without entering into further details, indicate the means by which the evils of a low background can be obviated.

In a similar manner may the too greatly circumscribed sides of a studio be made to give way to an apparently open lateral expanse. What is absolutely necessary in the carrying out of this idea in a perfect manner is to see that the small interposed sheet is of such a colour as to harmonise with that of the real background behind the sitter.

The idea here elaborated is one of great excellence. We are unaware by whom it was first mooted, although we have a hazy recollection of meeting with it many years ago. We know, however, from having conversed with some of our more intelligent readers that it is new to them, and, therefore, we publish it for the benefit of all who, from having low studios or the latter being otherwise unfavourably situated, are in a position to profit by the idea to which we have drawn attention.

ON THE RESTORATION OF FADED PHOTOGRAPHS.

Although a considerable amount of attention has of late been devoted to the subject of the fading of silver prints and its causes, very little practical good, we fear, has resulted therefrom. It is true the different discussions which have taken place have elicited the fact—or, rather, brought it into more prominent notice—that prints made from vigorous or dense negatives on a highly-sensitised paper are, all things being equal, those which possess the greatest degree of permanence it is possible to obtain with silver printing.

Unfortunately at present thin negatives and lightly-sensitised paper are the order of the day, and there is apparently but little chance of their being departed from; so that, notwithstanding all that has been said and written, we surmise things will go on pretty much as heretofore. Therefore there is little hope that the photographs of the immediate future will prove any more permanent than those of the past. Now, seeing that there is so little chance of any material improvement being made in the direction of securing greater permanence, it is somewhat a matter of surprise that so little attention has hitherto been paid to the subject of the restoration of those pictures which have faded, or of arresting the decay in others when it first makes its appearance. Up to the present time there is unfortunately no satisfactory method known for accomplishing this with paper photographs.

With daguerreotypes the case is different, for they can be successfully restored. But daguerreotypes do not fade in the sense that silver prints do. The image itself does not fade away; it is only the silvered surface of the plate that becomes tarnished, and it is simply the tarnish which obliterates the image. If this be removed the picture is at once restored to its original—or very nearly its original — condition. This is easily accomplished by treating the plate with a solution of cyanide of potassium—ten to fifteen grains to the ounce—which dissolves off the tarnish. When the whole of this is removed the image appears as good as ever. After the tarnish has been removed it is necessary that the plate be well washed (finally with distilled water) and dried. It is then fitted, air-tight, in its frame or case, so that it is thoroughly protected from the action of the atmosphere. If so protected it will remain unchanged. If, however, at any future time by the action of the atmosphere it should again become tarnished it can be restored once more by the same method of treatment.

But to return to the subject of paper prints. It has been surmised by some that when a paper print shows the first symptoms of fading—upon the supposition that it must contain hyposulphite of soda—the fading may be arrested, or at least checked, by re-washing

* In the thirty-sixth line of the second column of our article last week, for "glycium" *read* "glycerine."—Eds.

it; but many who have tried the experiment have not found this to be the case. On the contrary, in several instances the fading has been hastened by this treatment. In any case, very little advantage is gained by re-washing.

What becomes of the photographic image when the picture fades? It is a well-known axiom in chemistry that nothing can be destroyed. It can only be made to take a different form or condition, consequently the image (or what composed it) must still exist in the paper in some form or other; for we have no reason to assume that it has become volatile and evaporated. Hardwich says it is converted into sulphide of silver, and this, although dark in colour when in mass, is of a pale yellow when in an attenuated layer. Now, if the silver and gold which once composed the picture be still existent in the paper, it might fairly be assumed that modern chemistry could devise some means by which the latent image might be developed or restored to its original condition. Many ways of doing this have at times suggested themselves to experimentalists, but, up to the present, with no practical result. There is no question that, if a method can be devised by which faded paper prints may be restored to their pristine condition, it must prove invaluable. Here is a wide field open to experimentalists wishing to acquire fame, and to such we commend the subject for consideration.

Although at the present time there is no known means of actually restoring the image when once it has disappeared, yet there is a method by which faded paper prints may often be very much improved if not actually restored. In our article on *Old Prints* in our last number we mentioned that if the strong yellow tint in some of the very old photographs shown at the South London Photographic Society's last meeting were removed a bold, vigorous picture would remain. Now, this is precisely what is accomplished by the method to be described. It may here be mentioned that the plan was first published by Mr. R. F. Barnes nearly thirty years ago.

The treatment is simple. It is only to immerse the yellowed print in a dilute solution of bichloride of mercury until all the yellowness disappears. It is then well washed in water to remove the mercurial salt. If the print be a mounted one it is by no means necessary to unmount it previously to treatment. All that is required in this case is to keep it in intimate contact for a time with blotting-paper charged with the bichloride; indeed, this is the plan originally suggested by Mr. Barnes. By the bichloride treatment no lost detail is actually restored as some have imagined. It is simply that the sickly yellow colour which, as it were, buried the delicate half-tints, or what remains of them, is removed, and thus renders the picture bright and clear. Pictures which have been treated with the mercury always possess a much warmer tone than they did originally, as the purple or black tones give way to a reddish-brown or reddish-purple—more or less bright according, probably, as gold or sulphur had been the principle toning agent.

Here a question very naturally arises with regard to the future permanence of pictures which have been thus "restored," seeing that negatives intensified with mercury or transparencies toned with it are so prone to change. In answer to this we may mention that they appear to be permanent—at least that is our experience with some that have been done for many years. There appears to be no further loss of detail, and the whites retain their purity. Indeed, since undergoing the treatment with mercury no alteration is yet perceptible.

MECHANICAL METHODS OF TINTING PHOTOGRAPHS.

The interesting communication by Mr. Kurtz, described in our *Transatlantic Jottings*, will naturally recal to the mind of many an old practitioner the numerous methods of "improving," tinting, background-making, and the multitude of other mechanical devices which from time to time have been practised by the profession, or as specific nostrums brought before their notice. There would not seem, *a priori*, to be much connection between fire-irons and the production of pictures; yet, last century, a most fashionable style of picture was the "poker picture," which was produced by charring or singeing the surface of white wood by the aid of a red-hot poker. By charring to different degrees of intensity, the various depths of tones represented in a bistre drawing were thus imitated, at the hands of an expert, with pictures of considerable merit. Now we have Mr. Kurtz taking a photograph by means of a closed box and a pair of bellows distributing a cloud of fine colour, which falls over the surface of paper so as to tint it in a delicate and even manner. Many years ago a somewhat similar effect was obtained by sifting fine colour through a large muslin sieve, and by vigorous agitation causing the colour to descend almost as a cloud upon the picture placed at the bottom of a box. We are unaware if ever this method found its way into print, but it was communicated to us many years ago by an expert—a gentleman of great artistic skill—whose coloured photographs are among the very best pictures of the class we have seen.

This particular mode of manipulating pictures—the laying on of an even tint—is practised in an immense variety of forms by many clever artists as well as by the more mechanical stipplers who aim at nothing but "finish," and to whom monotony and smoothness are the limits of perfection. A well-known—we might say a notorious—process of this kind was devised a number of years ago, and was brought before photographers in such a dexterous manner that many thousands of pounds must have been netted by the inventors. The method of advertising and pushing the process was a marvel of commercial dexterity; so successful was it that some of the best business men in the profession were drawn in. Naturally, the carefully-cultivated *furore* soon died, and concessions for the patent rights — which at one time were valued at hundreds of pounds for a district—soon went begging for a five-pound note. We think it by no means undesirable at times to bring before our readers a reminder of past follies of this description, and for the younger generation of photographers, who may not have come into contact with anything of the kind, our remarks may serve as a word in season, for there will always be process-mongers.

We have in our mind as we write the doings of a singularly-facile and clever worker with powder colour, with whom we once came in contact a number of years ago. He must, we should think, be no longer alive, for the mode of operations he adopted and the methods of his art were well adapted to trap the unwary photographer anxious to learn a "wrinkle" or execute artistic work quickly and cheaply. This man formerly travelled through the country selling his boxes of materials and giving lessons in the working of them, and when once he succeeded in securing the ear of anyone to whom he had gained access, he was able in a very short period to execute marvellously-effective pictures in a space of time so brief as to be almost incredible. His sole apparatus, so far as our recollection carries us, was a box containing a black powder (very like the well-known "stumping sauce" of the worker in crayons), a piece of black chalk, a few stumps, and a large woolly bos more like a powder-puff than anything else. With a few dexterous sweeps of this puff, first filled with a quantity of the powder, he coated a good-sized piece of paper in a second or two, giving it greater depth in some places than others. A pocket hankerchief swirled round here and there removed the stain, and soon clouds were produced; a few black touches gave tree trunks, and the foliage was indicated equally quickly by a few touches with the thumb. A sweep or two of the handkerchief gave an eddying stream, and rocks were indicated with equal facility and rapidity. The final touch was given by a sweep, we believe, of the coat-cuff, which created a foaming cataract dashing among the rocks! In as brief a time almost as we take to write it this clever fellow produced a really effective picture, with apologies for its necessary incompleteness, owing to the short time occupied in its production. "More finish, of course, could be produced by giving more time to it." The price of a box of materials, with a lesson to explain complete details, was only two guineas! We do not take any very great merit to ourselves for not investing the two guineas; but if we have made clear to our readers that the merits of the picture so obtained were due, not to the process but to its expositor, our end will be obtained.

The laying on of a tint, and then removing portions of it to obtain effect, is a perfectly legitimate "dodge," and much time can be saved by it. A life-size head stumped over in grey with a large stump, and then the broad lights removed by a piece of bread and the finer points by a piece of the crumb worked to a point, can be effectually modelled in a much shorter time than if all this tone had to be hatched or rubbed in with a small tool. The darker portions can be equally well executed whether there be any tint already upon them or not.

In a similar way, some would say not legitimately, coloured crayon heads are started by giving a wash of flesh colour in water-colour, and then, after it is quite dry, putting on the local and other colours with either stumps or point of pastil. Such methods may be decried by some as false pretences, passing off as crayon what is not so; we merely offer the plan for what it is worth, and do not give it any name. But it must be said that some of the great painters whose works have posts of honour in our national collection are well known to have favoured such modes, and there are now to be seen oil-colour paintings which have a strong body of water-colour laid on before the oil.

We are glad to see that a method of tinting faces on a small and cheap scale, as once devised for use with aniline colours, seems to have entirely gone out of existence; yet, with a selection of colours that would not fade, effects—not artistic, certainly—could be quickly and cheaply obtained. These colours were weak, spirituous solutions, and were first put in drops out of the brush upon the face. Quickly spreading they gave an even tint to all the paler parts of the print, but had no power to give a visible stain to the darker portions. A minute point of slightly darker colour applied to the cheeks spread sufficiently to give a softened outline to the spot, and so avoided all need for stippling. We name this method now more to warn our readers not to make use of it if, as we thought seemed probable some little time ago, it should be brought forward again. If it were re-introduced, and upon so fugitive a groundwork further painting of a legitimate kind were added, the result, though cheaply obtained, would be so evanescent as to increase still further the evil reputation that "coloured photographs" have so long suffered under.

We think we have now said sufficient to show that mechanical aids to the tinting of photographs may, when in suitable hands, be capable of aiding in the production of good results; but when appeal is made for the adoption of, and the paying for, a process on account of its intrinsic value for obtaining artistic results quickly and by untrained fingers, we would at once say—beware! Artistic effects are the result of education and practice in art and art methods, and we cannot conclude better than by endeavouring to impress upon all who would invest in "processes" that there can be no fine art by machinery.

In the report of the Edinburgh Photographic Society we notice the mention of a new adhesive substance termed "gloy," and amongst its possible applications the mounting of prints is suggested. For this purpose it is, however, eminently unsuited, as our readers will understand when we inform them that it is made, we believe, by treating rice flour with caustic alkali, the latter being afterwards more or less carefully neutralised by means of some cheap acid. It is, of course, within the bounds of scientific possibility to deprive the product (by dialysis or other means) of its deleterious ingredients; but we question whether this would pay commercially, or whether the balance of its advantages as a mountant would justify the extra cost As an adhesive for ordinary purposes we can speak of "gloy" very highly.

The curious phenomenon mentioned in the postscript of Mr. H. Y. E. Cotesworth's communication in another column may be observed by any of our readers who will take the trouble to make a rather weak solution of chrome alum. In this state, or in a thin layer, the chrome alum solution has a green colour by daylight, but, as the strength or the volume increases, the tint changes to purple. If the green solution be examined by gaslight its colour will be found to change to a clear violet-purple, as described by Mr. Cotesworth. A solution of chrome alum made with hot water exhibits the green colour under all circumstances, both of light and concentration, but after some time gradually reverts to the red condition.

The current number of the *Athenæum* is interesting photographically in many directions. There is a review of Dr. Eder's *Chemical Effect of the Spectrum*, in which the writer speaks most strongly of the absence of acknowledgment of the value of the services of noted English workers, though a very sufficient reference is made to continental experimentalists.

It contains also a review of Vol. II. of the autotype reproductions of the *Liber Studiorum*, which it states is, on the whole, superior to the first volume—a statement involving great praise, as it reviewed in a very favourable manner the plates of the first volume. Speaking of the Frontispiece, it characterises it as being first-rate, saying that it could hardly be better given than by this reproduction, which shows the delicacy of the renowned mist-laden veil of light to perfection. Altogether better evidence could not be offered of the value of the process for the reproduction of works of art.

At the meeting of the British Association it appears that Professor W. G. Adams will give a lecture instead of Mr. W. Crookes. The trip need be by no means an expensive one, for we learn that the sum of fourteen thousand dollars has been allotted for the reduction of fares of members, in addition to the liberal allowance made by the steamship and railway companies. All the American railways will reduce their fares one-half. Only those persons, however, who were elected at or before the Southampton meeting are entitled to share in the fourteen-thousand dollars' subsidy.

Of late years several experimentalists have investigated the action of various portions of the spectrum upon the growth of vegetables, and in the March part of the *Transactions of the Chemical Society* there is an appendix to a paper by Mr. A. B. Griffiths detailing "the influence of certain rays of the spectrum in the growth of plants growing in an iron manure." It is a singular fact that the use of iron developed considerably increased growth irrespective of the treatment with special rays, and with regard to the latter he found that the more photographically-actinic the character of the light employed the less the quantity of iron absorbed. Thus, in the violet portion of the spectrum only so much iron was taken up by the plant as gave ·15 per cent. ferric oxide in the residue, while in the yellow 2·51 was taken up.

The danger of water taking up lead under certain contingencies, when stored in a lead cistern, has long since been discovered, and lately attention has been called to the ease with which zinc may be dissolved by water standing in vessels made of that metal, or running through pipes of iron coated with it—"galvanised iron," as it is termed. As many cisterns are so made it will be well for those of our readers who employ them to make a note of this fact, as, though the presence of zinc does not necessarily indicate injurious action in photographic operations, it is desirable to know whether water is or is not contaminated with other than the usual salts. Mr. Thomas Stevenson, M.D., in an old number of *Guy's Hospital Reports*, states, referring to this question, that "zinc in solution in potable waters is best detected by the addition of potassic ferrocyanide to the clear water after acidulation with hydrochloric acid, when a whitish cloud will immediately form if zinc be present. Of course this reaction must be confirmed by other tests. I know of no test for zinc which is so delicate as this."

In reference to the photographing of microscopic objects, it should be known that the results are governed, to a greater extent than might be thought possible, by the mode in which the object has been prepared. Mr. Lewis Wright, in writing to the *English Mechanic*, points out that a well-known microscopic preparation maker informs him that the demand for slides is for an average quantity at an average price, and that any demand for photographic purposes is quite recent. Such slides, can, however, be prepared readily as special objects; of course, the price will be in accordance. Our readers may look upon this as a decided "wrinkle," if they wish to produce photomicrographs of the highest quality.

CHEMICALLY-PREPARED DARK ROOM WINDOWS.

Just at present green as a colour for the light of the developing room appears to be in considerable favour; but in many cases a difficulty is experienced in procuring either glass or paper of the desired tint. The so-called "cathedral green" glass is not known by the merchants and dealers, for the sufficient reason, as it now seems, that there is no such thing; and "green tissue paper" is a rather elastic definition. Those, therefore, who have not the opportunity of actual inspection of the proper tints, as recommended by Mr. W. E. Debenham and others, are placed rather at a disadvantage.

I have been experimenting for some months past in the direction of producing (preferably by chemical means) a coloured medium or media of different colours which shall be suitable for the purpose, and the preparation of which may be described in definite terms so as to be capable of repetition at will, and with an identical result, by any person who may so desire. This is, perhaps, not attainable in its strictest sense ; for, though a chemical formula may be stated with sufficient exactitude to enable the colouring matter itself to be produced with practical uniformity, I fear that the medium on which it is spread, or throughout which it is diffused, will always present some features leading to uncertainty. This must, at least, be the case, where paper, textile fabrics, gelatine or other films are concerned ; but, if a layer of a given thickness of a solution prepared by a definite formula be used in a glass trough of suitable construction, it seems to me that a near approach to exactitude and uniformity will be secured.

Though I should have preferred for convenience sake one of the former plans—especially a coloured gelatine film or films—I have not yet succeeded to my satisfaction in securing the desired results, and have, therefore, confined myself, so far, chiefly to the use of coloured solutions contained in water-tight troughs of simple construction. The troughs I have used consist of a plain frame of wood of the section shown in the diagram, *fig.* 1 being a single trough, and *fig.* 2 a double one for two solutions of different colours.

FIG. 1.

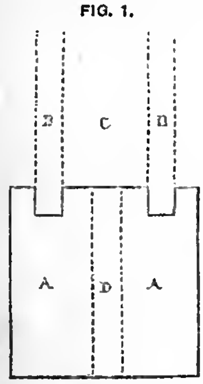
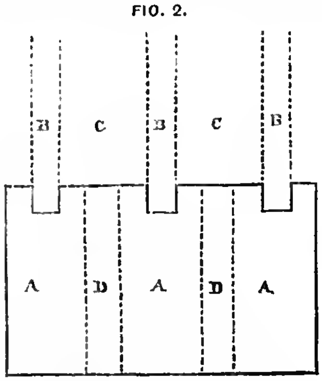


FIG. 2.



A A is the wooden framework in section, B B glass plates cemented into the grooves by means of shellac or marine glue, and C C the space between the glass plates to be filled with solution. D D are apertures pierced through one side of the wooden frame by which to introduce the solution. The woodwork, before being put together, is rendered waterproof by means of any suitable varnish, and the filling apertures are closed by means of small wooden plugs. I have, as will be seen, adopted half-an-inch as the thickness of the layer of solution; but if this be considered to render the frame too bulky it may be reduced to a-quarter of an inch, and more concentrated solutions employed.

As regards the solutions employed: I have confined myself to two or three as being the only suitable ones I have yet found—that is, which are stable and do not deposit their colouring matter. Many of the mixtures with which I experimented in connection with paper and films I found wholly useless for this purpose, and so I entirely discarded them.

For yellow or orange colour I find nothing better, in a general way, than potassium bichromate in strong acid solution if a full orange be desired, and neutralised by means of an alkali for paler yellow. Solution of chromic acid, which gives a much deeper red, I have not ventured upon using, in consequence of its probable action on the wood frames. For green colours I have used two chromium compounds which are easily prepared, and which between them and with certain modifications, give a wide range of greens—all having much of the character of what I suppose the so-called "cathedral" to be, namely, varying through olive of different shades of yellowness to the well-known chrome green. These substances are chromium sulphate and chromic oxide, both of which are very easily prepared from the commercial chromic acid.

The first is a very soluble and uncrystallisable salt of a beautiful green colour, and, therefore, lends itself readily to the formation of a solution of great depth of tint and with little tendency to form any deposit. It is prepared by reducing a strong solution of chromic acid by means of sulphurous acid. Thus, if the latter, in the form obtained commercially, be added gradually to a strong solution of the former the deep red colour disappears, and after passing through various tints of brown and yellowish olive-green it finally changes to a full green of great beauty, which may be diluted to any desired tint. The chromic acid is deprived of a portion of its oxygen, being reduced to chromic oxide. The oxygen converts the sulphurous acid to sulphuric acid, which, in turn, dissolves the chromic oxide, forming chromium sulphate, thus:—

$$2\,Cr\,O_3 + 3\,H_2\,SO_3 = Cr_2\,(SO_4)^3 + 3\,H_2\,O.$$

A still better plan for those who are accustomed to chemical manipulations is to pass sulphurous anhydride or sulphurous acid gas through a concentrated solution of chromic acid to saturation. This will give a solution of deeper colour, but without proper chemical appliances the operation is not a pleasant one.

Those who are unable to obtain chromic acid may prepare it as follows :—To a hot, saturated solution of potassium bichromate add cautiously, in a thin stream, stirring all the while, about twice its volume of strong sulphuric acid. Care must be taken not to add the acid too suddenly, or violent "spirting" of the highly-corrosive liquid will result. On cooling, crystals of chromic acid will separate. These are freed from the mother liquor and drained on a porous tile or over a plug of "glass-wool" in a funnel. On no account must filter paper or any organic substance be used, in consequence of the powerful oxidising action of the chromic acid. The drained crystals are then redissolved in a very small quantity of boiling water and again treated with strong sulphuric acid, which will precipitate the chromic acid in the anhydrous state, leaving nearly the whole of the potassium sulphate behind in the two mother liquors.

This preparation is quite pure enough for our purpose, though, I may here remark, it is not desirable to have any but the slightest traces of potassium sulphate remaining. Otherwise, upon reduction of the chromic anhydride with sulphurous acid a double salt of chromium and potassium (potash chrome alum) will be formed, which, though, perhaps, green at first, soon assumes the well-known violet tint of many of the chromium compounds. This, it is needless to say, is scarcely a suitable colour for a dark-room window.

It is for this reason that I prefer to use separate solutions of different colour rather than modify the character of the green solution by mixing with it the yellow bichromate. It is true that a very great range of tints may be obtained in this manner, but their permanency is not assured.

Another solution which I have spoken of as being prepared from chromic oxide consists in reducing the acid mixture obtained by the action of sulphuric acid upon potassium bichromate with sugar. If, when the hot mixture has somewhat cooled down, it be diluted to prevent crystallisation, and a lump of sugar be added, it will rapidly acquire a rich, deep green tint. The primary cause of this change of colour is, no doubt, the formation of chromic oxide, probably held in solution by excess of sulphuric acid or in the form of a double salt. Theoretically, this mixture is to be avoided for the reasons I have given above ; but, practically, I find that a quantity I have had preserved in bottles and test tubes for some time does not seem to have changed colour.

I have already said that I have so far not succeeded satisfactorily in applying these green solutions to paper or gelatine films ; but my efforts in that direction were not persevered in to any extent. The difficulty I met with was in obtaining a colouration of sufficient depth, and in the deliquescence of the substances and consequent stickiness of the papers and films when extremely-concentrated solutions were employed. If a deposit of chromic hydrate can be obtained in the body of a thin, even paper, I think that in combination with another paper prepared with plumbic chromate we might easily secure all the advantages claimed for the combination of canary medium and cathedral green glass.

H. Y. E. COTESWORTH.

P.S.—Since the above was written I have made a curious observation. Several of the examples of mixed solutions—that is, those which contain potassium as well as chromium, whether as sulphate of potassium or as chromate—while appearing to the eye perfectly green *by daylight* present the well-known purplish-violet colour *by gaslight*. On first noticing this violet colour I supposed that the solution had changed suddenly. It was only by going repeatedly from daylight into the dark room, and *vice versâ*, I could convince myself that the solutions while presenting this curious instance of dichroism remained still unchanged. What appears even more curious is that, when examined by means of a simple prism—not a spectroscope—in daylight only green rays (the visual colour) are transmitted, while by gaslight the transmitted colour is violet. I send you a bottle of this dichroic solution.—H. Y. E. C.

POLARISED LIGHT AND PHOTOGRAPHY.

As you are discussing the subject of polarised light, allow me to suggest a line of inquiry and experiment which has not been touched upon, but which, I believe, would be found both fruitful and interesting, and is more intimately connected with photography itself than any of those named.

The modern theorics of chemistry tend more and more to relate chemical reactions to the *dynamical* relations of the atoms and molecules of matter. Taking the most popular and photographic example as an illustration, it is held, for instance, that (roughly speaking) the chemical combinations employed by the photographer are almost literally *shaken* apart and into new combinations through the vibrations communicated to them by the luminiferous ether. It is very easy to understand such a theory generally, and also to see how vibrations of any given period may affect atoms of different substances very differently, since the periods of these latter, being of different weights, would probably differ in some way. We can even see how and why the quickest or violet vibrations should be on the average most effective—just as a piece of wrought iron is comparatively unaffected by slow movements, but by quicker vibrations is soon converted into a crystalline state. One of the great outstanding difficulties of the theory has lately been partially removed by the supposition, just referred to by Captain Abney, that the vibration-periods of atoms may possibly vary at different times.

But what has all this to do with polarised light? Well, it *may* have a great deal. In the ordinary light of the photographer, while the vibrations of the ether as they reach his plate are *parallel to its surface,* they take place in all azimuths or angles with the horizon. But supposing the same image cast by plane-polarised light: *all the v brations are in one parallel direction*, and it can hardly be that this great difference shall have no effect upon the dynamical result of these vibrations. Again: in circularly-polarised light we have absolutely circular vibrations. It is in the absolutely *definite paths* of the disturbances set going on the surface of the plate, instead of a mixture of all paths, that (upon the mechanical or dynamical theory) we ought to find, somehow or somewhere, marked differences of behaviour. Whether or not such differences can be traced, and if so when and how, seems to me a matter which, at the present stage of knowledge, urgently demands investigation.

Let me only remark, in conclusion, that a complete "polarising apparatus" ought not to be employed. We do not want (in this line of experiment) to photograph or investigate polariscope "effects" in colour or light and shade; that is done every day. For plane-polarised light, we only need light which has passed through a *polarising Nicol only*, and whose image "shows" no more structure than a common image. If circular vibrations are investigated, then we should want one Nicol and a quarter-undulation plate—no more. The image would be only half as bright; but it is quite a possible thing that these disturbances of *uniform and fixed direction* might be more energetic in effect upon at least some substances. As I fear the matter will be, for some time at least, outside my own possible field of experiment, I desire to recommend it to such as can follow it up amongst your readers.

LEWIS WRIGHT.

STANNOTYPE.
No. VII.

In principle the development of the gelatine relief is identical with that of a carbon print on glass, but the extra thickness of the gelatine film brings about certain practical differences; while, probably, the greater length of time occupied in drying after sensitising the relief tissue, by decreasing its solubility, aids in prolonging the duration of the development. We have, indeed, not only a greater thickness of gelatine to work upon—a greater quantity to dissolve and a greater depth to reach—but we find it also in a less easily soluble state. If it be added that the greater thickness of the relief tissue renders it far more liable to curl up and leave its glass support—a trouble that ordinary carbon printers will sufficiently appreciate—it will be needless to point further to the necessity for greater care in every department of the development. Let us now take the exposed tissue as it comes from the printing-frame.

The first matter for consideration is the glass support. This, like everything else in connection with Woodburytype or stannotype printing, must be of perfectly even surface. Plate glass is absolutely necessary, as any inequality in the surface must inevitably produce its result in the print. From one-eighth to three-sixteenths of an inch will be found a suitable thickness, though this is not a matter of consequence. Thinner glass may be employed if desired, as all the surfaces, both of glass and press, being perfectly flat and no great degree of pressure necessary, there is little risk of fracture.

Next, as to the preparation of the plate before transferring the exposed tissue: it must, of course, be perfectly clean and, before further treatment, carefully dusted. The next operation is to apply a substratum, as to develope successfully on the bare glass is a practical impossibility. Many operators content themselves with a simple collodion substratum, such as is used in developing carbon transparencies; but the increased care which this necessitates when employing the thick relief tissue, renders it a less desirable means than the alternative method with insoluble gelatine as the basis.

We therefore recommend a substratum consisting of a five- or six-grain solution of gelatine, very carefully filtered, and to which is added, just before applying to the plates, a quarter of a grain of chrome alum to each ounce. The precautions necessary in making this addition are sufficiently familiar to all who have used chrome alum in connection with gelatine; but, for the benefit of those who have not had that experience, it should be pointed out that if added in strong solution the chrome alum will precipitate a portion of the gelatine and fail to mix properly. To obviate this it is desirable to make the gelatine solution in a more concentrated form than is required for use, reserving a considerable proportion of the water for the solution of the chrome alum, and both solutions having been carefully filtered are mixed at a tolerably high temperature, very thoroughly stirred, and again passed through two or three thicknesses of muslin to remove air-bubbles. The complete solution must be kept liquid the whole time until used, as if it once solidifies it cannot be again satisfactorily liquefied.

A number of plates may be coated with the substratum, dried, and kept ready for use. The glass having been well cleaned and dusted is coated with the warm gelatine solution as with collodion, the surplus being drained off in the same manner. Should any difficulty be experienced in its flowing, from five to ten per cent. of alcohol may be added. The plates are then reared on end in a cupboard or rack in a place free from dust and allowed to dry.

The tissue being ready for development is immersed in water to soften. While this operation is proceeding the surface should be carefully rubbed with a pledget of cotton wool or a small pad of thoroughly-wetted wash-leather, to remove any dust or other particles which may have adhered to it. It is allowed to become thoroughly limp, and is then placed in contact with one of the gelatinised plates—which has also been soaked in water for a few minutes—and the two are brought into intimate contact by means of the squeegee. Both are then placed under pressure for at least a-quarter of an hour—preferably for double that time—when the development proper may be proceeded with.

The portion of the manipulations just described differs only from the ordinary practice in carbon printing in the necessity for greater care, arising from the increased thickness of the gelatine film. A longer soaking of the latter, more careful squeegeeing, and an increase of the time during which the surfaces remain under pressure before development will, if attended to, secure all that is needful.

The plate carrying the tissue is first placed in a flat dish containing water the temperature of which is at first not higher than 100° Fahr., which may be increased until it reaches 120°. This part of the proceedings must on no account be hurried. As soon as the paper backing shows an inclination to loosen the attempt may be made to detach it; but no force should be exerted, otherwise the whole film will, in all likelihood, become detached from the glass. Nor must the temperature of the water be increased beyond that mentioned; indeed, it is preferable, if possible, to keep it five degrees lower. The golden rule in the development of the relief is "patience" and, it might be added, "coolness." A somewhat refractory film, at first, will yield to prolonged soaking without any increase of temperature or the exertion of force, and eventually the paper will strip off with perfect ease.

The gelatine surface having been laid bare it is allowed to remain for a minute or two in the same dish; the plate is then transferred to another vessel kept specially for development, consisting of a zinc tank fitted with grooves, into which the plates slide as into a plate-box. Here it may have to remain for some hours according to the nature of the subject, the depth of the relief required, the exposure, as well as the age of the tissue, all of which circumstances affect the rapidity of development.

During this period it is, of course, necessary to retain the temperature of the bath at or about the point that has been named; and, as it is obviously inconvenient, if not impossible, to give continual personal attention, some expedient by which the temperature may be automatically regulated is desirable. Several forms of thermostat suitable for this purpose have been devised; but as it is intended shortly to devote a special article to this subject, we refrain from entering into the matter here.

TRANSATLANTIC JOTTINGS.

In taking up the *Photographic Times* (New York) we have to look a second time at the title to be certain we do not make a mistake; for we are so accustomed to the old, quiet, but effective back—more like a piece of bronzed albumenised paper than anything else—that the new and gayer cover (mostly like nothing in particular) causes us to think for a moment that we have taken up the wrong publication. A glance at the contents, however, assures us that we have made no error, and we are content to jot down our extracts of current matters photographic across the water.

Mr. Jabez Hughes lately gave before the Photographic Society of Great Britain a very interesting *résumé* of photographic progress during the last thirty years, and Mr. Bogardus, early last month, gave an account of his personal experience, extending over a long period, in a paper entitled *Thirty-Seven Years Behind a Camera.* We cannot, of course, repeat it in full, but a few extracts will give our readers some idea of its scope and style. He narrates that he started photographic operations in 1846, and only paid fifty dollars for outfit and instructions, and this at a time when exposures ranged about four minutes. Photographs and natural colour process-mongers were rife at that early period, and Mr. Bogardus gives an interesting account of the unmasking of an early member of that fraternity. "Cheap Jack" photographs existed at that embryonic period of commercial photography, and an account is given of a twenty-five cent studio where immense numbers were taken, and where, if a sitter were dissatisfied, he was told to pay and try again! One of Mr. Bogardus's pupils, who had attended to have further lessons as he was in a difficulty, asked him, after watching his operations some time, if he "focussed afresh every time," evidently considering it sufficient to perform the operation once a day. He gives an interesting recollection, recalling the old never-to-wink instructions—"Stop it! stop it!" exclaimed an old lady; "I winked." "A little thing, though full-length—a man standing by a fluted column," gives as good an idea as possible of the old original *carte-de-visite* as it first appeared. We cannot conclude this brief abstract better than by repeating his advice—"strive to excel rather than undersell."

At the same meeting Mr. Kurtz gave some valuable hints upon the production of crayon pictures, and described a most ingenious method he had devised for quickly covering the surface of paper to avoid labour in working up by the point of the crayon. To "kill the large white surface of paper he had experimented with all kinds of things, such as coffee, tea, &c., and then he happened to think of a very nice smoke-after-dinner picture made in artistic circles in Europe." Mr. Kurtz filled a tumbler with smoke from a cigarette, inverted it over a piece of paper, and showed how it became tinted. He stated that, following this idea, he had filled a large box with smoke, and, putting the paper in, obtained a fine yellow tint: it smelled too strongly of tobacco to be of any use. Finally, he constructed a special box, into which, by means of a pipe attached to a pair of bellows, he blew a fine cloud of powder colour, and then introduced the crayon paper, which was withdrawn, after a few seconds, tinted evenly any colour according to the pigment employed. He then showed how, with the tint as a groundwork, the lights or, indeed, complete objects could be completely stopped out by laying screens on the paper during the tinting. Mr. Kurtz further demonstrated how a photograph could be tinted in colours, and then the background put in by the apparatus described. He explained how lights could be put in the flat tint by taking off the pigment with bread. The whole lecture, it will be seen, was full of hints of great value, and, when illustrated by the lecturer's experiments, must have conveyed instruction in a very full and novel manner.

Mr. Clemons—whose name in connection with silver printing is very familiar—narrates an experience which, we must say, is to us as surprising as novel. Having taken into stock a new sample of albumenised paper and put into use with his usual solutions, he "was surprised to find how mushy and soft the albumen had become." He went back to his old brand, and that also worked "mushy and soft." After sundry experiments he hit upon a cure. He placed all his prints in a bowl of hot water before toning, and the evil passed away! The remedy seemed as singular as the disease.

The chairman of the meeting at which Messrs. Kurtz and Bogardus's papers were read gave his experience with iodide in the pyro. developer. It may be remembered that it was the same experimentalist who gave the mercury-iodide process, which has not succeeded in the hands of those who have tried it in this country. He stated a number of facts novel in chemical lore. Thus, iodide of lithium formed an insoluble iodide, especially in hyposulphite of soda, and it took at least an hour to dissolve the iodide. He gave "a formula by which the colouring matter of the pyrogallic acid which dyed the gelatine film yellow would be prevented from doing so. He destroyed the yellow and the property to dye the film by using ammonio-citrate of iron."

In the *Photographic Times* (New York) we find an excellent article on telescopes for astronomical photography, by Mr. William Harkness, of the U.S. Naval Observatory, Washington, D.C. Alluding to Mr. Rutherfurd's special addition of a third lens to his telescope for photographic purposes, Mr. Harkness states that the disarrangement caused by shortening the focus causes so much trouble that most photographers prefer to have a separate telescope constructed solely for photographic purposes. He points out a common mistake made in supposing the focus of the telescope to be changed by disturbances in the atmosphere which frequently break up the images of celestial objects so that it is impossible to see them. The focus never changes, he says. He explains why a sharp photograph of the moon cannot be obtained with Stevens's telescope. All the available counterbalancing powers of curves and differing densities of the glass are absorbed in important corrections for visual accuracy, and, in consequence, the spherical aberration of the blue rays remains uncorrected; hence a sharp photograph cannot be taken by the instrument. Mr. Harkness also states that attempts to photograph the moon with the twenty-six-inch Washington telescope has been a failure, and he predicts that like failures will attend all similar attempts with the great Lick telescope. In short, he says:—"The principles upon which all these instruments are constructed render them incapable of doing first-class photographic work when used with anything like their full aperture. To prevent misapprehension it may be well to add that, as the spherical aberration varies as the square of the aperture, passable photographs may be made with any telescope if a cap is put over its objective to reduce the aperture sufficiently." This paper is as excellent and instructive as it is brief.

We have only space to note a discussion at the Chicago Photographic Association upon the use of coloured media in the dark room for modifying the light during development. They were evidently founded on Mr. W. E. Debenham's experiments, but cannot be properly compared with them, as they did not observe his conditions nor use his actual materials. A large number of colours were tried, from blue to orange, to test both visual and actinic transparency. There was the usual discrepancy of opinion, and one gentleman courted and obtained a smart rebuff when he asserted that he had exposed a plate for ten minutes to the light from a lantern turned on to the full and protected by a sheet of green and one of orange glass. The members remarked it was a poor advertisement of the rapidity of the particular branch of plates tried.

We conclude by giving publicity to the latest discovery of photography, announced on the authority of the *Chicago Tribune* of January 30th:—

"*Cleveland*, January 28.—Edward W. Fell, of this city, after experimenting for two years, claims to have succeeded a few days ago in perfecting an invention, which the author ranks with the electric light and telephone. The invention consists of taking absolutely-permanent pictures upon any substance whatever having a smooth surface, instantly by the action of electricity upon a sensitive coating, and at an expense not exceeding one cent per picture. A reporter who called upon the inventor was shown some photographs on pieces of wood, which were not only perfect in outline and finish, but possessed a peculiar softness not obtainable by any other process."

ON THE PERMANENCY OF SILVER PRINTS.

[A communication to the Newcastle-on-Tyne and Northern Counties' Photographic Association.]

From the discussions now taking place at the various photographic societies, and in the journals devoted to photography, anent the fading of silver prints, I infer that the subject has come so prominently forward again from photographers finding a greater disposition in modern prints to fade than was the case formerly. The cause of this rapid fading must be rather far to seek, or some satisfactory elucidation would ere this have been put forward. Must we, then, be content to receive as an axiom the saying that "silver prints *will* fade?" Well; yes. They will, and so will engravings and every other production with paper for its base. But the difficulty is the short space of time photographs too often take to reach this stage. Many of us have photographs by us of twenty years' standing as good as when first produced, and examples of which I will show you, while others but a few months' old are passing rapidly away. How are we to reconcile this discrepancy? To what influence does the one owe its preservation and the other its decay—yet both equally, carefully, or carelessly kept? I would be glad if I could tell you. I can only offer a few remarks on the subject.

From the discussion and opinions promulgated by the earliest workers in photography one is lead to infer that the permanency of silver prints was more favoured by the old *sel d'or*, or mixed hypo. and gold bath, than by the present alkaline toning method. But is it so? As an old worker, both in the printing and albumenising, I trust I may venture to add my mite of information to that already laid before us through the medium of the photographic publications.

I am of opinion that the permanency of silver prints is only in favour of the *sel d'or* method of toning and fixing at one operation when certain conditions are observed, and those conditions exercise an influence upon the permanency of silver prints by any of the methods of toning. I have known prints to fade quite as rapidly when toned by the *sel d'or* bath as by any method subsequently introduced. The first of the conditions essential to permanency I consider to be the use of perfectly-fresh albumen, with nothing added thereto but the necessary chloride, whether of sodium, ammonium, or barium, or a mixture of these according to the required time of the prints. There is no question that the use of fresh albumen in the preparation of paper entails more labour in beating up, and greater care is necessary in coating the paper; the glass, too, may not be so smooth and high as that produced by stale albumen. These considerations, perhaps, may account for many manufacturers of albumenised paper using albumen in a state of fermentation, or, as we may judge at times by the perfume of the paper, in an advanced stage of decomposition.

Looking at the constituents of albumen, does it not stand to reason that if in the very first stage of our printing operations we use a material in a state of decay we introduce the elements of that decay into our photographs? I think this point may be satisfactorily proved thus:—Take two sheets of paper—one prepared with fresh albumen and the other with albumen that is in a state of decomposition, sufficiently so as to be unpleasant to a person with a delicate sense of smell. Sensitise these sheets on the same silver solution. What is the result? The paper prepared with the fresh albumen will retain its purity for some time. I have known it to keep a week in cold weather, while that prepared with the stale, according to the extent of the decay, turned yellow before it was dry, or very shortly afterwards. Take prints from these papers, toned by any method you please, and I will venture to say that the prints on the latter or decomposed albumen will soon be in the "sear and yellow leaf."

The next consideration is the toning bath. There are two drawbacks to the use of the mixed hypo. and gold bath. The first is its apparent extravagance, and the next the difficulty of knowing when you have left off toning with gold and begun toning with sulphur. Thus, it often happened that when a larger batch of prints was toned in the same bath than the capacity of the bath could possibly tone with gold, part of that batch would be in a condition to fade on the least provocation, and often without it. But you must remember that the votaries of the art in those days had not the means of information at their fingers' ends the present generation has. Photographic chemistry was at a very low ebb, consequently errors were committed that we should not be guilty of now. Yet, with it all, work was produced by a few able hands that would bear favourable comparison with the work of the present day, as my recollection of the first exhibition of the Parent Society enables me to say.

To return, however, to my subject. As to the extravagance of the *sel d'or* bath: that is more apparent than real, as by a very simple method all the gold not taken up by the prints can be recovered. The process is an interesting one, and made pleasurable at the finish by the large percentage of metal recovered. The whole process of recovery has lately been treated in a very exhaustive and able manner by Mr. F. W. Hart, so that I need say nothing on that head.

Of the alkaline methods of toning I certainly give preference to the carbonate of soda bath, as, although not, perhaps, giving the richness of tone the acetate bath does, I am inclined to think, by comparison, that the prints are more permanent; and were the gentleman whom I have the pleasure of nominating for membership present he would be able to fully bear me out in this statement both by precept and example. This bath you must make up freshly each day—presuming you tone every day, or, if not, a few hours before use; and that I take to be in its favour, as I consider a bath that has been used over and over again must necessarily carry some impurities with it. As the undeposited gold can be precipitated with sulphate of iron there is little gain in pushing a bath to the utmost of its powers.

The next consideration is the ready-sensitised paper, and whether its introduction is in any way answerable for the fading of silver prints. I have been led to the conclusion that it is. The accusation is sweeping, I admit; but as it is founded upon practical experience and not on theoretical reasoning—theory and practice not always agreeing, especially in photography—I shall stand by my statement until refuted by the comparative experiments of others. It has been our custom—rather an apathetic one—so long as a paper would "keep well, print quickly, tone easily, and yield prints of good quality," to be content, giving no thought to the morrow of such prints.

The method of toning the mounting medium and the quality of the mounts have been from time to time put forward as the delinquents in bringing about fading, and albumen more than once has been pointed out as the culprit; but a bill of indictment has never, to my knowledge, been preferred against durable sensitised paper. Well, it is done now, and, therefore, the sooner you constitute yourselves a grand jury to inquire into its merits the better, and if you are unable to return a true bill my experience will not be verified.

We must bear in mind, when making comparisons between the permanency of prints of the present day and those of the past, that in the earlier days of photography absolutely fresh albumen was considered imperative in the preparation of paper—so much so, that each egg was broken singly into a cup in order that its freshness might be assured before being added to the bulk.

What is the moral of the little I have had the privilege of saying? Firstly: that if you wish to secure the greatest amount of permanency in your prints use paper that has been prepared with absolutely-fresh albumen, with nothing added but the salting medium. Secondly: whether you tone by the *sel d'or* or one of the many alkaline methods, do not overwork your bath. Thirdly: watch the behaviour of your ready-sensitised paper. Lastly, and this is only a hint: finish washing in several changes of warm water.

Bear these items in mind, and I think there will be less cause to complain of the fading of silver prints. R. STANLEY FREEMAN.

LECTURES AT THE ROYAL INSTITUTION.

PHOTOGRAPHIC ACTION.

THE third lecture was delivered at the Royal Institution on Saturday last, the 15th instant, at the commencement of which Captain Abney referred briefly to the concluding remarks of his previous lecture, showing the method of the building up of an alkaline-developed image. He completed his remarks on this branch of the subject by saying that it was not a chance medley of events which caused an image to develope, but the small molecular energies that, when directed judiciously, lead to a practical building up of the edifice; and that the deposition of crystalline matter can be made to be the scientific mode by which an alteration in the composition of molecules can be made manifest. The use of sensitisers as halogen absorbers was briefly dealt with experimentally, as also the unity of the photographic image and the visible image.

The lecturer next referred to the effect of shearing stress on molecules, illustrating his results by experimenting, and showing slides which referred to his latest researches in the matter.

The intensity of radiation was next dealt with, and the apparent failure of the law which is usually enunciated that exposure multiplied by the intensity, if a constant quantity, should always give the same effect on the molecules. A plate was exposed, about one foot from a blue Bunsen flame, for thirty seconds, and another to the spark emanating from five Leyden jars, the relative times of exposures being stated to be 7,500,000 to 1, whilst the volumes of illuminated gas were as 1,000 to 1. Thus the quantity of illumination multiplied by the time of exposures would be as 7,500,000,000 to 1, which would mean an intensity of light in the spark far exceeding that which it really possessed.

The subject of the destruction of the effect of light on the molecules, by means of oxidising agencies, was next thoroughly gone into, and several experiments and slides were exhibited, showing the effect of bichromate of potash, peroxide of hydrogen, and iodine as destructive agents.

The action of light in aiding oxidation was next experimentally illustrated. A plate of bromide of silver, first exposed to light, was immersed for a second in a solution of bichromate of potash, and then exposed behind an opaque plate with a cross cut out of it, so as to be transparent. The sensitive plate, to which the bichromate was still clinging, was then developed; and the audience saw on the screen the parts of the plate which had received the second exposure continue unaltered, whilst the remainder blackened all over.

The lecturer made some final remarks on the struggle which always was carried on between the reducing action of light and the oxidising action. The whole of the experiments were most successfully performed.

Mr. C. Ray Woods managed the lantern for the lecturer, as also the electrical portion of the experiments. Captain Abney's well-known proclivity for "red coats" made it a matter of course that his assistant should be one of them, and Sergeant Jackson, R.E., was everything which a lecturer could wish.

PHOTO.-BLOCK PRINTING.

[Abstract of a Lecture delivered before the London and Provincial Photographic Association, by T. Bolas, F.C.S.]

The process of printing in a typographic press from a block produced from a photograph is a method of great interest to every photographer. Silver printing, however beautiful the results obtainable, is open to the charge of want of permanence, and, where large numbers were required at a moderate cost and with rapidity, was quite out of the question. Some time since a well-known photographer was asked what was the printing process of the future. He replied "photo.-block printing." He was probably right.

The process of printing from a raised block is now thirty years old, but it is only lately that such modifications and improvements have been introduced as to give promise of its coming into general use. There are now so many variations of the method known, each of which may be called "a process," that to enter fully into details concerning all of them would occupy not one lecture, but twelve or twenty-four. It is, therefore, only practicable to speak of a few of them.

Between twenty-eight and thirty years ago Paul Pretsch came from Vienna with a process which, with the perseverance characteristic of a great man, he had worked out and brought to a certain degree of perfection. This process was based upon the reticulation which a film of gelatine combined with bichromate of potash undergoes when dried at a temperature sufficiently high and exposed to light. This grain is modified by the degree of exposure to light, and so rendered capable of producing a block with a natural stipple or grain due to the reticulation of the gelatine. An illustration of this method appears on page 80 of the current vo'ume of the *Year-Book*.

The Pretsch process has not been worked to any great extent commercially, and when the company which had been formed to work it "came to grief" it was doubtless because it was before its time. Soon after the collapse of the Pretsch Company Mr. Dallas (who had been connected with it) started making blocks on his own account. From the specimens that have been shown, in which the lights and shades were reproduced in what is known as the reticulative grain, it is probable that the method is to an extent similar. A weakness in the Pretsch method is that the surface of the block is not absolutely plane.

The processes in more general modern use depend upon the fact that a stone prepared for lithography, or a sheet of metal upon which a fatty-ink design has been traced for use as a zincographic plate, can be converted into a raised block suitable for typographic printing by treatment with dilute nitric acid. This dissolves away the stone or metal in those parts not protected by the ink, and leaves them as raised lines. If the action of the acid be uninterruptedly continued sufficiently long to obtain a high relief, such as is required for the printing-press, the fine lines will suffer or be destroyed, and for this reason—the acid acts in all directions, and as soon as there is a perceptible depth eaten away the sides of the lines will be dissolved as well as the space between them. To obviate this difficulty, as soon as the plate has been eaten away to a very slight depth, the acid is poured off, the plate washed and re-inked, and the lines being loaded up with ink and resin the plate is warmed. The resin runs a little down over the sides of the lines and so protects them while another etching is performed. This is repeated until sufficient depth is obtained.

It will be seen, then, that the first essential matter in these processes is to obtain a photograph in fatty ink, the half-tones of which must be represented by a grain, by dots, or by lines. Some of the methods of producing such lines or stipple, illustrating the processes dependent upon such methods, will now be described. Hundreds of processes must be omitted, and those now treated on all depend upon the translation of a Woodbury relief into such a representation by line or dot of the half-tone of the original as has been found to be necessary.

An ingenious method of translating the gradations of a Woodbury relief into stipple was devised by Mr. Ives, of Philadelphia. An inking roller is used to enter the deep places in the gelatine, and the mould or relief is inked all over with this roller. A paper has been prepared which has been rolled into a pyramidal grain. The size of the grain may vary somewhat, but in the specimen shown the tops of the pyramids are about the hundredth of an inch apart. This paper is laid upon the inked relief, and is placed in a press. The greater pressure exerted by the prominent places in the relief causes the pyramidal grain to be filled up to the bottom or nearly so, whilst in the half-tones the pyramids will be inked to a less depth and in the high lights not at all. Thus the half-tone of the Woodbury relief has been translated into a sort of mechanical half-tone by dot or stipple. [The lecturer here performed the operation described, using a velvet roller and a small screw press.] In actual practice a hydraulic press is used, and the relief placed between accurately-true surfaces. It is not practicable or necessary to bring such appliances to this meeting. It will be understood that it is only intended to show the principles concerned. [An example of the translation by this method of the Woodbury relief into a raised zinc block was passed round, together with a print from the same.] This print was one of a number made with an ordinary printing machine at the rate of about twelve hundred an hour, and the result was good enough to illustrate the fact that a process of this character has a large commercial future.

Other methods of translating half-tone into dot or stipple have been devised. Very fine results have been obtained by Meissenbach, an example of whose work I now pass round. There is a good deal of quality in this production, but we must not expect to get at once every advantage. When block printing has been worked and studied as much as silver printing a still higher quality will come.

Three methods of translating the Woodbury relief into stipple have recently been patented by Zuccato. In the first of these methods V-shaped lines or grooves are ruled in type-metal, the metal is then inked, a piece of paper is laid upon it, and the relief on the back of the paper. Under pressure the paper is forced more or less between the lines, and takes up more or less ink according to the thickness of the various portions of the gelatine relief. In the second of the Zuccato methods a piece of gauze is used between the paper and the inked metal; and in the third method the metal block is covered with a pattern inked in dot or stipple. The pressure of the raised parts of the gelatine relief behind the paper caused the dots to be spread out, their magnitude and consequent closeness to each other causing the shades to be deeper.

Mr. W. B. Woodbury has devised several ingenious methods of translating half-tone into stipple. Some of these methods are patented. In one method he backs up the negative with gauze, so as to produce a grain in the relief itself.

OLD PHOTOGRAPHS.*

Permanence and the Causes of Fading.

The *permanency* of photographs has always been a thorn in the side of the photographer, or, I should rather say, the want of permanence. With all the improvements in apparatus, uniformity in chemicals, and experience the charge of want of permanence is quite as much and quite as fairly used as a weapon in the hands of its detractors, and even of its friends, as ever it was. If anything, I believe modern silver prints are, on the whole, less permanent than old ones. The reason is understood by most who have had experience in the matter, and is, I think, fairly attributed to the more delicate negatives and less-concentrated solutions used now than formerly, especially the thinness of the negatives. There seem to be a few well-ascertained causes of deterioration of silver prints, scarcely any of which are irremediable. They are—1. Very rapid printing from thin negatives. 2. Imperfect fixation, including imperfect removal of the salts formed by the process. 3. Insufficient washing or bad quality of the paper. With regard to the first reason—"quick printing from thin negatives"—the remedy is obvious. With regard to the second, which is by far the most serious fault of any, the remedy, although obvious, is not so easily applied, *perfect* removal of the unstable matter from the paper being somewhat troublesome to thoroughly effect. This arises in a measure from having uncertain quantities to deal with, the methods of procedure not being varied accordingly. A plan that will answer with one sample of paper at one time will at another, with a different paper, fail. The temperature, also, at which the process is worked has a considerable influence upon the results.

The following conditions, I am inclined to think, form a rough outline of causes of failure:—An exhausted or a too weak solution of hyposulphite of soda. This may be brought about by attempting to fix too many prints in one quantity of solution, or owing to the hypo. having lost some of its solvent power by being kept in solution and exposed to light, or by the crystals being kept in a moist state; by the salt itself being impure or containing a large percentage of sulphate; or *the silver salts formed by the action of the hyposulphite not being thoroughly removed from the paper* by rapid and effectual washing. I have found by actual experiment *that if the hypo., after having effected the solution and alteration of the salts of silver, be well washed out of the prints, fresh* hyposulphite (say a twenty-per-cent. solution) applied to and left in the prints and dried in the usual way has *no effect* whatever on their permanence—an experiment anyone can make. This, I am aware, runs counter to the general opinion, as it includes the mounting of prints on boards containing hyposulphite, which is supposed to affect their permanence. I attribute the deleterious effects of such mounts to something else than hyposulphite—probably chlorine.

That a strong, hot solution of hyposulphite will effectually fade a silver print there is no doubt whatever, but the cases are not parallel. We might with as good reason say because strong nitric acid applied to the skin will blister it very dilute nitric acid will do the same, only more slowly. This we know is not the case. Therefore, because under certain conditions hyposulphite of soda will be injurious, under different conditions there is no reason to look upon it as prejudicial to the degree it is generally represented. Like many other substances, the effect depends upon how it is applied. Bad quality of paper will cause a degradation of the tones and a yellowing of the whites, but will not cause fading in the true meaning of the word.

* Continued from page 169.

CONFUSION AS TO THE MEANING OF TERMS.

There seems to be some amount of confusion with regard to the term "fading" that is applied indiscriminately to silver prints which have become defective from various causes, when it should rightly be confined to those prints in which the shadows have become less deep than when they were made. With numbers of photographic printers a sort of rule-of-thumb holds good—a certain quantity of hypo. in the fixing-bath, a certain time for the prints to remain therein, without any other variation, so that they are turned over occasionally, and no consideration for kind of paper used or the number of prints to be fixed. The routine is the same, winter and summer, and, like the laws of the Medes and Persians, which altereth not (or had not used to be), the consequence is irregular results. Probably the first prints put into the bath are all right, but the subsequent additions are not so; hence some fading and some remaining good. These causes, operating on prints of different degrees of substantiality, so to say—prints from strong or hard negatives, and those from delicate or weak ones—are quite sufficient to account for the different degrees of permanence. This has, in fact, procured for silver printing the unenviable notoriety of being a fugitive process. In addition to these causes of failure, printing for many years was looked upon as merely an unimportant mechanical process, to perform which almost anybody was good enough. Inexperienced youths were generally employed in the printing department. The mystery is that silver prints lasted as well as they have done; and is it to be wondered at that prints faded, yellowed, and had all sorts of complaints, when operations requiring a considerable amount of technical skill and chemical knowledge were deputed to such incompetent hands, so utterly ignorant, and, as a rule, careless as ignorant? It only remains for photographers to be conscientious and careful to remove this stigma from an art the results of which have never been surpassed by any other mechanical or chemical method of printing, and, in all probability never will be.

I have as yet said nothing about toning as an influence for the preservation of silver prints. That it exercises a good effect to this end there is no doubt; but that it is absolutely necessary is doubtful. That prints which have been toned in the old hypo. and gold bath have remained in good condition up to the present time we have proof of here tonight; but whether, in some instances, the toning resulted from the action of gold or sulphur we are not so absolutely certain. Possibly, if after the toning the proofs had been subjected to a fresh hypo. bath, the result might have been much better. In our present methods of working with the alkaline gold bath we certainly do get a deposit of gold on the image, and the colour resulting therefrom is pleasant to look upon. Basing our opinion on the respective qualities of the two metals (gold and silver) to resist atmospheric influences, the superior permanency must be accorded to gold. This, with the decided improvement in the appearance of the picture will, no doubt, cause us to retain the use of the gold toning bath so long as silver printing continues to be the process in general use. EDWARD DUNMORE.

(To be concluded in our next.)

THE CHADDERTON EXPLOSION.

WE have condensed from the *Oldham Evening Express* the following report, omitting from it such matters as were devoid of technical interest:—

The adjourned inquest on the body of William Heywood, the boy who was killed by an explosion at an entertainment given in the Chadderton Town Hall, on the 22nd ult., was resumed on Monday last, in the Chadderton Town Hall, before Mr. Molesworth, coroner. The wrecked apparatus was temporarily fixed in the room, in order that the matter might be better explained to the coroner and the jury.

The Coroner, after the jury had answered to their names, said since the last sitting of the inquest he thought it right that they should know what had taken place, and what he had done with a view of saving the time of the jury and the witnesses. He had seen Mr. Diggle, and had taken from him a considerably lengthy deposition, which he would read to them. He also said that he would forward the facts of the case to the Home Secretary, requesting that an inspector of explosives should be sent down. He had received a reply to that letter, in which Mr. A. F. O. Liddell, on behalf of the Home Secretary, stated that he thought it was a case in which it was not necessary and would not be of any advantage to send down an inspector. Since then he had taken the statement from Mr. Diggle, and which had appeared in the papers. As certain portions were somewhat vague, he thought it would be a convenience to the jury to have an expert present, and whose opinion would carry some weight and lead them to ascertain the cause of the disaster now under investigation. He had therefore seen Professor Roscoe, who would be able to give every information for the assistance of the jury, and whose advice might lead to the prevention of similar explosions.

Mr. Diggle was then sworn, and in reply to the Coroner said he had used the ether-oxo gas about three months. He had used it about thirty times in all. He had two generators, one being horizontal and the other vertical. The horizontal one was made entirely of brass, and the other of brass and glass. He had the horizontal one connected on his return into the room after he had been to fetch the weights, but he could not get the burners to light. He then found that the ether generator had not been charged with sufficient ether at the time the horizontal generator was connected with the oxygen bag and the lantern, but the tap connected with the bag was closed. He then went for some ether, and found that another bottle in which he had some was empty. He therefore knew there must be something wrong with the horizontal generator. He then took down the vertical generator and removed the horizontal one, and put it in its place, and charged it with ether. In the afternoon he had been trying the lantern and generator to see that they were right, and after trying them he thought he must have taken the ether out of the small bottle he had got for that purpose, as when he went home he found it was empty. On his return into the room afterwards he thought some one must have been touching it in his absence. He then opened the tap to see if it was right, and connected it with the tube of the vertical generator. He found the lamp burnt improperly, and he asked the party he left in charge of the entertainment during his absence who had been touching the lantern, and he said he did not know. Witness said it must have been touched. He did not then think there was any danger, and mentioned the delay which had occurred in consequence of changing the generator. The oxygen that passed through had to be lighted with a match, and when I lighted it it burned all right. I was not deaf at the time, but I am a little now.—Mr. Mellor: In your judgment would the oxygen gas on the floor rise without pressure? No. At the time of the explosion there was 112 pounds weight on. I put one 56-pound weight on, and I lighted the gas. There was a necessity to put another 56-pound weight on, because one was not sufficient. One 56-pound might turn the pure oxygen on, but I did not try it. The pressure would force the oxygen more forcibly through the ether. In order to do that the one weight was not enough. I have used this ether-oxo light several times. I got the brass generator the week the explosion took place. I got it for the reason that if the glass were to burst the brass was safer, otherwise he preferred the glass one because he could see the ether.—Mr. Mellor: Had you on other occasions found ether in the tube before? No.—Before you connected the pipe with the oxygen bag had you held it up to see if there was any ether in it? Yes.—Did you hold it up on every occasion to see if there was ether in it? Yes.—Why on this occasion? To see if it would light. In my judgment it was safe to use it.—In your judgment, now, was it safe? It was not, but on this occasion it was more susceptible to explode because there was a less vacuum on the bag.—The accident was caused by a vacuum flame rushing down the pipe into the bag? That is my judgment.—And that vacuum was caused by the weights being removed from the bag? My impression is that someone had pushed against the bag and removed the weight; the vacuum would then be caused.

Professor Roscoe, professor of chemistry, said he had examined the apparatus used at the entertainment by Mr. Diggle. He had partly heard the evidence given by Mr. Diggle, and had come to certain conclusions, which he would be glad to explain if they desired it. He had formed an opinion respecting the cause of the explosion. It was evidently due to the admixture of ether vapour with oxygen, which, mixed together in the proportion of six volumes of oxygen and one volume of ether vapour, became a most explosive mixture, and the firing of a bag of the size used filled with such a mixture would be quite sufficient to produce the effects observed. He considered that the vertical ether vessel was much more dangerous than the horizontal one, inasmuch as a small variation in the pressure of the bag might with this arrangement cause a suction of the ether back into the bag, whereas if it were an horizontal ether vessel, by keeping it in its right position, such a back suction could not occur—that was, a suction of the liquid back into the bag. The evaporation of about one ounce of ether into the oxygen contained in the bag would be sufficient to produce the explosive mixture referred to. He wished, however, to express his opinion that this system of using ether, whether in the vertical or horizontal vessel, was one which ought to be most strongly discountenanced. Even with the horizontal ether vessel the operator was working necessarily with a most dangerous explosive mixture in his vessel, and unless the greatest care was taken this vessel might explode the ether, and a most inflammable liquid would then run out and take fire.

The Coroner then read over the evidence of Elizabeth Heywood, which has already been given, and she stated that just before the explosion took place she heard something like the clapping of hands, and this was followed by the explosion. He asked Professor Roscoe if he could explain the clapping of hands?—Professor Roscoe said that was readily explained, and in fact he had rather expected to hear some evidence on that point before explaining.—A Juror said he would like to know whether one ounce of ether would cause the fumes that were experienced after the explosion.—Professor Roscoe said it would produce fully that. He meant to say that a small quantity of ether would produce this effect. He said one ounce of ether evaporated into the bag would form with oxygen this explosive mixture, and would be quite sufficient to produce the effects observed.

Professor Roscoe then explained how the flame would pass through the tube, and in doing so there would be a series of small explosions in the tube before the main explosion, which would account for the noises that had been heard.—By the Coroner: Would the bag being placed on the floor be more dangerous than being on the level?—Professor Roscoe: The position of the ether vessel on the table and the bag on the floor would render back suction of the ether easier than if the vessel had been placed on the same level. My most strong advice is that ether should not be used in any case. The only safe way in using the light is to have the hydrogen in one bag and the oxygen in the other unless a blow-through burner be employed, in which the coal gas can be taken from the ordinary gas main.—Mr. Diggle: How was it possible for ether to get mixed with the oxygen when there was 100lbs. pressure on the bag and the tap was closed?—Professor Roscoe: It is possible that a diffusion might have taken place. The fact that the bag was burst is proof positive that ether or ether vapour found its way into the bag, notwithstanding the pressure on the bag. It was possible for the noises heard to have occurred an hour before the explosion. —Professor Roscoe proceeded to give other technical evidence.—By Mr. Mellor: It was possible that some ether might have been left in the tube after it had been poured out, and it is quite possible that so much ether might be left in the tube as to cause the claps spoken of. If a quantity of ether had got into the bag it would certainly cause an explosion. I condemn the system in any shape.—Mr. Diggle: I should like to know if Professer Roscoe has ever used the light?—Professor Roscoe: No; I should be very sorry to do so.—Proceeding, Professor Roscoe said he had no doubt that if a weight was removed from the bag it would conduce to an explosion.—The Foreman asked the professor his idea about the pressure-board. —Professor Roscoe said sometimes these boards stuck, and weights came off. There was not much danger of the weights falling off.—A Juror: Then how do you account for the vacuum theory? I don't account for it, and I don't understand what Mr. Diggle means by a vacuum.—Mr. Diggle further explained what he meant, but Professor Roscoe characterised it as a "notion."—Juror: You say that there was ether in the bag, and you turned on oxygen to find that out. When you did so was it not possible for some to get into the bag?—Mr. Diggle: No.—The Coroner: If the bag had been above the apparatus would it have been dangerous?—Professor Roscoe: It would be dangerous in all cases.—Mr. Ascroft: Has Mr. Niele asked, on behalf of the society, whether the new gas was as safe as the other?—Mr. Diggle: I cannot say. If he did I told him it was, in my opinion.

Dr. Patterson said: I made a *post mortem* examination of the body of William Heywood, on the 25th of February, assisted by Dr. C. F. Diggle. The body was much discoloured, and bore evidence of having been crushed or squeezed. There were superficial abrasions of the skin, the largest of which was over the left shin bone. There was nothing unusual in the other parts and organs of the body, except in the lungs and heart. The former were much congested and exhibited the appearances usually found in persons who have been suffocated, while the heart bore similar testimony. The cause of the death of William Heywood was therefore suffocation.—By a Juror: There were no bruises or crushes to cause death. I cannot say that death was caused by gas. It was for want of air. A man standing on the chest of deceased for two minutes would cause death. Suffocation by gas could not be detected after death.—By Mr. Diggle: There was not sufficient gas in the room to cause death.

Mr. Joseph Farrer, one of the secretaries of the Oldham Industrial Co-operative Society, said on the evening in question he saw a number of children sitting near the bag, and removed them. They were about a yard away. The front form would be about four feet from the apparatus, and the children would be about a yard from the bag on either side of the apparatus. The machine would be about a yard from the back of the platform. None of the children touched the bag, so far as he saw, and he was in before the children went in. By a Juror: Did you, Mr. Farrer, notice a noise as of clapping of hands?—Mr. Farrer: I did. It is customary for a slight explosion to take place before an exhibition of this sort begins. I asked Mr. Diggle if anything was wrong, and he said someone had been tampering with the taps, and he apologised for being late. I then told him not to be more than an hour, and also said I had turned out a lad who was making a noise. Otherwise the children were very orderly. —Mr. Ascroft: How many children had you present at the exhibition?—Mr. Farrer: About 393 by ticket.—A Juror: Did you see anyone meddle with the apparatus?—Mr. Farrer: No; there was nobody to meddle with it.—Another Juror: If anybody had meddled with it you would have seen it?—Mr. Farrer: Yes.—A Juror: If anyone but Mr. Diggle had touched it you would have seen it.—Mr. Diggle: You did not hear any report of any kind only at the commencement of the meeting?—Mr. Farrer: I did not.

The jury found that the deceased, William Heywood, was accidentally suffocated owing to pressure on the stairs of the Chadderton Town Hall, caused by a panic owing to an explosion of a mixture of oxygen gas and ether vapour at an exhibition there. The jury appended to their verdict the following recommendations:—1. The jury are of opinion that the use of ether-oxo gas should be prohibited at all public entertainments. 2. That a recommendation be forwarded to the Home Secretary that no person shall be permitted to have any exhibition with explosive gas without a license for such purpose being first obtained.

RECREATION IN ART.

[A communication to the Edinburgh Photographic Society.]

To a Society such as this, with its several hundred members, the vast majority of whom are amateurs studying photography for the pleasure it brings, it may not be amiss to turn aside for an evening from the dry bones of *technique* and manipulation to consider in what way photography stands related to other arts as a source of recreation and enjoyment.

To the professional, who has to attend upon the wants of a somewhat captious and exacting public, the practice of photography may be some *few* degrees removed from the domain of pure pleasure. Indeed, if we are to believe the facetious "notes" and "incidents" recorded in the journals from time to time, it would appear that few occupations are more irksome, worrying, and wearying than the photographic portraitist; so that even to him the following remarks may not be without their interest. They are, however, more particularly addressed to the younger amateurs of the Society—to those who, while delighting in the skill of a handicraft, exercising both brain and hand to the utmost, yet look upon the pursuit as a pleasant, rational, and artistic pastime.

It is not necessary at this time of day to urge the necessity for recreation. Every one recognises the need for it; it is one of the prime necessities of civilised life. The more complex society becomes—and anxiety and worry ramifies life in its various relations, commercial and otherwise—the greater is the need of sources of relaxation which shall give rest and change to those faculties and powers that have been, perhaps, overtaxed, or at least kept too long in a state of tension.

Much as we may prize the many advantages we derive from our commercial and industrial modes of life, it is quite unquestionable that these are obtained at the sacrifice of many things which formerly constituted characteristic elements of social life. We have to find substitutes nowadays for the old-fashioned styles of enjoyment, such as the village fair, the jousts and games, the tournaments, and sundry other sports that suited the tastes and the needs of our forefathers.

I pass without mention those purely physical recreations which now rightly form so large a part of every young person's leisure occupation, merely observing in passing that the development of a taste for athletics among the youth of the country is one of the most gratifying and hopeful signs of which I know. It is a valuable antidote as well as a manly protest against the lackadaisical and maudlin sentimentality which prevailed too long, and did much damage during the earlier part of this century.

My special plea is for the higher forms of recreation—in that sphere where not only can our higher faculties be brought into active exercise, but where the light of genius sheds its rays upon our path, revealing the beauty, the grandeur, and sublimity of nature. That sphere is the sphere of art; its seers, its prophets, and its missionaries are the true artists, under whatever name they may be known, and with whatsoever implements or tools they may wield their power.

There is no recreation so beneficial, so much in unison with our constitution, as that which ministers to the imagination. It is of its very essence that it should take us away from the ordinary and daily routine of life. To renew, to create again, to call in a new set of ideas, feelings, and emotions is the object and meaning of recreation, and this can only be accomplished by falling back upon that power of imagery which we possess, and by which we place before the mental eye pictures of things that have no actual existence, but which excite the mind to action as though they were, while the body remains in a condition of dreamy repose. The mind thus finds relief from the pressure of fact by betaking itself to the realms of fancy, and procures alleviation from the burden of matter by throwing itself into the domain of spirit. Nature transformed and idealised by the imagination has been to man his greatest solace and the source of his best enjoyments.

In a lecture delivered in Edinburgh some years ago, on *Artistic Aspirations*, Lord Gifford thus expressed himself on this subject:—"It is a duty as well as a pleasure to cultivate the artistic or æsthetic faculties, claiming, as they do, so large a part of our highest nature. It were no exaggeration were I to say that, taken in its highest, truest, profoundest significance, æsthetic ripeness embraces the whole duty of man. To be artistic was to know, to love, and to rejoice in nature. *That* was artistic aspiration. To know and to enjoy nature was not only man's highest happiness; it was his paramount, sacred, and eternal duty. Although to the artistic mind and heart beauty and joy were found everywhere in nature, yet to attain æsthetic height, or drink deep of its joys, it was necessary that he should avail himself of all the sides of art, neglecting no form or aspect of external loveliness, and seeking the highest glory in the noblest manifestations and loftiest aspirations of the spirit of man."

The fine arts represent the highest work of man's skill and imaginations, including, under that term, music, literature, paintings, sculpture, and the drama.

Each of these branches of art supply exhaustless sources of recreations of the very highest kind. Of the claims of the drama as a source of recreation too much can hardly be said; for, notwithstanding the evil odour which still hovers over the stage, it is undoubtedly a powerful auxiliary in keeping alive sentiments and emotions which otherwise would but seldom come into play. With a more hearty patronage from those who occupy commanding influence in matters of social order and of morals, I think there can be little question that its influence would be greatly for good. The art of the player is one of those that appeal through the senses to the imagination, working on the feelings and the emotions of the spectators in such a way as to bring out a response—a coincidence of sentiment, of sympathy, or of repugnance, as the case may be—giving by that means exercise to many qualities of heart and brain which otherwise might lie dormant. Some of the best men of our time have defended the stage, advocating its claims as a source of instruction as well as recreation.

The object of the painter is to produce impressions; he in a measure is a coadjutor with the poet in "holding the mirror up to nature." He reflects from his canvas his own impressions of external nature—its moods and conditions. What has moved his sympathies, his admiration, his pity, or his disdain he will endeavour to fix upon his canvas; and so we have in a picture a transcript not only of natural objects and conditions, but a series or combination of impressions of these as they affect the *painter's* mind. I have said the painter is a coadjutor with the poet. Is it not true that the poet looks out on nature with a soul keenly alive to its beauties, his whole being strung in harmony with its every mood and grace. To him the twinkling stars tell tales of mystery, the mighty ocean throbs forth a pæan of eternity, the drooping daisy signifies to him a type of modesty, while the grass and the dewdrop convince him of a tender Providence. He is, as it were, an incarnation of nature—a very part of its inner self; its whole wealth is embodied, transfused, and humanised in him. He steps forth from behind the veil that hides creation's inmost secrets, and as a mediator or interpreter divulges them to his kindred. The ordinary mortal sees not what he sees, hears not what he hears, has no experiences such as he has. His communings with nature inspire him with its profoundest truths. His distinction is not merely that he has the power to put his thoughts or impressions in flowing verse, or clothe them in words that charm the ear by their consonance or their rhythm, but because he obtains glimpses of the inner essence of nature that are not vouchsafed to common men.

And so it is in some degree with the true artist. By the aid of his pencil he is enabled to portray to us aspects and beauties of nature which, but for his interpretation, we would have passed unheeded, or but feebly realised. In greater reality than the ancient wizards he conjures up before our waking eyes scenes of beauty and loveliness that entrance the imagination and absorb it in delight.

J. Hutchison Simpson.

(To be concluded in our next.)

RECENT PATENTS.

PATENTS APPLIED FOR.

No. 4,750.—"Photograph Holders." T. SCHMIDT, 122, Oranien-street, Berlin.—*Dated March* 12, 1884.

No. 4,906.—"Dark Slide for Photographic Cameras." A. T. HOWMAN.—*Dated March* 14, 1884.

No. 4,930.—"Changing Sensitised Plates in Photographic Cameras." J. STURROCK.—*Dated March* 17, 1884.

SPECIFICATIONS PUBLISHED DURING THE PAST WEEK.

MANUFACTURE OR PRODUCTION OF BACKGROUNDS FOR PHOTOGRAPHIC AND OTHER PICTURES.

THIS invention, by FRANCESCO ANTONIO MARRA, of No. 69, New Bond-street, London, received provisional protection only.

My invention has for object the manufacture or production in an economical manner of a brilliant, strong, and durable background that will show up and prevent fading of photographs, and which is applicable also to indian-ink and other drawings or paintings.

To produce such a background according to my invention I employ metal in a pulverised or flocculent state, which I cause to adhere to the paper or material that contains the picture by means of adhesive material, such as size. In practice I find it advantageous to coat or cover the paper or material containing the picture with size of the kind used by gilders, taking care to exactly follow the outlines of the picture; then I sprinkle or flock the metallic powder or powders or flakes on to the layer of size, applying pressure so far as needful to obtain an uniform coating; after which the whole is slowly dried, producing a strong background of paper or other fabric and metal so combined as to resemble a sheet of metal with a sparkling, roughened surface, and practically imperishable.

Various kinds of metals—such as gold, silver, bronze, aluminium, and others—may be employed according to the result desired to be produced; and by the use of two or more different metals polychromatic effects can be obtained.

PREPARING AND PAINTING PHOTOGRAPHS, PRINTS, OR DRAWINGS TO RESEMBLE OIL PAINTINGS ON CANVAS.

LIKE the preceding invention this one, too, only received provisional protection. It is by ALBERTA MARY FRANCES CASPAR, artist, of 200 and 223, Regent-street, London.

The photograph, print, or drawing selected should be quite dry and fastened face downwards to a drawing-board or table with four drawing-pins. It should then be rubbed with glass or sand paper until it becomes quite thin. The surface of this reverse side must then be spread with an adhesive gum, paste, or glue, and, if a photograph, must be previously soaked with water. The photograph, print, or drawing so prepared is then covered by coarse canvas, and this is pressed and rolled until the fibre of the canvas penetrates and shows through the photograph, print, or drawing. The photograph, print, or drawing, and canvas is then allowed to dry while still fastened flatly to the board or table. When dry the canvas is stretched on a stretcher. After the canvas is so stretched the picture is clearly shown thereon, and must be painted with transparent albumen colours mixed with water or a water medium, coarse touches of body colour being freely used to add to the illusion. When the picture so painted is dry a coat of varnish can be applied to the whole surface of the picture, which will then be ready for framing.

The novelty consists in—1. The preparation of the surface of the photograph, print, or drawing so as to admit of the canvas showing through it. —2. The pressing or rolling of the canvas upon the prepared photograph, print, or picture so that the canvas shall be seen through the same.—3. The painting in transparent albumenous colours in water, which produce upon the canvas so prepared as aforesaid the resemblance of oil paintings.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
March 25	Bolton Club	The Studio, Chancery-lane.
,, 25	Bristol Amateur	Studio, Portland-st., Kingsdown.
,, 27	Photographic Club	Anderton's Hotel, Fleet-street.
,, 27	London and Provincial	Mason's Hall, Basinghall-street.
,, 27	Liverpool Amateur	Free Library and Museum.
,, 27	Oldham	Hare and Hounds, Yorkshire-st.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AT the meeting of this Association held on Thursday, the 13th instant, the chair was occupied by Mr. A. Cowan.

The presentation to the Association, by Mr. J. Burgess, of Lommel's *Nature of Light*, international scientific series, was acknowledged.

The evening was set apart for one of the monthly "lecturettes," which, on this occasion, was delivered by Mr. T. Bolas, F.C.S., on the subject of photo-block printing. [See page 185.] Mr. Bolas illustrated his observations by experiments and by examples of the various processes under consideration.

Mr. W. M. AYRES said that when Herr Pretsch was in England he did a good deal of work for him. He thought that if silver printing was properly performed the results were permanent, if only sufficient gold were used.

Mr. BOLAS remarked that the value of Pretsch's services were now better appreciated, and that a monument had recently been erected to him at Munich.

Mr. J. BARKER wished to know how the gelatine relief should be made.

Mr. BOLAS replied:—Take one part of soft gelatine—say Nelson's flake—swell, and dissolve it. Add one-fourth of its weight of sugar and one-sixth part of bichromate of potash. Paper should be coated with this mixture to a thickness of two millimetres. It was essential for the film to be of such thickness that it should not be hardened all through by the action of light. After exposure under the negative the film is wetted, squeegeed on to glass, and the paper removed and relief developed by hot water, the same as in the carbon process.

Mr. BARKER wished to know whether a composition roller of glue and treacle would serve for inking the relief.

Mr. BOLAS said that it would not be suitable. There should be no moist surface to come into contact with the gelatine relief.

Mr. A. L. HENDERSON inquired what would be the result of using a hard, cutting substance and pressing that into the relief.

Mr. BOLAS said it would make a mould that would give an intaglio but not a typographic block. The Goupil process of producing photolithographs was believed to be based upon that method.

Mr. A. J. BROWN wished to know what was the best cutting medium.

Mr. BOLAS replied that the best was hard glass—bottle glass crushed fine. It was an article of commerce.

Mr. BARKER said that he had made some experiments with glass paper and obtained nice results.

Mr. HARE inquired how the Sprague ink-photos. were produced.

Mr. BOLAS replied that it was generally understood they were printed from a lithographic stone.

Mr. BROWN remarked that these pictures showed a grain resembling the reticulation of a carbon print.

Mr. BOLAS said that that was "Pretsch grain."

Mr. J. T. TAYLOR remarked that Mr. Winstanley, many years since, invented a method of obtaining a block by using a set of needles, the points of which were let down into the relief. They were then firmly clamped together and the ends ground off until the points of those which had been least prominent were just reached. A series of dots was thus obtained varying in size with the depth of the various parts of the relief. He thought it a most ingenious invention, but had not heard of its coming into commercial use.

Mr. BOLAS said that a gentleman had long ago consulted him as to the practicability of carrying out Winstanley's invention commercially, but on going into the calculation it was found that the enormous number of needles required would make the cost prohibitory.

Mr. HENDERSON referred to a process of Bullock's, which was of about twenty years' standing.

Mr. BOLAS believed that it was practically identical with that of Sprague. The two photographic journals in 1866 contained illustrations of Bullock's process.

Mr. A. MACKAY wished to call attention to an advertisement and circular representing that the —— Company were prepared to instruct and find employment in colouring photographs for persons not possessing artistic knowledge. The circular called attention to a woodcut representing an imposing-looking building, and professing to be the offices of the —— Company. He went to see what was the art, and found that at a side entrance there was a notice that the —— Company had an office, which at last he reached after mounting many flights of stairs. The process appeared to consist of dabbing on oil colour with the tips of the fingers. The results the members could well imagine, and would understand how far the representation that the purchase of a twelve-and-sixpenny box of colours—said to be specially prepared, but bearing the name of a well-known maker, and worth about five shillings—would enable the purchaser to obtain employment from photographers was likely to be realised.

Mr. W. COLES said he had reason to believe that ladies had been induced to part with their money under the belief that they would be able to earn a living. One had lately called upon him and shown specimens produced in this way. Of course he had told her that no photographer could make use of such work, and that if she really wished to make money at colouring photographs she must learn and practise in the usual way.

Mr. BARKER thought it a duty to humanity that such proceedings should be exposed.

The meeting concluded with a hearty vote of thanks to Mr. Bolas for his lecture.

The next "lecturette" will be given on the 10th of April, by Mr. W. E. Debenham, *On Lenses*.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

A SPECIAL Board meeting of this Association was held on Wednesday, the 5th instant, at 181, Aldersgate-street. The minutes of the previous meeting having been read and confirmed, Messrs. Muller and Collins were elected members of the Association.

The list of members requiring situations and correspondence was then submitted.

The following alteration of Rule IV., clause 1, was then proposed by Mr. ASHMAN and seconded by Mr. GANLY:—"That subscriptions shall be 10s. per annum, payable quarterly, half-yearly, or yearly, which shall entitle the subscriber to one vote at general and special general meetings, and also at each election of pensioners." In the same rule, line 9, it was proposed that the word "benefit" be struck out.

Mr. W. M. ASHMAN, speaking in support of his proposition, said the existing rule did not allow an honorary subscriber to receive assistance should misfortune overtake him. That he considered a mistake, and to his knowledge it deterred some of the profession from supporting the Association. He had no fear that by removing the distinction between the classes those gentlemen who had hitherto ranked as honorary members would withdraw their support. The proposition gave them the option of being donors, or donors and members. He would like to see them enrolled as members, and the balance of their usual subscription considered as a donation. At the same time it would enable those whose position was not fully assured to feel that in case of need they would be entitled to the support which the Society could render. Again: the reduction of the subscription would enable the assistants who could not afford to pay the yearly subscription in one sum to do so by two payments of 5s. or four of 2s. 6d., as circumstances would permit. This he believed would considerably augment the strength of the Association, and that most desirable object having been attained the success of the Society was certain.

Messrs. Ganly, Hall, Thorne, and others spoke in favour of the proposition, which was put to the meeting and carried unanimously.

Mr. Collins, son of the late Mr. C. G. Collins, was elected a member of the Board of Management, and the meeting was adjourned.

EDINBURGH PHOTOGRAPHIC SOCIETY.

The fifth meeting of the current session was held in 5, St. Andrew-square, on the evening of Wednesday, the 5th instant,—Mr. W. Neilson, President, in the chair.

After business of a private character, which occupied more than an hour, Mr. J. H. Simpson read a paper entitled *Recreation in Art* [see page], in which, after referring to the great branches of art, and suggestions for recreation in them, he referred more particularly to photography.

The set of transparencies in gelatino-chloride by Mr. A. Cowan were then exhibited.

The Secretary intimated that Mr. A. L. Henderson, on his recent visit to Edinburgh, had promised that he would endeavour to get members an opportunity of examining these beautiful productions, and Mr. Cowan had most courteously sent them. The transparencies were examined with great interest.

Mr. A. Pringle stated that he had had an extended experience with the gelatino-chloride plates, having experimented with them from their first introduction. Their manipulation was so easy and the results so certain that he fancied if he had had failures he could perhaps have given better information as to the working of these plates. He used the dullest diffused daylight to impress the plates, and he could pretty correctly hit any colour he desired. The larger the quantity of citric acid employed in the developer the longer must be the exposure. He found a ten-per-cent. solution of common salt a splendid restrainer, keeping the bright lights beautifully clear. From extended experiments, however, he had come to the conclusion that as yet no gelatine film was capable of yielding such clear and brilliant transparencies as collodion. He thought that for printing on opal the gelatino-chloride was unapproached for beauty. He preferred to develope a red image, and then tone to the desired colour, the result being one of the prettiest things it was possible to see.

Mr. Alexander Matheson had come to the same conclusion, and he found that when transparencies were thrown on the screen, people with a knowledge of the requirements constituting a good transparency invariably selected those in collodion from any kind of gelatine transparency, as being in some sense more acceptable.

Mr. Forgan had only tried two of Mr. Cowan's plates, and he submitted these as the first results of an amateur. They were both successful.

Mr. Fraser had tried several dozens, chiefly for microscopic work, and found them much superior to bromide plates; and so simple were the operations and requirements that he was invariably successful.

Mr. J. M. Turnbull thought those who desired a perfect lantern slide ought to fall back on the old collodio-bromide. In every particular the development was exceedingly simple, and as certain as simple, while any desired result could be obtained with ease, every detail being under most thorough control.

Mr. Pringle entirely agreed with the remarks made by Mr. Turnbull.

Hearty votes of thanks to Mr. Simpson and Mr. Cowan were accorded by acclamation.

Mr. Turnbull exhibited a new slide-carrier which he had picked up in his recent wanderings in the south. He did not know its author, but it was admitted by all present as probably the simplest and most generally acceptable form of carrier for a single lantern that could be found.

Mr. G. Mitchell exhibited a splendid series of views and animal studies, by Mr. Reid, of Wishaw. They were examined with great interest, and much admired.

The Secretary submitted what he had found to be a very useful adhesive material, obtainable at a very low price, under the name of "gloy." He was afraid to recommend it for mounting silver prints, as he had only met with it during the last six weeks. A silver print coated on both sides with the material had not undergone any change during that time; but for every other purpose he thought it greatly superior to the adhesive materials commonly employed. It dried slowly with a minimum of "cockling," and free from unevenness of body. It was very clean in use, practically transparent, and dried with a slight gloss. By the addition of water it could be reduced in consistency and still retain great tenacity, and it seemed well suited for many purposes where ordinary glue, gum, or starches did not always answer satisfactorily. By the courtesy of Messrs. Fraser and Co., he was able to distribute samples to all who desired to test the material. Several questions were asked as to the constitution of "gloy," but the only explanation definitely given was that it was a waste product.

Mr. Fraser said that when potato-starch was boiled in a *bain-marie* for several hours a somewhat similar material resulted.

The Secretary exhibited a new American camera, which possessed several novel features. The 10 × 8 camera with three double slides only weighed about seven and a-half pounds; it was, nevertheless, very strong and rigid. By a beautifully-finished rack arrangement, exceptional length for focussing was available. The bellows were of india-rubber, and all the metal work was nickelled. By an ingenious arrangement the slides could be used vertically or horizontally without altering the position of the camera, and by the simplest of devices the unwitting exposure of the same plate twice was prevented. In reply to a number of questions, the Secretary intimated that Mr. J. J. Atkinson, of Liverpool, would answer queries as to other sizes of these cameras.

After the usual votes of thanks the meeting was adjourned.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.

The ordinary meeting of the above Association was held in the College of Physical Science, Newcastle-on-Tyne, on Tuesday, the 11th instant,—Mr. J. B. Payne in the chair.

The minutes of last meeting having been read and passed, Mr. Andrew Ross, Mr. John Russell, and Mr. J. H. Inness (of Newcastle), and Mr. F. W. Morgan (of Durham) were nominated for membership.

Mr. R. S. Freeman read a paper *On the Permanency of Silver Prints*. [See page 183.]

The Chairman remarked that the subject was of a very interesting character, and that no one was better qualified to speak and write on such a subject than Mr. Freeman. Personally, his own experience of silver printing had been considerable, and he detailed an experiment he had conducted some time ago:—A sheet of paper was sensitised, divided in two, and these halves were printed together to the same depth as nearly as possible under a mask and vignetted. One half was toned and the other not toned. They were fixed together, washed together, mounted together on the same mount, and exposed together to sunlight. The *toned* print began to fade in the vignetted portion, and in three months had faded altogether. He (the Chairman) remarked that this had never been satisfactorily explained.

Mr. J. P. Gibson was opposed to the use of the *sel d'or* bath, and did not agree with Mr. Freeman's remarks on the use of ready-sensitised papers, especially those prepared with albumen in a state of decomposition. He (Mr. Gibson) had used ready-sensitised paper for many years, had always found it equal in quality to the paper he had sensitised himself, and far less trouble. He used a toning bath composed of chloride of gold and washing soda, being careful not to use too much of the latter, and he always took care to have his fixing bath alkaline. Carbonate of ammonia, in the proportion of about two ounces to the gallon of hypo. solution, was used. He thought that damp was chiefly to blame in cases of fading, and some mountants were totally unsuitable. He preferred himself, for mounting purposes, a solution of gelatine with a large proportion of alcohol added.

Mr. E. Sawyer advocated the use of warm water for washing prints.

The Chairman reminded members that the late Professor Marreco, in a paper read at one of the early meetings of the Association, proved, from experiments, that the copious washing of silver prints so much recommended in photographic text-books was quite unnecessary, and that with care the hypo. could be easily, perfectly, and quickly eliminated.

Mr. P. M. Laws deprecated the practice some photographers had of overworking their baths. He always made fresh baths, using as much gold as was necessary and then discarding the bath. He considered that gold was one of the cheapest chemicals they used.

Mr. Proctor (invited by the Chairman) said he had no prints by him. He had, in conjunction with Mr. Swan and Mr. Pattinson, produced many years ago the first prints ever done in Newcastle. They were on plain paper, salted, and sensitised; but they faded very quickly. That was before the introduction of albumen. He (Mr. Proctor) thought very little was known then of the cause of fading, and that they knew very little even now of the matter. The metals forming the tones of the print would be probably in the form of sulphide, and this might eventually turn to sulphate; but, whatever they were, damp and sunlight would favour such chemical changes.

Mr. Freeman narrated his first experience with ready-sensitised paper and the failure (by fading) which resulted. He would not condemn *all* ready-sensitised papers, as he had found some to be excellent in all respects. He (Mr. Freeman) showed, at the close of his paper, a large number of prints of various ages. Some mounted *cartes* of the exhibition of 1862 were excellent. They were toned in the *sel d'or* bath, and mounted, he stated, with a freshly-prepared solution of gum arabic.

On the proposition of the Chairman, a hearty vote of thanks was accorded to Mr. Freeman.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

The tenth general meeting of the session of this Society was held in the Religious Institution Rooms, on Thursday, the 6th instant,—Councillor Robertson, President, in the chair. The minutes of the last meeting were read, and after an addition—namely, the exhibition of a patented camera by Mr. S. D. McKellen, of Manchester, and the thanks of the Society to Mr. McKellen—were approved.

The question-box was then opened, and one of the questions found in it raised a slight discussion, which was not satisfactorily settled, namely—"Does the luminous paint used with Warnerke's sensitometer lose its power through time?"

Mr. J. Parker then read a paper on a *Sky Shade*, invented by Mr. Henderson, of Montreal. As a special article will soon be published on this shade it is not necessary to comment upon it now.

Mr. McGhie then exhibited several new pieces of apparatus, namely, Addenbrooke's instantaneous shutter, giving an exposure as desired from $\frac{1}{24}$th of a second to three seconds, and Cadett's latest studio shutter, the principle of which is a sliding front raised and lowered by the usual air-pressure arrangement. Both worked very well and were much appreciated by the meeting. He also exhibited Samuel's new patent camera, the novelty of which is the dark slide, which may be made to hold any number of plates. It is simply a box twice the size of the plates to be used, with a division in the centre, and a shutter in front of one of the divisions. The sensitive plates, in blackened tin holders, were put into the division behind the shutter. When it was withdrawn a strong spring pushed the plates forward, the front plate taking the place of the shutter. It was now in position for exposure. When the shutter was pushed back again it moved the plate before it into the other division of the dark slide, which projected beyond the side of the camera. This operation was repeated until all the plates were exposed.

Mr. R. DODD then exhibited a combined apparatus for varnishing negatives and distilling water, which he had used constantly with great satisfaction for the last twelve years. It was a flat copper case about thirty inches square and two inches thick, tinned in the inside, and standing at an angle of about eighty degrees. There were hooks at intervals on each side, to which were fastened movable wooden supports for different sizes of negatives. It was heated by steam conveyed through a tube from a small tinned copper boiler heated by gas. A tube in one of the corners drained off the condensed steam, which, if the apparatus be kept free from dust, is chemically-pure distilled water.

The CHAIRMAN then called upon Mr. Andrew Mactear to re-read a paper which he prepared for the Association twenty years ago on *The History of Photography in Glasgow.* [This paper will appear in our next issue.] The communication proved very interesting, as did also the supplementary remarks by several of the oldest members.

The meeting closed with the customary vote of thanks.

GLASGOW AND WEST OF SCOTLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE usual monthly meeting of this Association was held in the Religious Institution Rooms, Glasgow, on Tuesday, the 11th inst.,—Mr. Hugh Reid, President, in the chair.

The following gentlemen were elected members:—Mr. F. C. Buchanan, Mr. James Harvey, Mr. A. W. Hogg, and Mr. John Sheriff.

On the recommendation of the Committee it was agreed to take a lease of premises for the sole use of the Association, the rooms to be used for meetings, demonstrations, &c., as well as for members wishing to develope, &c.

Mr. W. Lang, Jun., then read his paper *On Bichromated Gelatine Films and the Stannotype Process.* [The MS. of this lengthy communication reached us as we were going to press, but we hope to include it in our next number.] He also gave a demonstration of the whole process of stannotype printing, and threw off a number of prints at the meeting from moulds made by himself. The interest of Mr. Lang's lecture was much increased by a number of very fine specimens of the various bichromated processes and some exquisite stannotype prints—all very kindly lent by Mr. W. B. Woodbury for the occasion.

On the motion of the CHAIRMAN, the meeting awarded a very hearty vote of thanks to Mr. Woodbury for his kindness in sending the specimens, and the same compliment was paid to Mr. Lang for his interesting paper, and for the immense trouble he had taken in getting up his demonstration.

The CHAIRMAN then read a letter of resignation from Mr. Smithells, the Secretary, who is leaving Glasgow, and the meeting passed a unanimous vote of thanks to that gentleman for all his work on behalf of the Society.

Mr. George Murray, 31, St. Vincent-place, Glasgow, was appointed Secretary. The meeting was shortly afterwards adjourned.

BURY PHOTOGRAPHIC AND ARTS CLUB.

THE first *conversazione* since the formation of this Club took place on Tuesday, the 11th instant, at the Temperance Hall, when a very agreeable evening was spent by about 240 ladies and gentlemen who had accepted the invitations of the members. The windows of the hall were draped with crimson and white curtains, and the gallery had also received its share of adornment, crimson and white being the prevailing colours.

Around the room were placed tables on which were arranged photographs of notable places and choice bits of local scenery, the work of the members, and much of it of the most commendable character. These included views taken in the Fylde district by Mr. C. H. Openshaw, one of the junior members of the Club. Mr. Wm. Booth (Heywood) exhibited views of the Isle of Man, &c.; while a large number of photographs of local and other scenery, including an excellent view of the interior of a farmhouse where John Wesley preached, were the work of Mr. J. Nelson. Mr. W. Palmer contributed an oil painting of the old "White Lion" Inn, Bolton-street, before it was pulled down; and Mr. J. J. Rishton, a member of the Manchester Photographic Society, exhibited a number of views on the Wharf. Views of the district through which the River Wyre flows, Miller's Park, Preston, Prestwich Clough, and other localities, were shown by Mr. R. Grundy, Jun., Parkhills. Mr. H. M. Dearden had no fewer than thirty photographs of bits of local and other scenery, including the interior of the Bury Grammar School. Mr. F. W. Livesey, the Secretary of the Club, contributed twenty-nine views, amongst which were some capital sea-pieces produced by the instantaneous shutter. Mr. W. S. Barlow had several, and Mr. E. Eccles a fine case of portraits. The Rev. J. C. Hordern sent two excellent water-colour drawings, *April on the Yare, Norfolk*, and *Quarry Tramway, Penmaenmawr.* Mr. Shaw exhibited a figure of *Hamlet*, the gift of his friend Mr. Henry Irving, and some portraits of Miss Terry, having written upon the back by that lady an expression of thanks for many kindnesses received. A number of microscopes were contributed by Mr. J. Taylor, Mr. E. W. Mellor (Warthfold), Mr. J. Walmsley, and Mr. J. Nelson. Mr. E. W. Mellor lent some beautiful views of the Bermudas and Eastern scenery, and a pencil drawing of Mrs. Langtry was also shown by Mr. E. Watkin, of Sale.

The PRESIDENT opened the proceedings by briefly giving those present a hearty welcome. He remarked that clubs of that kind were doing a useful work. Young people after leaving school, in order to keep out of mischief, should have some hobby, whatever it might be, for their leisure. It was, therefore, only natural that those having similar tastes should join together and form clubs such as that was. The bulk of the members of the Club had taken to photography as their hobby, but they did not wish to confine the Club to that. They wished to have their taste improved, and desired those to join the Society who devoted their spare time to the brush and pencil, in order that they might be told where they had gone wrong, so that their photographic views might be as artistic as possible. He thanked especially the President and members of the Manchester Photographic Society for attending.

During the evening songs, glees, &c., were given by a number of the members, assisted by several lady friends.

A number of views taken by the members of the Club were shown on a screen by Mr. Walmsley by means of the oxyhydrogen lantern, and in the intervals the guests were supplied with refreshments.

YORKSHIRE COLLEGE PHOTOGRAPHIC CLUB.

THE day of meeting of the above Club having been changed from the first to the last Thursday in every month, to avoid clashing with the Leeds Photographic Society, the third meeting was held on Thursday, February 28th,—Mr. H. B. Hall in the chair.

Professor THORPE, Ph.D., F.R.S., read a paper on ***Platinum Printing***, with practical illustrations.

Previous to this paper being read the terms of the second prize competition were arranged. It was decided to have another competition, all competing pictures to be sent in on or before the day of meeting in May. The subjects selected for the competition were ***A Group, A Cottage***, and ***Spring.*** Three prizes will be given for the best picture sent in of each. This having been settled, the Chairman called on

Dr. THORPE, who commenced his paper by giving the theory, chemically, on which the process of platinum printing is based, pointing out the technical difficulties which had to be overcome. He (Dr. Thorpe) then dealt with the rapidity of printing as compared with silver, and with the increased difficulty of double printing. He also pointed out particularly the limitation of the process, inasmuch as under-exposed or soft negatives, and also negatives with extreme contrasts and half-tones, could not be used. Dr. Thorpe concluded his paper by actually developing some prints to illustrate the process. He also exhibited a number of instantaneous and other pictures, in platinotype, taken in widely-different places, and admirably showed the wide adaptability of this kind of printing if the negatives were good.

A vote of thanks, moved by the Chairman, and seconded by Mr. Gamble, concluded the proceedings, and the meeting was adjourned until Thursday, the 27th March.

Correspondence.

DARK ROOM ILLUMINATION.

To the EDITORS.

GENTLEMEN,—Allow me to correct a mistake that occurs in your report of the last meeting of the Photographic Society of Great Britain. I said that I used *deep* not "*pale*" yellow paper in combination with the green glass.

The manner of setting up your abstract of Captain Abney's paper makes it appear that what was read as part of that paper was expressed by Mr. C. Ray Woods and Mr. J. Cadett in the debate; and Mr. Cadett is represented as being responsible for the statement that exposure at a certain distance gave an image with canary medium, and none with stained red glass. I do not think that that gentleman, or indeed anyone else at all, will undertake the responsibility of such a statement. "Stained red" glass is an article of commerce. I have obtained some from Messrs. Chance's agent, and the amount of photographic power passing through it I have found so much greater than that which passes through canary medium that I am at a loss to understand any experimentalist meeting with any other result. Mr. G. F. Williams, about a year ago, showed at the Photographic Club a wedge composed of increasing thicknesses of stained red glass up to ten, and photographic action had passed through them all.

With respect to a comparison of the visual light transmitted by various media: Mr. Woods' sight appears to be of such an abnormal character as not to afford a fair basis for any general argument. At the technical meeting in January, when I showed my lantern with various coloured media, whilst all others who expressed an opinion considered that the red side (cherry fabric) gave the least visual light, Mr. Woods said that he thought he could see best with that illumination. I am willing to accept Mr. Cadett's estimate of the luminous values of the several media, and should like to see this estimate compared by independent experimentalists with the protective power of the same media, as well as with the combination that I have particularly recommended. If it be found that, with an equal illuminating power, yellow has no more effect upon a sensitive plate than red, the case, as I originally put it, is established; and there is no necessity for the employment of a light which is certainly in many cases injurious to the sight. The experiments of others, however, appear to show much more than this.

Captain Abney is further reported as stating that green glass only cut off such rays as were harmless. In another report I find Mr. C. Ray Woods stating that Captain Abney had not used the glass I employ and recommend, but one of a "better green for the purpose." Surely these gentlemen "protest too much." If the "better one" only cut off harmless rays, does the one I use let through more photographic power than would pass without it? As a matter of fact, yellow-green glass *does* cut off considerable photographic power, especially when used in conjunction with deep yellow. When a moderately-safe amount of yellow medium is used a considerable additional thickness of the same medium does not cut off the active light so well as one thickness of green glass, whilst the latter takes the heating effect of the red and orange rays out of the light, and preserves or restores its yellow colour.

If the Council of the Society permit, I propose to show the results of some experiments with the media in question at the next regular meeting, before the commencement of the lantern display.—I am, yours, &c.,

March 18, 1884. W. E. Debenham.

MUNGO PARK *versus* MUNGO PONTON.

To the Editors.

Gentlemen,—Allow me to show you by the enclosed page of my work on carbon printing that I give the right name—"Mungo Ponton." Mr. Ponton was the first to point out the photographic properties of bichromate of potash, as early as 1838. He immersed well-sized paper in a solution of this salt and dried it by the fire, and exposed it under an engraving to sunshine, whereby a yellow print upon a brown ground resulted.—I am, yours, &c., E. Liesegang, Ph.D.

Dusseldorf, March 15, 1884.

TOURISTS' REQUIREMENTS.

To the Editors.

Gentlemen,—I am one of those who think that tourists' requirements are very badly met by manufacturers, especially in the waste of their time over each view in making the multifarious adjustments of the present travelling cameras; but now I write on another point. The weight of glass plates greatly reduces the quantities sold for tourists' purposes. If they were of the thinnest glass, and if the slides were reduced in bulk, I should use 100 plates per month more than at present; but with the present plates I cannot increase the weight of the apparatus, as it would then be too heavy to carry comfortably without a porter.—I am, yours, &c.,

Lucerne, Switzerland, March 12, 1884. W. H. Harrison.

SODIC SULPHITE.—FINAL.

To the Editors.

Gentlemen,—I was unable, from absence, to reply to Mr. Berkeley's article last week. I beg to assure him I do not in the least ignore his undoubted claims to early publication of the value of sodic sulphite. Quite the other way. But there is just this point of difference, that whereas he tells your readers it can be bought at his place of business, and distinctly declines to say how it is made, I gave full and detailed instructions for making it up. It is true it can be made with cold water, but not so surely as to getting a saturated solution as with hot.

I was a little puzzled, on reading the earlier portion of Mr. Berkeley's article, to know what was the real cause of his intervention in the discussion; but I soon came to that part where he says he notes gratuitous advertisements are to be had in your Journal, and then proceeds to at once secure the advantage of an excellent one for his house of business. I am far from censuring him for this—quite the reverse. I assure him I fully recognise his services in pressing on public attention the use of sodic sulphite, and that I have no desire at all to diminish his perfectly-just claims.—I am, yours, &c., Samuel Fry.

Surbiton, March 19, 1884.

[Mr. H. B. Berkeley first pointed out the properties of soda sulphite in our Almanac for 1881; in the following volume he gave a definite formula, in which the employment of warm water is recommended. Mr. Fry's subsequent directions, during 1883, to use hot water can have no special advantage beyond securing a saturated solution more rapidly. Mr. Berkeley's formula leaves the operator independent of the uncertainties of a "saturated" solution.—Eds.]

MOUNTING LARGE PHOTOGRAPHS.

To the Editors.

Gentlemen,—The following method of mounting large photographs may be new to many of your readers. We have used it for more than fifteen years, and know of no better way.

If large photographs are mounted *damp* and with starch the expansion and contraction are so great that the mount is "cockled." The correct principle is to mount the print as dry as possible. First have the prints in a pile, nicely damp, and flat. Glue with fine, clear Russian glue and a flat hog's-hair brush, and spread each print out face down to dry. When dried they may be trimmed and kept any time until required for mounting. To mount: have about twelve half-sheets of thick blotting-paper. Place two dry sheets at the bottom, then one well-damped sheet next; lay (say) twelve photographs on this sheet in a pile, and place another damp sheet on the pile. Have one more damp sheet above, and then the rest of the dry sheets. Now take out the top photograph and place it between the two top damp sheets. This is merely to take the hardness out, and the print must not remain long enough to allow expansion. Take it out (putting the top one of the pile in its place), and place it on the top dry sheet. Now sponge it all over with a fine sponge from the middle to the ends, taking care to wet it all over; it must be merely damped, and with as little use of water as possible. Take it up and lay deftly in its place on the mount, smoothing it out from the centre of the print; now take a sheet of paper and a handkerchief and rub it down from the centre to the edges.

It is better to have a flat burnisher at hand to smooth any unevenness. If the print have been nicely mounted and with no unnecessary damping it will soon dry, and, even if only in a paper book, the "cockling" will not be much. The glueing must be thin and even—something of the nature of the gum on a postage stamp. The sheets of blotting-paper will require re-damping if a number of photographs pass through, and it is not well to wet too many on the top sheet without changing it, as the paper is apt to fray up, and small pieces will then stick to the glue and make the finished picture uneven. Keep a basin of clean water on the table and a plate for the sponge.—We are, yours, &c., Robinson and Thompson.

Liverpool, March 19, 1884.

THE MANCHESTER PHOTOGRAPHIC SOCIETY.

To the Editors.

Gentlemen,—In your report of the proceedings of the Manchester Photographic Society, at its February meeting, published in today's Journal, a mistake has been made as to what I said in commenting on Mr. Rishton's excellent paper.

What I said was that when a camera had to be tilted enough to necessitate the use of a swing-back a more truly proportionate picture would be obtained by the concurrent use of a swing-front than without it, because by its use the parallelism of the front and back would be maintained, and the axis of the lens would be perpendicular to the sensitised plate. This, of course, is contingent on the supposition that a lens of sufficient covering power is being used.

I also said that by the combined use of swing-back and swing-front the rise-and-fall slide usually inserted in the fronts might be dispensed with. Possibly this latter remark would be the one which your report has given in an incorrect manner.—I am, yours, &c., S. D. McKellen.

18, *Brown-street, Manchester, March* 14, 1884.

CORRECTIONS.

To the Editors.

Gentlemen,—In my last communication to the Journal, which appeared in last issue, a grave error has taken place. I am made to say "Herr Obernetter now employs a new patented process," &c., &c. It should have been *Mr. Sachs* instead of Herr Obernetter. My note was intended to prove that Herr Obernetter's new process of engraving was known and at full work long ago, and patented by Mr. Sachs. The latter gentleman, whose modesty has hitherto prevented him from coming to the front, possesses the highest inventive genius; his discoveries in photography are legion. "Honour to whom honour is due."

In the same communication I omitted to mention the name of M. Thouroude in connection with MM. Perrot de Chaumeux and Londe. These gentlemen have written to me that as the greater part of the honour is due to their colleague, M. Thouroude, they hope I will rectify the error in my next letter to the Journal, and I wish to take the earliest opportunity of doing so.—I am, yours, &c., E. Stebbing, *Prof.*

25, *Rue des Apennins, Paris, March* 17, 1884.

Notes and Queries.

Is there any reason why *l'eau javelle* should not be used in washing gelatine negatives after fixing?—J. Dutton.——In reply: This has been already recommended on more than one occasion.

R. Barnard desires to know the amount of duty chargeable on engravings, photographs, and other pictures sent to the United States of America. ——In reply: On engravings and photographs a duty of 25 per cent. is charged, while the duty on paintings is 30 per cent., unless such paintings are the works of American artists, in which case they are admitted free. On frames for paintings the duty is 35 per cent. Stereoscopic views on *paper* are only 25 per cent., but on those on *glass* the duty is 45 per cent.

C. E. E. wishes to know why two lenses are employed in the formation of a lantern condenser. One lens, he thinks, should answer better than two, as it would stop less light and have only one-half the number of reflecting surfaces.——To this we reply: To correct the aberration of the lens would not be difficult if we had to deal with a radiant placed at a great distance, and the rays from which were to be made converging only in a very small degree after transmission. A short focus, however, would necessitate a deep curve, which implies great thickness in the glass and a certainty of its becoming fractured by the heat; besides which, the spherical aberration of such a lens would be very great and the result altogether bad. By the employment of two lenses both these evils are obviated.

Having a triple achromatic lens, the central component of which is plano-concave with the flat side next to the front, I would like a little information as to the capabilities of this objective. I was informed, when I got it from the friend to whom I am indebted for it, that it was capable of doing a great number of things which were enumerated at the time, but which I have unfortunately forgotten. May I trespass on your kindness to afford me the information desired?—E. B. Smallwood.——In reply: The objective in its complete form will produce a rectilinear picture. It will answer equally well for landscapes, architecture, or groups. For the last-named class of picture no diaphragm should be employed. If the centre and front lenses be removed, the back lens will answer as a single landscape lens. The front and back employed alone in combination will answer for portraits, but will cover only a limited area. We write this on the assumption that the objective is one of the usual triple class.

F. G. H. wishes to be informed whether a lens which is non-symmetrical can be made to produce a photograph that shall be absolutely rectilinear.——To this we reply that mechanical symmetry in the construction of a lens is not at all necessary in the production of a non-distorted photograph. Rectilinear projection is ensured by the rays emerging from the objective in a direction parallel to that at which they enter, and this condition can be ensured by other than symmetrical systems. In reply to the postscript of our correspondent's letter: The best position for the diaphragm in a combination of lenses is not necessarily that at which the distortion is cured or reduced to a minimum. This depends upon the nature of the lens. But the desirable class of lens is that in which, when the diaphragm is best situated for effecting the cure of distortion, it is also best for curing spherical aberration and conferring the most perfect flatness of field.

ALPHA says:—I am desirous of making panoramic stereographs on glass which, when examined in the stereoscope, shall subtend a very wide angle, and permit both eyes to roam, as it were, from side to side of the picture. Kindly say what steps I must adopt in order to achieve this end.——In reply: Without quite comprehending all that our correspondent may mean, we believe he will attain the end desired by taking his stereoscopic negatives with a wide-angle lens of short focus, not exceeding three inches, even if so much. This will ensure a wide angle of view being obtained, to begin with. Next, and of equal importance, comes the method of examination. This can only be effectively done by having achromatic eyepieces of short focus fitted in the stereoscope. By this means the rays from the sides of the picture, oblique though they be, will be transmitted to the eye, and the whole of the picture be clearly seen, the definition of the sides being not inferior to that of the centres of the respective photographs. This ensures the condition required, namely, a wide angle of view, much magnification of the details, and such a width of visual angle when being examined as to suggest a panoramic picture.

ALFRED H. CONWAY desires information with respect to the blackening of brass—not by an application of black varnish, but as an indelible stain. He has tried making the metal quite clean and free from every trace of grease (as recommended elsewhere) and the applying a solution of chloride of platinum, which he purchased under the name of "chemical bronze;" but the stain thus obtained is not similar to what he has frequently seen in the brass work of certain foreign optical instruments.——We believe that he will succeed to his satisfaction by making the brass quite hot—the precise degree of heat he will discover after a few trials—and immersing it in a solution of nitrate of copper; then holding it over a charcoal fire or Bunsen gas burner until it is observed to become black. We have several times seen experts at work, and from this we would say that to produce the best results with certainty much experience is requisite. To blacken brass by this process it is necessary that no soft solder shall have been employed in putting together any portion of the work. When this is the case it is advisable to give the work a grain by immersion in nitric acid, and then to apply either a solution of protochloride of iron or the "chemical bronze" already mentioned as having been employed by our correspondent.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

EXCHANGES.—In our next.

THOS. WIDDOP.—Thanks for kind attention.

A. S.—Thanks; but you do not seem to have grasped the point of the subject you attack.

STEPHEN RAWSON.—The address required is Mr. Archer, optician, Lord-street, Liverpool.

G. T. GRAMMER.—We shall probably treat upon the subject shortly. Justice cannot be done to the subject in this column.

ALF. WILMORE.—Read the report ou the explosion in the present number. From this you may be able to form your own conclusion.

S. E. D.—The collotypes in question are glazed after they are printed. An aqueous solution of bleached shellac is usually employed for the purpose.

FRANCIS FREEMAN.—If you will take the trouble to refer to any of our ALMANACS for the past three or four years you will obtain the desired information.

JAS. HUNTLY.—We are not aware whether the photograph is copyright or not. The only way of learning that is by searching the register at Stationers' Hall.

A. WELSHMAN.—If you will send the instrument to our office we shall, no doubt, be able to inform you for what purpose it is intended. However, we think we may safely say it is for nothing photographic.

W. J. RICHARDSON.—The reason the cotton dissolved in your attempt to make pyroxyline is that the acids were too weak. They must be the full strength given in the formula. The remedy is obvious in the future.

THOS. B.—According to your own showing the transaction was little short of a fraudulent one, and if the matter be contested we doubt much if you will be able to recover. We certainly shall not assist you in any way.

T. J. E. B.—Re-blacken the inside of the lens tube. Doubtless the haziness is caused by reflections from the inside of the mount. You might also, with advantage, paint over the edges of the lenses themselves with black varnish.

NOVICE.—The portrait lens is certainly incomplete if, as you say, there is only one glass in the posterior cell. You had better obtain your money back from those who sold the lens to you. The thing is decidedly imperfect. Never mind who is the maker.

P. P. A.—1. This query is quite unintelligible. Kindly repeat it, and be more definite.—2. Yes.—3. The iodide of starch test, as employed for paper prints, will do quite well for gelatine negatives.—4. Yes; but the plate will be very slow as compared with bromide.

G. A. WINGFIELD.—Unless you are a fairly good hand in using cabinet makers' tools we advise you to send the camera to the maker, direct, for repairs. The accident was very unfortunate, and will necessarily involve some expense, though not very considerable, we imagine.

J. PERCY GRAHAM.—Unless you inform us of the proportion of silver employed in the emulsion, and the quantity put upon each plate, it is impossible to estimate the value of silver per gross. Commercial plates vary considerably as to the amount of silver they contain.

A. W. (Newcastle).—The powder process is certainly the best you can employ. Unfortunately, there is some little difficulty in working such large sizes as you require. In this process much depends upon hygroscopic conditions, which, in our changeable climate, are not easily controlled.

CHROMO.—"Chromotypes" or carbon prints, developed on glass, when mounted with the full gloss, require to be spotted while they are still on the glass—of course before the transfer paper is applied. Instead of using water colours, oil colours must be employed; otherwise, when the picture is wetted, the spotting would be removed.

R. E. G.—Something must be wrong either with the nitrate of silver or the distilled water; otherwise the bath would not behave as it does. Your best plan now will be to neutralise the nitric acid you have added with a solution of carbonate of soda. Then leave it exposed to sunlight in a white glass bottle for a few days. After this filter it, make it slightly acid with nitric acid, try it again, and, probably, all will be satisfactory.

F. AND R. S. JOHNSON.—We do not clearly understand your query. Is it the Talbotype process you require or Talbot's photo.-engraving process? If the former, you will find it described in any of the early manuals on photography; if the latter, you had better procure a copy of Talbot's specification from the Patent Office. Sheet gelatine, such as that employed for glazing prints, is made by coating plates of tin or glass previously rubbed over with ox-gall, with a solution of fine transparent gelatine. When the coating is dry it leaves the plates easily.

RECEIVED.—George Smith; Herbert S. Starnes; W. H. Harrison.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—The next monthly technical meeting of this Society will be held on Tuesday next, March 25th, at eight p.m.

THE CALCUTTA EXHIBITION.—The bronze medal and certificate connected with the above exhibition was awarded to Messrs. H. and E. J. Dale, of 26, Ludgate Hill and Little Britain, for their patent multiplex camera back and excellence in photographic camera work.

PHOTOGRAPHIC CLUB.—At the forthcoming meeting of this Club, at Anderton's Hotel, Fleet-street, on Wednesday next, the 26th inst., the subject for discussion will be—*The Preparation of Lantern Slides.* This being a lantern night, members and visitors are invited to bring slides for exhibition.

PHOTOGRAPHY AND ASTRONOMY.—At a meeting of the Liverpool Astronomical Society, on Monday last, the 17th instant, the Rev. T. E. Espin, B.A., F.R.A.S., stated that the work of photographing star-charts was proceeding favourably. In some of the pictures there were stars down to the eleventh magnitude. Several plates were passed round for examination, including one of a fine cluster near Alpha Persei, and another of Prœsepe, showing the planet Mars.—The Secretary announced that the Rev. S. J. Perry, S.J., F.R.S., &c., of Stonyhurst Observatory, had promised to deliver an address, on the 21st April, on *Sun Spots: their Birth and Changes.*

ANOTHER PANIC AT A MAGIC LANTERN ENTERTAINMENT.—On Monday night last, the 17th instant, at Holland's school, Farnworth, near Bolton, Mr. Peter Greenhalgh, exhibitor of dissolving views, gave an entertainment in aid of the fund to provide a new organ for the Wesleyan Chapel, Farnworth. During the singing of a chorus shortly after the commencement of the entertainment there was a loud detonation, followed by a large volume of flame. This caused a rush to the doors by the panic-stricken audience, which was chiefly composed of young people. The explosion arose not from the gas bag, but through the imperfect working of a small tube in connection with the ether vessel. The light used was the "ethoxo-oxygen." Some persons who sat near the lamp were singed about the head and face, and other members of the audience met with a few knocks and bruises, but no very serious damage was done. Fortunately the attendance was not large, or the panic might have been attended with disastrous results.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1247. Vol. XXXI.—MARCH 28, 1884.

GLYCERINE IN GELATINE EMULSION.

In the course of the experiments some results of which have been recorded in the past two weeks' issues, we have been led to branch off in various directions with a view of testing the capabilities of glycerine as a medium in which to suspend the silver bromide. It will be remembered that, some three or four years ago, Captain Abney suggested glycerine in place of gelatine for this purpose, the silver bromide after cooking being permitted to subside, and the glycerine together with the decomposition salts being then poured away and replaced by plain gelatine.

This process, for some reason or other, never obtained any great degree of popularity—most probably on account of the feeble suspending power the glycerine possesses as compared with gelatine and other substances; so that, on this ground alone, we should not have again troubled to enter into fresh experiments. But, bearing in mind the extraordinary effect that glycerine has in increasing or hastening the penetration of liquids into animal tissues and substances, it struck us that this power might be utilised to advantage for a double purpose in connection with gelatine films. First of all, in assisting in the rapid and complete removal of the soluble matter from the emulsion; and, secondly, in increasing the permeability of the dried film when submitted to development.

In the latter direction we had previously experimented with other substances—such as starch, dextrine, gum arabic, *et hoc genus omne*—with results that showed there was a possible gain if the attendant disadvantages could be got rid of. We did not expect to meet with, nor are we now prepared to recognise, any gain in point of rapidity from the use of glycerine or any similar substance, as has been claimed by one or two experimentalists, who have apparently mistaken rapidity of development for increased rapidity of impression. This we have never been able to verify; for, though if we develope side by side two plates prepared under identically similar conditions except that one contains glycerine and the other does not, the former will probably be nearly fully developed before the other has fairly started. Still, if time be allowed, the non-glycerine plate will eventually overtake its competitor.

But, as a valuable adjunct to the emulsion during its preparation, we can speak very favourably of glycerine; for, not only does it assist in the rapid removal of the decomposition salts when the jelly is washed, but it further seems to cause a more complete elimination of the semi-colloid matter resulting from the decomposition of the gelatine, which is charged by some with producing "green fog." Certain it is that of two emulsions prepared from the same formula—with the exception of the addition of glycerine to one, and worked side by side through each operation—the one containing glycerine would bear the application of a much stronger solution of ammonia without showing green fog than the other, and this not in an isolated instance, but as an invariable result.

To test the value of the glycerine in assisting rapid diffusion and removal of the soluble salts an emulsion was prepared and divided into three portions, to one of which glycerine was added in the proportion of half-a-drachm to the ounce, to another thirty grains of gum arabic, while the third was made up to the same bulk with water. A pretty large excess of soluble bromide was employed in order to afford a sufficient range of tests. The three emulsions were allowed to set separately, and were then broken up for washing by the same instrument, as close an approach as possible being made to similarity of condition in each case. They were then suspended in muslin bags in separate jars of water, and each tested at intervals to ascertain the progress made in the removal of the soluble matter. The jars were numbered 1, 2, 3, containing respectively in the order named the plain emulsion, the glycerine, and the gum.

Upon testing the washing waters after a lapse of five minutes No. 2 gave a copious precipitate with silver nitrate, the others showing far less—No. 1 rather more than No. 3. In ten minutes No. 2 still showed most result, Nos. 1 and 3, about equal, being decidedly behind. In a-quarter of an hour Nos. 2 and 3 showed equality, No. 1 being now behind. From this point No. 2 gradually showed less and less deposit upon the addition of silver; No. 3 increased until thirty minutes, and then commenced to decline; while No. 1 went on without any apparent increase in its "output" of soluble bromide for about an hour, when it in turn began to decline.

The different waters became free from reaction under the silver test in the following periods:—No. 2, twenty-five minutes; No. 3, forty minutes; No. 1, eighty minutes. This method of washing, be it observed, is not the most rapid, but was the one most conveniently adapted to the purposes of identical treatment.

Now, if we examine these results, they will show that with the addition of glycerine we have a copious and rapid diffusion of the salts from the very first, and easy removal of all soluble matter. The gum arabic, from its more viscous character, resists for a time, but eventually succumbs, and renders aid in getting rid of the soluble matter, which is retained for a far longer period by the gelatine alone.

These results point, therefore, to an application of glycerine which will no doubt prove useful. We may add, incidentally, that with one particular sample of gelatine that "pits" badly the addition of glycerine completely cures the defect.

FLEXIBLE NEGATIVES.

Once more this subject has been brought under the notice of one of the societies—this time that of the London and Provincial Photographic Association.

Several years ago, when collodio-bromide held sway, attempts were made to apply it to paper instead of glass; none of these, however, were attended with such a degree of success as to have led to glass being superseded. Other pellicular systems in addition to paper were introduced, but before these had a chance of becoming developed in the form of being generally worked, collodion emulsion was deposed in favour of gelatine. The union of gelatine emulsion with paper as a support has already proved not only possible but quite practical; and, notwithstanding the great advantages possessed by glass as a basis on which to form the sensitive gelatine film, especially in portrait operations, it does not require much acumen to prophesy that for landscape work one department of gelatino-bromide which will ere long become developed in an extensive manner is that of the employment of paper as a support for the sensitive layer.

What are its disadvantages? That which would at first suggest itself is the fear of the grain of the paper producing an effect, greater or less, of granularity in the print. But it was shown by one of the speakers at the meeting to which reference has been made that even in prints from some Talbotype negatives, to which transparency had been imparted either by waxing or by some other of the means adopted by calotypists for effecting this purpose, the grain seemed to have been practically eliminated, or, at anyrate, rendered innocuous. Since those early times in the history of our art, when the recognised system of imparting transparency to a paper negative was the somewhat primitive method of laying it down upon a heated slab and rubbing wax over it, which melted and effected the desired end, the superfluity being absorbed by blotting-paper—since those days, we say, although the making of paper negatives has been discontinued the art of rendering paper translucent has been steadily advancing, and in this respect we stand upon higher ground at the present time than at the earlier epoch of which we have spoken.

A second disadvantage that might be imagined to be a concomitant of paper as against glass is the inferiority, as regards sharpness, which would result from its employment. This objection, if closely examined, will not be found tenable. The image will not be in the texture of the paper, but superimposed upon its surface in a thin pellicle. This being the case, it stands to reason that, no matter how great would be the granularity resulting from the backing of paper—if any such granularity really existed—the quality of the definition in the paper negative would precisely equal that obtained upon glass. If the printing were effected through the paper support the case would be different; but here the gelatine pellicle and the sensitive albumenised paper are placed in contact during printing.

But sharpness of a high order has been obtained in negatives taken on paper altogether; that is, upon paper which has not received any superficial coating, but contains interspersed throughout its substance the atoms forming the picture. This is the condition that existed in the now-extinct Talbotype process, in which the paper was salted by immersion in a solution of iodide of potassium, and sensitised by a wash of gallo-nitrate of silver. And yet, in Talbot's *Pencil of Nature*, examples of this process are before the world from which it is seen that the sharpness is such as to enable any person, by the aid of a magnifier, to decipher the titles on the backs of books in Talbot's photograph of a library, a further note-worthy element in this photograph being that it is printed on plain and not upon albumenised paper.

It will not, we believe, be said that there exists any exceptional difficulty in coating the paper. A speaker at the meeting alluded to said he laid the paper upon a plate of glass and then applied the emulsion as if coating a glass plate. It is presumable that, after the system comes into more general use, methods will be employed of a description similar to those now adopted in the preparation of carbon tissue. We have coated paper with perfect success by means analogous to those employed in albumenising, namely, by floating.

With respect to the nature of the paper that will prove best as a support: stiffness conjoined with homogeneity and transparency are requisites which claim the chief place in the selection. *Papier mineral* has been mentioned as suitable, and, despite its thinness, it may perhaps answer well. Still we think it will in practice be found to be too thin.

At this period we are introduced to something which may turn out to be just what fulfils every requirement. In *Recent Patents*, in this week's Journal, we publish the specification of an invention which, if it prove all that its introducers claim on its behalf, may serve a useful end as a support for gelatine emulsion. Suitable paper as regards thickness is rendered transparent by impregnation with copal varnish. When dry the surface is smoothed by means of powdered pumice-stone, and a coating of isinglass is then given, followed by treatment with ox-gall. It is probable that the transparency and stiffness imparted by the varnish will give to the paper such properties as will obviate the necessity of carrying out the patented invention in all its details. We have no doubt that varnished paper has, for purposes of negative photography, been tried by many.

The applications of negative pellicles of the character here spoken of are too numerous and obvious to require noticing in this article. We trust soon to learn that this application has been brought to such a degree of perfection as to be very generally adopted.

THE *SEL D'OR* TONING PROCESS.

From the published reports of the discussions on the causes of the fading of silver prints, which have recently taken place at several photographic societies, it appears that considerable misapprehension exists as to the older methods of toning. Evidently several gentlemen who have taken part in these discussions are labouring under the impression that the *sel d'or* process and the process of toning and fixing in one operation are identical. This is an entire misconception, for the processes are totally distinct and dissimilar; in fact, there is as great a difference in the manipulation of the two as there is between the present alkaline process and the old plan of toning and fixing in one solution.

This being the case, we shall here explain the *sel d'or* process, so that it may be seen how widely different, both in principle and in practice, it is from the process of fixing and toning in one operation. The latter process will be found described in an article in our issue for February 22nd. We deem it necessary that attention should be called to this matter now; otherwise, as time wears on, the two processes may be confounded and, eventually, considered as one and the same. Also, results which have been produced by the one process may ultimately be credited to the other and thus become misleading, if such be not already the case.

Sel d'or (salt of gold), it may be explained, is a double hyposulphite of gold and soda. It contains one atom of the former salt to three of the latter, together with four atoms of water of crystallisation. It is formed by adding one part of chloride of gold in solution to three parts of hyposulphite of soda, also in solution. The resulting *sel d'or* is then precipitated with alcohol. The salt thus formed crystallises in fine, needle-like crystals. It was once an article of commerce, and used to be put up in small bottles in the same way as chloride of gold, but it was somewhat dearer. In a price list, bearing the date 1854, now before us of an establishment which at that time had a reputation for cheapness, *sel d'or* is quoted at four shillings per fifteen-grain bottle, while chloride of gold is only three shillings for a similar quantity. Now, we believe, it is not made commercially at all, as we do not find it in any price list of photographic chemicals; even in the very complete list of Messrs. Hopkin and Williams it is not mentioned. As *sel d'or* is practically obsolete, in our further remarks we shall speak in the past tense.

The salt was first introduced by M. Fizeau for toning—or "gilding," as it was termed—daguerreotypes, and was employed in the following manner:—After the picture had been fixed with hyposulphite of soda and thoroughly washed a dilute solution of the *sel d'or* was poured on, and a gentle heat applied to the plate. In a couple of minutes or so the picture was generally sufficiently toned. Gold toning of the daguerreotype image, besides much improving its appearance, undoubtedly conduced to greater permanence.

If our memory serve us rightly, it was the late Mr. Thomas Sutton, B.A., who first introduced the *sel d'or* process for toning paper photographs. At the time of its introduction, the advantages claimed for this process was that it yielded greater permanence than was secured by toning and fixing in one operation, and this was borne out by experiments made at the time. Little or no over-printing was required. Further: the toning solution could be prepared at the time of using, and only so much as was required for immediate use need be made. A freshly-made solution secured the pictures being toned with gold. This could not be relied upon after the compound toning and fixing bath had been kept for some time, and was only used occasionally. The *sel d'or* process of toning was chiefly confined to plain paper prints, as it was not found to work so satisfactorily with albumenised paper. Even with the slightly-albumenised paper then in vogue it was recommended to treat the prints with diluted ammonia in order to render them more easily permeable by the toning solution. As time wore on and the albumen on the paper was increased *sel d'or* toning was only employed for plain paper.

The plan usually pursued with this method of toning was as follows:—As the *sel d'or* of commerce, notwithstanding the high price charged for it, often contained far less than the theoretical proportion of gold, it was customary, therefore, to prepare it extemporaneously as required. Here is the formula:—Six grains of hyposulphite of soda were first dissolved in four ounces of water, then two grains of chloride of gold were dissolved in a similar quantity of water, and the two solutions mixed by pouring the gold solution into that of the hyposulphite of soda, which had to be vigorously stirred at the time. It was imperative that the gold be added to the soda, and not the soda to the gold. Finally: six or eight minims of hydrochloric acid were added, and the solution was then ready for use. If the chloride of gold contained much free acid the hydrochloric was omitted.

After the prints were taken from the pressure-frames they had to be thoroughly washed to eliminate all the free nitrate of silver. This was essential, otherwise the prints were liable to become yellow and the toning bath was also injured; therefore the prints after washing were usually immersed in a dilute solution of common salt prior to toning. In the *sel d'or* process the printing was not carried nearly to the same depth as was required when the compound fixing and toning bath was employed. The toning generally occupied but a few minutes with plain salted or ammonio-nitrate paper, but with albumenised paper, even with the small proportion of albumen then used, the toning action was much slower, as we have already explained. When the prints were toned to the desired depth they were rinsed in water and then transferred to the fixing bath. This was simply a plain solution of hyposulphite of soda of a similar strength to that now employed for fixing prints toned by the alkaline method, the time allowed for fixing being about the same as at present.

From the foregoing description it will be seen that the *sel d'or* process is, in every way, distinct from that of toning and fixing in one operation. In the former process the toning and fixing are separate operations, the same as with the alkaline method, and the toning is completed before the prints are immersed in the fixing bath; while in the latter process the prints are practically fixed before the toning action is commenced.

Since the alkaline process was introduced no other system of toning has really been employed; hence *sel d'or*, like the compound toning and fixing bath, has become a thing of the past. We should, therefore, probably not have alluded to the subject at all, but we notice that many of our younger brethren in the art-science are confusing the two processes, and are evidently labouring under the impression that pictures toned and fixed in one operation have been toned by the *sel d'or* process.

PROFESSIONAL *VERSUS* AMATEUR PHOTOGRAPHERS.

The ever-increasing number of amateurs who within the last few years have joined the ranks of photography is a positively startling fact. In estimating the results that have followed, and are likely to follow, the introduction of gelatino-bromide plates, it is one which many professionals look upon with undisguised alarm—whether rightly or wrongly, we propose to discuss. Such is the unreasonableness, such the want of proper feeling, displayed by some that they choose to term "interlopers" the very men to whom modern photography may be fairly said to owe its existence. We cannot avoid thinking that it shows to what a height of selfishness, or, perhaps, we ought to say, egotism, some persons can soar.

Photography is almost essentially the product of amateur experiment, the main result of which has been given to the world untrammelled and unpaid for. We all know of the early patent which was taken out for a photographic method, but it was soon relinquished entirely for the public benefit. Commercial photography—photography, that is, of magnitude—may truly be said to date from the introduction of the collodion process. What was done for its inventor by those who had risen to affluence through his means—the man who, practically, had invented a new art, a new industrial pursuit, a means of livelihood by which we are fairly within the mark in saying tens of thousands gain their daily bread—the man who enabled scores of decayed gentlemen, discharged clerks, and unfortunate tradesmen, not to speak of worthless handicraftsmen, the broken-down butchers, bakers, and candlestick makers who rushed at the new means of making a lazy living, soon to be a luxurious one, without training being needed or knowledge required? What was done for him? We should be ashamed to name the contemptible sum that was raised for the benefit of those he left behind him.

Are not, rather, the professional photographers themselves interlopers? Gelatino-bromide is to all intents and purposes entirely the outcome of amateur efforts; yet, if we were to see at the dealer's counter some of its earlier exponents side by side with a member or two of those great firms who order a few thousand plates at a time, we are afraid that the former asking for a few dozen of the things he had called into existence would have to bide his time till the interloping professional had been supplied.

It will not suffice to say that amateurs of this kind are not meant—that the amateur who buys a small apparatus and a good supply of chemicals, and goes about taking his friends' portraits in every direction, is the class which is objected to—for to imply this would be making things still worse, and would be tantamount to saying that "we will not murmur at those people photographing without pay or reward who are likely to invent something new that may turn to our benefit; but we don't want anyone to come photographing if we are not to gain by it." We appeal to the broader-minded—whom we really believe form a far larger proportion of our readers—if we have not rightly stated the way in which many professional photographers speak. Thus we see it is as ungenerous as it is illogical to complain of the influx of amateurs, and we do not think it will be difficult to show that it is equally unwise in every way to offer the "cold shoulder" to them.

The absurd action of a firm of American photographers, who notified the closing of their account with the stock-dealers with whom they did business on account of these dealers selling materials to amateurs, has been well laughed at by the intelligent men of business on either side of the water; but it is a fair example of the feeling we describe and deprecate. On many grounds we should advise professional photographers to encourage and assist the increase of amateurs. An example will illustrate our meaning. Let there be two or three well-known photographers in a town, one of the three only sharing our views. If he show courtesy to amateurs he will enlarge the circle of his *clientèle*, and, more than that, it will be a strange neighbourhood if he be not able to obtain an occasional pupil. This, even to a prosperous photographer, is all pure gain, as he could make appointments for lessons. If he charge (we could give instances where this is done) a guinea for a lesson of one hour it will be fairly-paying work, and he will naturally both increase his reputation and his business—the other two photographers we have supposed, as a matter of course, losing to that extent.

Many professional photographers have made acceptable additions to their income by teaching and supplying apparatus; though we have heard them complain that there is so great a demand for apparatus that the dealers and makers do not care to allow them a discount or commission, they being able to sell at first hand all they can produce. This is a point upon which it is not our province to enter; but we may be sure that the inexorable law of supply and demand will very soon cause a levelling of inequalities of this character.

We have kept to the last the most formidable difficulty—formidable in appearance only—the expectation that the more work done by amateurs the less there will be for professionals. This we, and and many with us, believe to be a pure figment. Photography, nowadays, is a very different thing from what it was even a dozen years ago. The pictures which then would have delighted their originals would not be looked at now, on account of the increased excellence that characterises photographs from the average professional and the added work of the retoucher. Now we would ask—Is it reasonable to imagine that any everyday amateur could be, in the brief time which he can give to the work, at all likely to produce anything that will compete against good average professional photography? On the face of it the supposition is absurd. Hence, no loss could occur from any such course; and, further, the difficulties that the amateur will find to beset the production of really good work would, through the very publicity obtained, place the professional photographer in a better position and enhance the reputation of his skill.

Finally: we might add that, if in intimate circles *cartes* and cabinets of friends were produced, a knowledge of human nature would enable us to predict that the selfsame people would come to be taken by the professional portraitist; and thus, as in all other ways, would amateurs aid the professional photographer and improve his status.

AMONG the Americans who are at present on a visit to this country, one of the most distinguished—certainly *the* most distinguished in the transatlantic world of mechanical science—is Mr. Coleman Sellers, of Philadelphia. For several years prior to 1864 Mr. Sellers was the American correspondent of this Journal, and the trenchant and able manner in which he treated of the various current matters of interest in those days will be remembered by many. Rarely has any journal been blessed with so genial a correspondent as Mr. Sellers. The cares of an increasing business (now one of the largest and most important in the world) compelled the retirement of Mr. Sellers both from his position as our correspondent and also from that of an executive officer of the Philadelphia Photographic Society, greatly to our regret and to the loss of photography. Previous, however, to his retirement he rendered a service of unspeakable importance to our art-science in completing arrangements by which Mr. M. Carey Lea became his successor. Of Mr. Lea's valued services this is not the place to speak. With regard to Mr. Sellers it is enough to say that in the optics, the mechanics, the chemistry, and the practice of photography he was quite at home. We trust that he will enjoy his visit to Europe.

WE regret to learn, from the Chicago *Eye*, of the stoppage of the Chicago Dry Plate Manufacturing Co., caused, as stated in the official circular to the creditors, "by the trade having fallen off to such an extent that the expensive plant, indispensable in producing their products, left the Company without capital enough to tide itself over the period of dull trade." We hope that the creditors will arrive at such conclusions as will enable the Company to resume operations.

JUDGING from an announcement in an American contemporary the writing diamond appears to be an instrument unknown to its readers, but after which they are assumed to have aspirations, in order to place the numbers or names indelibly upon their negatives. The writing diamond has been more or less in use in this country since photography on glass was first introduced; but its employment is not now much resorted to, owing to the adoption of systems of numbering and naming the negatives which meet with more general acceptation.

THE word "art" in its various forms—fine art, artistic, &c.—always acts like a red flag upon a bull in some quarters photographic; hence we feel a little diffident in re-introducing it at a time when it may possibly again start the old discussion, though, after all, such discussion carried on in a proper spirit is calculated both to interest and instruct. Definitions innumerable as to the meaning of the word have been given, but those to be found in even first-class dictionaries do not embrace in a satisfactory manner that shade of meaning which has formed matter for argument so often in the pages of our own and other journals. The editor of the great lexicon—the *English Dictionary*—now in course of publication, the first number of which was reviewed by us a few weeks ago, writes to the *Athenæum* on the word "art," asking for references on the use of the word "as it is used in *art* journals, by *art* critics, by Mr. Ruskin in writing on *art* and artists, or by anyone who speaks of early Italian *art* or modern English *art*." He asks—"Is it not a curious illustration of the traditional character of English lexicography that this, which is probably now the first sense of *art* that comes up to one's mind, is not, so far as I know, to be found in any dictionary, English or American?" . . . "Even dictionaries which have added *art union* to their vocabulary, and define it as 'a union of persons interested in art,' leave posterity to conjecture whether this *art* in which the nineteenth century was interested was 'skill,' 'tact,' 'cunning,' 'speculation,' 'the principles of science practically carried out,' 'a device, a project,' or 'whatever has been made by man' (*e.g.*, the Griffin—tall hats)"! What food for argument will there not be when Part II. of the dictionary is issued!

THE wish expressed by *La Nature* that Mr. Cecil V. Shadbolt might make new conquests in the aërial world is in a fair way of being realised, for that gentleman is already contemplating making further ascents in the near future, the "Sunbeam" having been undergoing repairs nearly all the winter, and being now almost ready to be launched into space again. The balloon had become very sticky, so that Mr. Dale, as Mr. Shadbolt informs us, had a long and difficult task with it. Our readers will be interested to know that the indefatigable balloonist is having another and a smaller balloon made, which will be capable of accommodating three persons. It will have a bright and gay aspect when soaring aloft, the fabric being put together in alternate red and yellow gores, and it is expected to be ready early in summer, when it is Mr. Shadbolt's determination to do still further and better photographic work.

ONE of the earliest suggestions as to the use of the spectroscope was that it would serve as a means of qualitative chemical analysis, and, gradually, experimenters came to consider that it could be used even as a quantitative mode. At a meeting of the Royal Society, on the 13th instant, Professor Hartley, whose photographed spectra are so beautifully executed, read a paper summarising the methods that had been employed for the purpose, and then gave an account of the length and strength of metallic lines in solutions of different strength. Magnesium gave the strongest effect, and arsenic the weakest, so small a quantity as one part of the former in 10,000,000,000 parts of water being detected. The immense value of photography in researches of this character can scarcely be estimated, and as it eliminates all personal equations it forms a permanent register of the highest value.

FOR many purposes it is very desirable to possess a substance which, applied to vessels or tubes, should be as impermeable as possible to heat, and an interesting addition to our knowledge on the subject has been made by Mr. J. J. Coleman, in a communication to the Philosophical Society of Glasgow. In a room heated to 100° Fahr. he placed a number of boxes containing ice and of about a foot cubical capacity, first placing them in a tin box, allowing four inches of space all round, and then packing with the various materials. He tried also a second series in a room of 60° Fahr. temperature, and obtained the following results, the numbers indicating the amount of ice melted in a given time:—

Room at a Temperature of 100° Fahr.

1 Silicate cotton	100
2 Cotton wool	122
3 Sheep's wool	136
4 Infusorial earth	136
5 Wood charcoal	160
6 Sawdust	163

Temperature of Room 60° Fahr.

1 Silicate cotton	100
2 Hair felt	117
3 Wood charcoal	120
4 Wood shavings	125
5 Gasworks' breeze (coke dust)	230
6 Air spaces of 1 in. alternated with wood 1 in.	280

A box well packed with silicate cotton, after the manner of a Norwegian cooking stove, would form a very easy mode of cooking emulsion without the aid of extra heat and its attendant necessity of care and watchfulness.

THE same gentleman exhibited a most ingenious thermometrical arrangement of his invention, which he termed a "discontinuous thermometer." It consisted of a series of tube bottles arranged in a row in a wooden frame, the liquid contents of which became frozen successively as the temperature lowered, commencing with an olefine (paraffine), solidifying at 100° Fahr., the series consisting of olefines until 32° is reached, when the series is continued to 40° below zero with mixtures of glycerine and water.

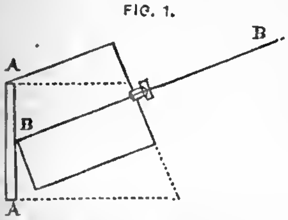
WE lately called the attention of our readers to the state of affairs at the Paris Observatory, and the objections offered to the sale of the grounds to raise funds for making the necessary alterations suggested. At its last private sitting the Academy of Sciences debated the question of the sale of the observatory grounds in order to find the funds for erecting—not a substitute, but a branch observatory, as it were. No conclusion was arrived at, and the discussion was adjourned for fifteen days. The majority of the Academy is of opinion that it would be desirable to grant the credits required for the erection of a new establishment; but many members are against the sale of any parcel of ground. They contend that the present position of the observatory must not be deteriorated under any pretence whatever. MM. Wolf and Janssen delivered addresses defending the *status quo.*

DISTORTION BY THE CAMERA.

In writing some little time since on *Distortion by Lenses*,* distortion by the camera was left for future treatment; and, as the subject in the form of a discussion on swing-backs and rising-fronts is now on the *tapis*, it seems a fitting occasion for considering the principles involved.

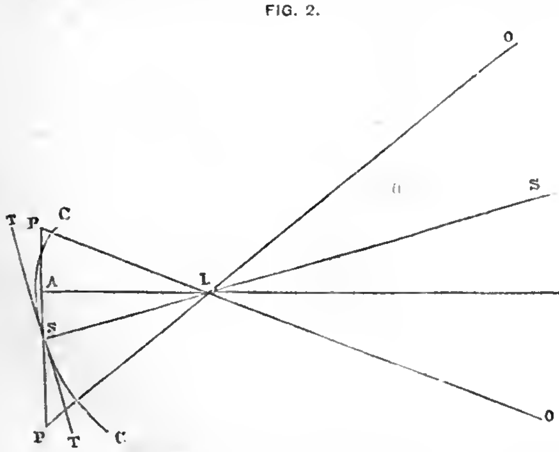
As to the relative merits of the swing-front and the swing-back: it is merely a question of mechanical convenience, and there is no advantage optically in the one arrangement over the other. With the swing-front, however, it is imperative that there should be also the rising-front; otherwise with the back kept vertical to avoid distortion there would be even less of a high building included on the plate than there would be with the whole camera square and rigid. To prove the identity of action of the swing-front and swing-back, let A A (*fig.* 1) be the camera back, and B B a line from some point in the building which has to be represented in the centre of the field of view. Now, whether the camera be tilted and the back swung vertically, or the camera be fixed with its back vertical and the swinging and rising front used, the lens must occupy the position in which it is shown on the line drawn from the centre of the object to the centre of the image, and it can make no difference optically whether the leather and woodwork of the camera take the ordinary form indicated by the continuous lines or that of the camera with the swing-front shown by the dotted lines.

FIG. 1.



With respect to the use of a swing-back or of a rising front: when a difficult architectural subject—such as a tall building taken from a short distance—has to be photographed, the advantages on the side of the rising front are so great that it is almost always, if not in every case, to be preferred, provided that the lens employed has a sufficiently large angle of view. I am glad to be supported in this view by the practical experience of Mr. F. York, who stated at one of the societies some little time since that he used a rigid camera and a high rising front in preference to the swing back. In illustration of the difference between the methods: let P P, *fig.* 2, be a plate, and P O, P O be lines from the top and bottom of the subject to be delineated drawn through the lens L. Now, assuming the lens to have a flat field, its plane of definition will, in the case of a rigid camera and rising front, be P P, at right angles with the axis A A of the lens and identical with the surface of the plate. In the case, however, of a tilted camera, with the back swung vertically to preserve the perpendicularity of the lines, the plane of the definition will be T T, at right angles to the axis S S of the lens, and only cutting the plane of the plate along one line. It is obvious that the greater part of the picture will be considerably out of focus. This is additionally aggravated by the fact that the top of the building is further from the lens than the centre, and to be in focus would require the back to be swung in the contrary direction from that which it has had to take, in order to preserve the uprightness of the lines. The foreground is also nearer the lens, and, for a similar reason, ought (so as to be in focus) to have the back also swung in the contrary direction from that in which it has been tilted.

FIG. 2.



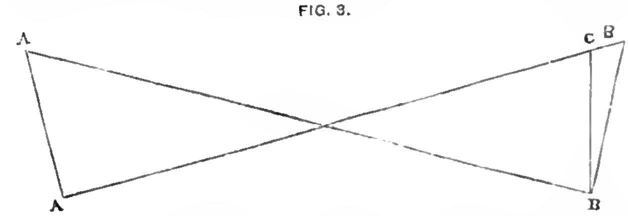
The case of a lens having a curved field, as seen in the line C C, shows an advantage with respect to the upper half of the plate, the curve of definition cutting the plane of the plate in two places and being for some distance very near it; but a corresponding disadvantage on the lower half, where the two lines P P and C C are seen to recede more violently from each other. Opticians have always recognised the desirability of having a flat field of definition, and in lenses of the wide-angle doublet kind a considerable approximation to this result has been attained.

An additional reason for preferring the rising front to the swing-back arises from the fact that the top of a building is generally much more lighted than the base, and the foreground commonly requires most light of all. Now, with a camera tilted, the circular opening of the diaphragm is presented to somewhere near the centre of the building, and the top and the foreground receive equally the smaller amount of light that comes from the opening of the diaphragm, as it is seen somewhat sidewise in an elliptical form. When, however, the camera is kept square and the front raised the lower part of the picture has the full circular opening of the stop presented to it, letting in the greatest amount of light, whilst the top (the most strongly illuminated) part of the building and the sky have the narrow, semi-edgewise view of the diaphragm presented, and the supply of light cut off accordingly, thus equalising to a considerable extent the illumination of the whole picture.

Of course the use of a rising-front instead of a swing-back involves the employment of a lens having a larger field of view than the size of the plate which it is intended to cover. There are many lenses, however, that will cover a considerably wider angle than that occupied by the plate with which they are generally used, although I notice a tendency of late years to cut down the size of lenses with a view to greater portability. I think that this is to be regretted. I know it is urged that leaving a little more margin on the lens, so as to increase its width of angle, involves that the edge of the field included in this extra angle will not be so well-defined as the remaining portion. To this it may be answered that it is often useful to have width of angle of light even if the definition in that extra width be not perfect. How often does it happen, when using a lens to its full field of light, that the sky shows as a circle with the edges of the plate as black corners! If a little more glass had been allowed at the edge of the lens this would be prevented, and the sky without much definition in it would certainly be to be preferred.

In connection with the subject of distortion by the camera, that of correcting such distortion by special methods of copying the distorted photograph may properly be considered. The method which will accomplish this in any particular case will depend upon how the distortion has been produced, and the manner of correcting it may be divided into three cases, illustrated as follows:—Let A A (*fig.* 3)

FIG. 3.



be a map which has been copied with the camera not square to it. The camera back B B' has been swung to obtain an even focus, and the copy of the map, although right in length and average width—that is, width across the centre—will show one end narrower than the other. If the picture is now to be corrected by recopying, and is tilted to a sufficient extent, the camera remaining square as at C B', the lines may be restored to squareness; but the proportions of the original will be altered, and the photograph will be too short in proportion to its width. If the picture be put square to the camera, and the back be swung to restore parallelism of the side

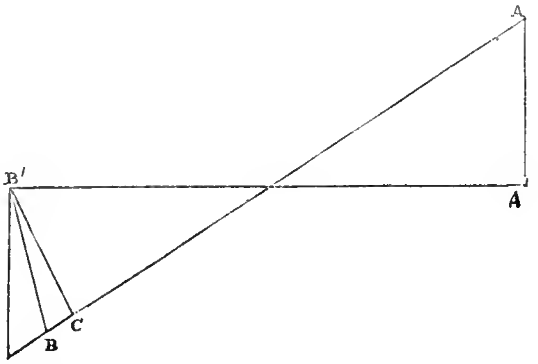
* The British Journal of Photography, 1883, p. 722.

lines, the photograph will make the length too great in proportion to its width. The true way in this case is to swing both the copy to be corrected as A A, and the camera back B B′.

In the second case, suppose B B′ to be the side of a slanting wall, or the side of a hill, and that the camera back A A has been swung to get top and bottom in focus. This case differs from that of the map, in that it is not proposed to represent the flat surface as it would appear if looked down upon from such a height that a line at right angles to the surface of the wall or side of hill would be the line of sight, as that would make the wall or hill appear vertical instead of showing its slope; but the line of sight is to be parallel with the earth's surface. In this case the photograph to be copied must be slanted as at A A, and the camera back kept square as at C B′.

In the third case, let A A, *fig.* 4, represent a building which has been photographed with a tilted camera, and with the plate B B as

FIG. 4.



with a rigid camera it would be at right angles to its axis. To set this right in copying, the picture must be presented square to the camera, the back of which should be tilted. The picture was already too short in proportion to its average breadth, and if it be presented otherwise than vertically square to the camera it will become more so. If, in addition to pointing the camera upwards, the bottom of the camera has been swung inwards as at B′ C, the case resembles that of the map first mentioned; but, as in consequence of the difference of the conjugate foci, the inclination of the camera back to its axis will not be so great as that of the front of the building is to the same axis, the slope of the picture to be copied must not be so great as that of the back of the camera with which the corrected copy is to be made. W. E. Debenham.

STANNOTYPE.
No. VIII.

As a matter of convenience, when several reliefs have to be developed at once, the grooved zinc trough will be found far preferable to any other form of vessel, being at once compact and roomy and, at the same time, holding the films in such a position that the dissolved gelatine readily washes away from the surface of the relief. Clearly there is a gain both in time and trouble when the development of several films is carried on at the same time; for, even when personal attention is devoted to the operation during the whole period, there need be no waiting or waste, as must be the case where only a single relief is in question.

Circumstances may, however, arise in which it is desirable or necessary to operate upon a single film, in which case the grooved developing trough is needless; indeed, when the operations are likely to be generally on a small scale, a preferable plan is to employ a circular oval basin, or an ordinary pie dish of suitable size, in which the plate carrying the relief is placed face downwards and left to develope itself. Here the gelatine, as soon as it is dissolved, sinks by its own weight, leaving a fresh portion of the surface to be acted upon. Regularity and rapidity of development are thus secured.

Where the operations are on a small scale it will probably not be considered worth while to adopt the refinement of an automatic system of regulating the temperature during development, though for various reasons this plan is to be preferred. The amateur will probably be content to trust to some simple means of retaining the temperature at a point somewhere between the limits allowable by means of a small gas jet or spirit flame, or by renewing the water as it cools. The latter plan is likely to cause irregularity in development, as when the water is allowed to sink below a certain temperature it ceases to exercise any solvent action upon the gelatine, but merely causes it to swell and become slimy, in which condition it is dissolved rapidly and irregularly upon the sudden change to water of a higher temperature. The danger in the other case is that, unless the arrangements are carefully adjusted, there is the chance of the temperature rising too high—a matter which must be most carefully guarded against, especially during the earlier stage of the process. In fact, the conditions to be observed here are identical with those which prevail in ordinary carbon printing, only a greater amount of care is necessary.

Thus, though we have given 120° as the limit of temperature to be used, we may increase this by ten or fifteen degrees towards the end of the operation, especially if the tissue appear to have been over-exposed; but, if such increased temperature be applied at the commencement, the probability would be that the film would become loosened from the glass, and blisters and reticulation make their appearance. Those who are familiar with carbon printing will appreciate to the full the increased difficulties in this and similar directions that the thicker relief tissue involves, and will readily recognise the necessity for and value of extra care in little matters.

Should a slight detachment of the film occur from any reason, the difficulty may sometimes be overcome by laying a strip of waxed glass along the detached edge, and clamping it thereto by means of a couple of American clips. The arrangement is not an elegant one, nor does the presence of the clips add to the convenience of the developing operation; but where the treatment offers the chance of saving a relief it is worth adoption. A very convenient clip for this and other purposes may be made by slipping half-an-inch of india-rubber tubing over two narrow strips of glass, so as to bind them together in the middle. If a piece of thin glass rod be passed transversely through the rubber tube and between the slips of glass it forms a "knuckle" upon which the slips of glass hinge, the rubber tube acting as a spring, and the strength of the clip being regulated by the position of the transverse rod.

If a slip or slips of glass be attached to the relief in this manner they must be allowed to remain until the development is complete and the plate thoroughly dried. They may then be removed by carefully inserting the point of a penknife underneath the slip, when, if properly waxed, it will detach itself readily.

Experience alone will enable the operator to judge when the development has been carried sufficiently far; but, as a rule, when the image presents much of the appearance of an ordinary negative as regards density, and the surface appears even and free from smears of partially-dissolved gelatine, the action may be considered as complete. It is a good plan, when the development appears to be finished, to place the plate in a dish of clean and tolerably warm water for a few minutes; and if, on removal, no smears of gelatine are evident when the plate is tilted, a final rinse in clean, cold water completes the operation.

It is not absolutely necessary, but some operators prefer at this stage to treat the relief with alum in order to further harden it, but it is a question whether such treatment is not superfluous. However, no harm can accrue from a five minutes' soaking in a strong and carefully-filtered solution of common alum, after which the plate is again rinsed and placed to drain for a few minutes upon blotting-paper. The final treatment consists in immersing the plate for twenty minutes or half-an-hour in a dish of strong methylated alcohol, which, like all the other solutions employed, must be well filtered and perfectly free from dust. This precaution is specially necessary with the alcohol, as much of the commercial article contains a considerable quantity of sediment which, if it become attached to the surface at this stage, will cause endless trouble in the way of spots.

After immersion in the alcohol the plate is drained and removed to a warm, dry place, carefully protected from dust, until it is thoroughly desiccated. When apparently dry it is a good plan to heat the plate to about 150° Fahr. for a few minutes, in order to ensure the complete removal of all moisture and to harden the film. So long as the relief contains any trace of moisture it is not only in a soft condition and liable to be easily damaged, but it is not in its best state as regards sharpness.

A few words may be said on the subject of the apparent sharpness of the image during development. The beginner will be frequently mislead by the seeming want of sharpness of the moist relief, and will imagine that this is the result of imperfect contact between the transparency and the tissue; but such is not the case. The swollen state of the gelatine image is the cause; and, when completely developed, if the plate be held at an angle with a sheet of white paper, the image will be seen to present a considerable delicacy of detail, though, if viewed by direct transmitted light, it may seem "woolly." During the early stages of development the presence of considerable proportions of swollen, soluble gelatine causes the want of sharpness to be very noticeable; but this gradually disappears, and to the practised eye the apparent sharpness of the image is a good test of the progress of the operation. When dried the relief contracts and becomes perfectly sharp in its minutest details, provided always the original is sharp and contact has been secured between the printing surfaces. The difficulty in securing contact is not so great as might at first sight seem likely, if the tissue have been properly dried after sensitising. If it be allowed to curl up, and especially if it be over-dried, perfect contact is impossible, as the necessary pressure will fracture the tissue rather than flatten it. If, however, proper precautions are observed to secure its drying flat, a very slight degree of pressure suffices.

As regards the symptoms of over- and under-exposure, these are the same as in ordinary carbon printing. In the former case difficulty in retaining the tissue in contact with the glass during development, and refusal of the gelatine to dissolve except at a very high temperature, are plain signs. An over-exposed relief is not necessarily useless, as by the employment of very hot water and prolonged action a sufficient depth may be secured. Under-exposure, on the other hand, is fatal to success, as the thin layer of insolated gelatine which forms the image fails to give a sufficient degree of relief. Slight under-exposure may be remedied by modifying the colour-strength of the ink; but if the relief be a very shallow one there does not exist a sufficient gradation from light to shade to give a satisfactory result with any kind of ink.

If the tissue be of the right thickness and contain a moderate amount of colour, and the exposure and development have been correct, the finished relief, when viewed by transmitted light, should present the appearance of an ordinary negative of moderate density. But it does not follow that because this appearance is wanting that the relief is useless. An over-exposed relief may make a perfect printing surface while presenting a considerably veiled appearance by transmitted light. The depth and gradation of relief are the only true tests.

SAFE LIGHT.

No. I.

A general revulsion of feeling has lately taken place against the red light—most usually considered the only safe one to employ in the dark room for developing gelatine dry plates; and experience has shown that the most rapid plates now in use can be safely developed in a degree of light which a short time back was considered by most people to be absolutely inadmissible. There can be no question of the fact that by degrees it is becoming much more general for rapid plates to be easily and successfully developed in a light which a year or two ago would have been, in the opinion of careful workers, considered highly dangerous.

The explanation of this change of opinion is not difficult to find. It is not that the yellow or yellowish-green light now advocated is safe, or even approximately safe, but that the plates are more reliable.

In the earlier days of gelatine plates, every effort was made to produce the highest possible degree of sensitiveness by special treatment of the emulsion. Manufacturers were working in the dark as regards their knowledge of the treatment most effectual; but not in darkness as regards the light necessary for the coating, drying, and packing before the plates could be offered for sale. One of the great difficulties has been that of securing a sufficiently safe light with which to work without affecting the quality of the plates.

Now, it is most clearly established that the sensitive silver salts which are employed for photographic purposes can be exposed to direct light for a certain time without injury to their photographic value—indeed, in some cases, with positive advantage. In the old collodion days it was a common practice to deliberately expose the newly-sensitised plate to light before exposing it in the camera, with the result of practically producing a plate which was very appreciably more sensitive than a similar one prepared in the same way, but which had not received this preliminary exposure to light.

A curious instance of this came to my knowledge. A photographer, in the course of his practice, having heard of this preliminary exposure as increasing the sensitiveness of the collodion, gave it a very careful trial but failed altogether; but finding that the slightest preliminary exposure inevitably produced fog, he challenged one of the advocates of the method to prove its worth or fallacy. The gentleman who went to his studio to conduct the trials found the facts as the photographer had stated. The slightest preliminary exposure of the collodion film to light produced no extra sensitiveness in the plate, but certainly caused fog in developing. He was not, however, long in finding out the cause, which was the simple one that the usual yellow calico blind in the photographer's dark room had gradually become bleached, and so admitted a considerable amount of white light into the dark room. That this was the case was proved at once. A new blind was procured, when instantly the collodion plates became far less sensitive than they had been previously; but a preliminary exposure to light at once restored them to their maximum sensitiveness. It was, therefore, evident that the photographer had, without knowing it, been working under conditions of light which increased the apparent sensitiveness of his plates.

I have no doubt that gelatine dry plates have the same peculiarity; indeed, Mr. W. K. Burton has shown that such is the case. In his experiments he tested a plate out of a batch by the sensitometer, and found it to register a certain number. He then took a quantity of similar plates, and exposed them to the diffused light of a room lighted by a candle for various times, finding that with each increase of preliminary exposure a higher number was registered on the sensitometer, until at last a point was reached when the ordinary developer produced fog.

I have found the same thing with the ordinary sensitised albumenised paper. Some years ago I had to employ a Vogel's sensitometer, in which the scale of tints consists of a series of strips of paper each a little shorter than the preceding one, and numbered consecutively in opaque figures. No. 1 was only one thickness of paper, No. 2 two thicknesses, and so on to 24, I think. The exposure was read off in a similar manner to Warnerke's sensitometer—the highest visible number. The strip of sensitised paper was, of course, long enough to cover the whole scale, but it most generally happened that I only wanted to expose to (say) No. 7 or 8. I, therefore, for a second exposure utilised the other end, on which no impression was visible. The second exposure was, however, less reliable; for not only did it seem to come quicker—though that I never really tested—but at the other end, where before only 7 or 8 was visible, one or two numbers more would come out. This, to my mind, makes it doubtful if sensitised paper is quite reliable as a photometer test, unless it be carefully protected from light until the time of exposing.

Now, I take it that this is exactly what usually occurred with most dry-plate manufacturers in the early days. Every one was comparatively inexperienced, and operations (which after a time could be well done in a dim light) required then considerably more; so that, unknowingly, the plates had received all, or very nearly all, the preliminary exposure which they could bear without fogging on the application of an ordinarily-powerful developer. Such plates as these evidently could not be manipulated by the consumer except in the very safest possible light. Add to this the fact that the consumer was also inexperienced, development was very slow compared with the rapid process he had been accustomed to with collodion plates, and the difficulty of judging density also demanded more prolonged exposure to his developing-lamp. With all his care the plates would fog. How often did it occur to him that the plates *might* have been in just the exact state for fogging, even if developed as received from the maker? I had some which I felt certain were in that state. I believed that my light was as perfectly safe as any artificial light could be made; so I made the experiment of developing two plates of the same batch, one by my red light and the other in absolute darkness, with precisely the same result—fog all over, and a distinct mark in each case where the packing papers were inserted between the plates.

Unquestionably large numbers of plates were sent out on the verge of fogging from the treatment they had received during manufacture. Whether from an unsafe light in undue quantity being administered to them during the process, or whether from inexperience in the process of making the emulsion, it matters little if the fact be allowed. If they would just bear the test of exposure and development in the manufacturer's studio under the most favourable conditions, he could confidently assure the tyro that the systematic fogging of which he complained must be due to his light not being safe. What he did not say (perhaps because he did not know) was that any plate ought to be able to support a certain amount of exposure to light and yet not show any sign of fogging with the strongest developer; that any plate which will not bear that test is useless, as, no matter how safe the light may be which is used for developing, &c., the plate must of necessity receive some diffused light reflected from the sides of the camera during exposure.

The poor struggler, however, naturally concluded that it must be the developing light that was in fault. He put another thickness of red fabric over his lamp, and, possibly, getting hold of some plates which were a little nearer the mark, secured some negatives free from fog. He was then convinced that it was his light which had been wrong all the time, and thus the era of the deepest possible ruby light came about.

It must not, however, be forgotten that in the North of England it has been the practice to use canary medium, and not the ruby light so general in our latitudes. The fact was publicly stated at one of the London meetings a couple of years since, but only elicited the criticism that the northerners must have been working slower plates. Possibly they might have been slower in the sense that they had not received the preliminary exposure necessary to bring them to fogging point, but they would bear the canary light, which is anything but safe. GEORGE SMITH.

ON THINGS IN GENERAL.

"No tree in all the grove but has its charms,
Though each its hue peculiar; paler some,
And of a warmish grey; the willow such,
And poplar that with silver lines his leaf;
And ash, far stretching with umbrageous arms.
Of deeper green the elm; and deeper still,
Lord of the woods, the long surviving oak."

WHAT slight verbal alteration would be needed to adapt these lines of Cowper to the present controversy on dark-room windows! The canary medium is pretty well understood; but the "cathedral green," which is not cathedral green at all, is enough to drive the average photographer far on the road to Colney Hatch! I am afraid many of the disputants are not in the habit of going either to a cathedral or even their own parish church, or they would soon find the hues of the window panes differed as much as the verdure so well depicted in the lines with which I have headed my communication. The four hundred and sixty-seven squares in the window to my right in my favourite seat at church are of a pale yellowish-green, while the three hundred and eighty diamonds, familiar to my gaze in past years, were of a deep sea-green (with three deep blue-greens, evidently the result of "repairs"); and all possible shades between are doubtless to be seen in one church or another. By-the-bye, what a relief it is to count these squares all ways when the sermon is long and not clever! This, however, is a digression; we will leave the further elucidation of the original matter in the very able hands of the gentleman who first set the ball rolling. I may just say I would rather he had to explain than I had how one thickness of green glass "takes the heating effect of the red and orange rays out of the light, and preserves or restores its yellow colour." With this little puzzle I leave the subject.

I observe that my reference to Mr. S. Fry's remarks has not been left without reply by that gentleman. I think he had better have been content with the points which, indubitably, he had made, and not have attempted to hold on to everything he had uttered. The man who never makes a mistake is a—— well! I will not fill in the hiatus! Mr. Fry said the beauty of sulphite lay in its keeping the fingers clean, and when I say it does not act so with mine he upholds his statement by asking me to use an old knife (instead of sulphite I presume); and then informs me how to get rid of the stains that he said would not be present. Further: about this removing the stain by rubbing with weak acid—a nice long rubbing it sometimes is, too—it has to be followed by plenty of washing; or, when the hands are afterwards washed with soap, *presto!* the stain, or most of it, is back again.

Another correspondent, "Coleswegen," writes—"Free Lance criticised Mr. Hume Nisbet's paper in the Journal of January 18, 1884, but did not explain how far his picture was to be from the eye to cover the whole of the landscape or part. I suppose that the focal distance of the lens which he used for his picture and the axis of both picture and landscape are what he means when he talks of exact superposition." I meant what I said; nothing so silly as "Coleswegen" suggests ever entered my mind. How the focus of a lens and the axis of a picture and of a landscape, whatever they may be, are to be exactly superposed must be explained by "Coleswegen." The feat is beyond the power of anyone else. What I said was that a correctly-taken photograph, if rendered transparent enough for objects to be seen through it, would, if held *at a proper distance* between the eye and the view it represented, exactly coincide, line for line and point for point, with the lines and points of the scene depicted. As I have just stated, I meant what I said, and was not called upon to say what the distance would be. I was not writing a mathematical treatise, and it would have been absurd to introduce such a detail.

Anthony's Bulletin, too, is complaining of me for doubting its correctness in giving the famous Mr. Kurtz the credit for having been the first to introduce retouching. So far as its actual introduction is concerned, I should think it must have been simultaneously introduced by a score of people. I know that I ameliorated the rugosities of the complexion in negatives close upon a quarter of a century ago. The question is—Who first made it the rule of his business to retouch negatives? Let the *Bulletin* say when Mr. Kurtz did this, and I think I can show him the work of a man who retouched all his negatives before Mr. Kurtz entered the ranks of photography. If I am wrong I will own it candidly; if not, I am sure my opponent on this point is equally fair and will be equally candid.

I hasten to assure Mr. H. S. Starnes that I had not for a moment any idea of accusing him of plagiarism when I wrote of having seen something like his remarks in Mr. W. Harding Warner's papers. I referred to their tone and scope, the audacity of their conceptions, and the originality of their ideas. I am quite sure Mr. Starnes is literally right in saying he has never seen any articles of anyone which were like the theories he had set forth. I can safely say that I also have not. Mr. Starnes excites interest by speaking of having come across some experiments by Bunsen and Roscoe in which they unite chlorine and hydrogen by light. These experiments must be very interesting, and, I daresay, further research might lead to other similar accounts. I should not be surprised to learn that both these gentlemen had, for instance, published some remarks about the spectrum; the subjects are very closely connected.

Among the patent specifications lately published I notice one for storing chemicals, by Mr. G. D. Macdougald. Seeing that for preserving his chemicals he employs a sealed tube, like a chloride of gold tube, that requires to be broken before being used; that he breaks them by means of a file-cut or other indentation, as has been done for a century by chemists; or that he soaks paper in the chemical and then dries it to get a definite quantity, just as is done in medicine and surgery, I should think the patent requires the pruning-knife before being of much use.

I often read Mr. W. H. Harrison's remarks with a deal of pleasure; but I must confess to a complete feeling of mystification as to the meaning of a portion of his article on a pyro. sulphurous developer. When he obtained sulphurous acid through decomposing sulphite with sulphuric acid, where did it go to in developing? Are we to understand that it did not combine with the ammonia, or that a grain of sulphite of ammonia goes as far as a multitude of grains of sulphite of soda?

I always look out for novelties in the reports of societies' meetings; but I rubbed my eyes when I saw announced as a novelty at the Glasgow Photographic Association the discovery that one cause of fading was hypo. in the mounts—a fact which was not, the speaker believed, generally known! I should have thought that of all causes this had more prominence given to it than any other. The speaker seemed to have taken much trouble in the matter, which was praiseworthy, though a very slight knowledge of current literature would have enabled him to devote his energies to better purpose. By-the-bye, how did he find traces of *hypo.*, sulphates, and *chlorine* in the same mounts?

The Chairman of the Newcastle-on-Tyne Photographic Association made a most interesting observation with regard to gold toning. He took a sheet of paper, divided it, exposed the two halves under a vignette mask, toned one and left the other untoned, all other operations being the same. Contrary to the usually-received opinions the toned half faded soonest after being exposed to the sun. The fading of prints is a very intricate subject, and our thanks are due to anyone who throws fresh light upon it, as Mr. J. B. Payne thus does.

Dr. J. K. Tulloch, at the meeting of the Dundee Photographic Society, gave an excellent, simple illustration of the effects of reflection in producing halation, and I commend his few remarks (see THE BRITISH JOURNAL OF PHOTOGRAPHY, page 167), to the attention of those interested in the subject.

I notice that at the Manchester Photographic Society the question of swing-backs led to a rather mixed series of statements. Mr. S. D. McKellen thinks it desirable to correct the statement put in his mouth, but the Chairman does not qualify the words reported as being his—"that placing the plate at too great an angle to the lens must have a distorting effect." When the camera is tilted this very placing at an angle is to prevent distortion. FREE LANCE.

OLD PHOTOGRAPHS.*

ANTIQUITY OF FIFTEEN YEARS' DURATION.

IT may be asked—What is an old photograph? In my own mind I have fixed the date at any time anterior to fifteen years.

I feel quite satisfied that it is carelessness or want of the necessary chemical knowledge on the part of the photographer which has induced the idea that silver prints are not to be trusted in matters of permanence. It must also not be lost sight of that after Disderi introduced the popular form of photograph (the *carte-de-visite)* hundreds took up photography as a means of increasing their incomes, looking upon it as an El Dorado—a mine of wealth—the majority of those adopting it just getting a superficial knowledge of how to make a negative and produce a print. This knowledge proved sufficient to flood the country with photographs that are by the irony of fate a lasting insult to all right-minded photographers, and deservedly obtaining the

* Concluded from page 180.

sneers of artists and an evil reputation that has, unfortunately, yet to be lived down. Combinations of occupations that, to say the least of it, sounded peculiar, namely, 'chimney sweep and photographic artist," "shoemaker and photographer," "hair cut and portraits taken," were frequently met with, but are fortunately becoming more rare year by year.

Happily, however, photography in the present day is shaking off these attachments, and has become of sufficient importance to be pursued alone as a means of living and a source of wealth. It has been found an art capable of doing something more than merely pander to personal vanity and amusement; for it would be difficult at the present time to overrate its importance in industrial, scientific, or artistic occupations. The claims made for it to be a fine art of itself can hardly be admitted, but works having every claim to the title are by its means not unfrequently produced, and in the future bid fair to be much more numerous. This Society, seeing the advantages to be gained by the improvement of the artistic side of photography, instituted the monthly competitions, and it is to be regretted that more enthusiasm has not been evinced in the promotion of a work so productive of beneficial results. The subjects now selected for the next competition are both numerous and varied, and the members of this Society will do well if they take the matter up in earnest and make it thoroughly successful.

I am afraid I am somewhat travelling away from the subject of my paper, which should properly be confined to "old photographs;" but I could not resist the opportunity of alluding to our competitions, for I think they are calculated to improve that phase of photography in which there is the greatest need of improvement. One conclusion we cannot fail to draw from the examination of good, old photographs, and that is—they were in every way equal in manipulative qualities to very many of the modern ones; and also that old photographs have proved that silver printing, *when it is properly done*, is a permanent process, and not one of those evanescent, fugitive, unreliable methods of picture-making with which it is so unfairly credited. The older specimens of silver printing have been from negatives developed with acid pyro., or from negatives produced by the "converting process," as it used to be called; that is, a positive was taken, treated with a solution of iodine and mercury, which had the effect of increasing the density and destroying the positive appearance by reflected light it originally possessed. The results were generally harsh and deficient in half-tone, the shadows being represented by clear glass and consequently printed with the well-known "soot-and-whitewash" effect.

INFLUENCE OF ADAM-SALOMON.

It was some time before the general run of photographers discovered that increase in exposure was nearly all that was required to make a sufficiently-dense image at one operation. The elaborate performance of making a negative bath that often as not ended in fog and stains deterred many from "going in" for direct negatives. Saving residues had not become generally known, and a bath that would not work satisfactorily was incontinently shot down the sink. This, with the high price of silver nitrate, acted as a considerable check to experimentalists, and the more certain, if worse, way of proceeding was for a long time the adopted process. You will understand I am not alluding to the few specially-dexterous workers, but to the majority of those who took up photography, and who, living in the country, did not possess the opportunity of comparing results. I think that the first *really* turning over of a new leaf was after M. Adam-Salomon and one or two other foreign exhibitors showed some specimens of their work at an exhibition of the Parent Society, at the rooms in Conduit-street, Regent-street. In the present day the amount of enthusiasm those exhibits created can hardly be realised. The name of M. Adam-Salomon was in every photographer's mouth, and they were not long attempting to rival the sculptor-photographer, and with the utmost beneficial effect on photographic work. Mr. V. Blanchard came to the front with excellently-managed, large portraits of the Salomon tone and character, and his exhibits were for a long time anxiously sought. Others, too, were not far behind, and the old fashion of portraiture gradually died out.

In landscape, the work also of Mr. F. Bedford stood out from the rest as a lighthouse on a rocky coast, and was the envy or admiration of many less successful men. There were, however, other "good men and true" a credit to the time. I merely mention the names I have as having particularly struck me as workers to be imitated, and without drawing any invidious comparisons. It may be borne in mind even from the first that, irrespective of manipulative excellence, art qualifications did much to raise photographers to the pre-eminent position they hold; for even then as now artistic treatment, if less understood, commanded notice and respect. The works of the late Mr. O. G. Rejlander were almost entirely dependent on artistic qualities for their popularity. The only regret is they were not combined with cleaner manipulation. Had he lived in these days of rapid dry plates, the world might have been astonished at the results he could undoubtedly have achieved.

ADVANTAGES OF INDIA PAPER.

I have endeavoured to collect a few specimens of early work to show you to-night, and in criticising them you must forget for the time the beautiful and artistic work of the present day, and only think of them as good examples of the general work of that time. Where possible the history of the production is written on the back; but with many of the specimens their age is their only history. In calling your attention to the transparencies by Ferrier, which I have had in my possession for more than twenty-five years, I think they compare favourably in every respect with work of the present day. The price then, at Messrs. Horne and Thornthwaite's, was 12s. 6d. each. They have retained their brilliancy and colour unchanged, although they have been kept in both damp and dry rooms, with no other care than being placed in a grooved box. I may also mention that some of the prints shown have been for some years stored in a portfolio in a very damp room—so much so that they were quite mouldy—and with this result: the mounts have suffered, but the prints themselves have not. Could we say as much for water-colour drawings? In one case the print had been laid down on India paper on plate paper. The plate paper had become covered with mildew spots, but not one appears on the India paper, nor is the photograph at all affected. I may remark that on looking through a number of mounted photographs I did not find one instance of fading where the prints had been laid down on India paper, but when attached to ordinary white mounts some had commenced to yellow at the edges. A great number of my prints I used to mount at home, using gum arabic, and they have stood the test of damp without showing any sign of deterioration. Others have been mounted by professional mounters, and I am unable to say what substance they used; at anyrate it has not affected the prints. I will not now trespass on your patience by adding to the length of my paper, which has already exceeded the usual limits of the opening of a discussion; but trust some of the points to which I have adverted may elicit from you, experienced photographers, some practical and useful remarks. Mr. H. P. Robinson has kindly sent some examples of old work, upon which I have written a few remarks. EDWARD DUNMORE.

LECTURES AT THE ROYAL INSTITUTION.

PHOTOGRAPHIC ACTION.

CAPTAIN ABNEY continued his experiments in demonstrating the action of acids on the photographic image. A sheet of paper containing bromide was exposed to light, and then written upon with solutions of different acids, such as hydrochloric, nitric, and sulphuric acids. When these acids had acted the image refused to develope. The action was attributed to the acids appropriating an atom of silver from the sub-bromide, and not to the oxidation.

The lecturer mentioned as a curious fact that the image which had been destroyed by oxidation, due to peroxide of hydrogen and other oxidising agents, could be revived by passing a current of natural hydrogen over the surface, the hydrogen taking away the oxygen first of all, and then, if continued, reducing the saline salt to the metallic state. Two more experiments showed the destruction of the action of radiation through the agency of iodide and bromide of potassium. In both cases the plates were exposed to light and then washed and dipped in a solution of bromide or iodide of potassium. Whilst still moist they were exposed to the image of a negative. The plate treated with iodide was developed as a wet plate on the screen, whilst the other was developed by ferrous oxalate. The reversal of the image in both cases was very marked, and required but a short exposure. The lecturer stated that Fox Talbot's patents included the production of positive images on paper by this means, but the *rationale* of the result he himself had investigated some few years ago. In these cases it was necessary that free oxygen should be present or the reaction could not take place, the products of decomposition depending for their formation on its presence.

After some further remarks on the oxidation of the image the subject of phosphorescence was introduced for the purpose of exemplifying the destruction of the action of one kind of radiation by badly-timed oscillation of another kind. A series of tubes containing various sulphides was illuminated by the electric light, and then phosphorescence was studied by the violet phosphorescent substance which forms the essential part of Balmain's paint. A lozenge-shaped beam of light was allowed to fall on a phosphorescent plate, and it became strongly illuminated where the beam fell. It was then illuminated entirely, and a lozenge of light passing through red glass was allowed to fall on the illuminated plate. Instead of a bright image it was now dark. A selection of coloured glasses were next placed in contact with the light phosphorescent plate and again illuminated with the electric light. Some increased the brightness, whilst others diminished it. These glasses were next passed through the spectrum, and it was shown that those glasses which allowed only rays of low refrangibility to pass through caused a diminution of the brightness. The spectrum was next allowed to play on an exposed phosphorescent plate, when it was seen that the green, red, ultra-red, and ultra-violet rays diminished the luminosity, the blue rays increasing it. A diagram was thrown on the screen giving the phosphorescent spectrum, by which it was demonstrated that the action below the blue part of the spectrum which illuminated the plate was inactive in destroying the phosphorescence. This, the lecturer stated, was an exemplification of badly-timed vibrations stopping the vibrations of the atoms in the sulphide of calcium.

A piece of ice placed against a luminous phosphorescent table immediately darkened the part in contact with it, whilst a heated flat iron strongly increased it. The explanation of this was given, but we should have been glad if the lecturer had entered into it a little more fully. The clock, however, evidently had something to do with the brevity of his explanation, and we hope that it may be gone into further next Saturday. Several of the experiments in phosphorescence were new at the Royal Institution, and were evidently appreciated. The lecture was brought to a conclusion by a demonstration of the beauty of Rowlands' concave gratings, with one of which some splendid spectra were thrown on a transparent screen. Captain Abney demonstrated that all the apparatus necessary for utilising them for spectrum work was a source of light, a slit, the grating, and a photographic plate on which to examine the image. The grating was the largest we have yet seen, the used surface measuring something like six inches by four and a-half.

The lecturer was well supplied with light, for he had the dynamo machine, an oxyhydrogen lantern, and the electric light all at his command.

On the next occasion we may presume that the real business with the spectrum will be commenced. It should have been treated of in the third lecture according to the syllabus, and if a syllabus be of any use at all it ought to have been moderately adhered to.

HISTORY OF PHOTOGRAPHY IN GLASGOW.

[Written in 1861, and re-read before the Glasgow Photographic Association on March 6th, 1884.]

I AM put down in the circular to read a paper on *The History of Photography in Glasgow*; but, before doing so, I will sketch out, very faintly indeed, the commencement of the photographic art, which has become pre-eminently a scientific art, as it requires no peculiar genius in its cultivators; whereas the painter and sculptor excel only according to the high gifts they possess for their divine art.

It was in the sixteenth century that, in searching for the "elixir of life," the alchemists found out the great fact that salts of silver became blackened by exposure to light; and in the eighteenth century this wonderful phenomenon engaged the attention of Petit; in 1722, Scheele, the Swedish chemist; in 1777, Ritter, and other celebrated men. Yet but very little progress was made in the science until Wedgewood, in 1802, assisted by Sir H. Davy, produced pictures; but these took too long an exposure and were, besides, unfixed—the fixing agents being then unknown. Hyposulphite of soda was only discovered in 1819, by Sir John Herschel, and iodine in 1812. Without these discoveries being known photography would never have reached its present point of perfection. Wedgewood may, therefore, be claimed as the earliest photographer.

Then Joseph Nicèphore Nièpce, in 1813, partially succeeded in fixing these silver pictures; but his efforts were directed to reproduce, on a metal plate, an image in the camera in order to change it into an engraved plate, and when he and Daguerre went into partnership, in 1827, it was abandoned. In 1833 he died. His son Isodore went in with Daguerre, and it was not taken up again till after Daguerre's discovery in 1839. Professor Arago, in announcing it to the scientific world, said—"France has adopted this discovery, and is proud to present it as a gift to the world." Daguerre received a pension of 6,000 francs and Nièpce 4,000 francs for their invention.

M. Berres and Dr. Donné were the first to change the daguerreotype into an engraved plate.

M. Bayard, a very successful photographer, used to paint names and devices on unripe peaches while growing, which, on being ripe and the paint washed off, left the image on the peach.

Sir John Herschel was next known in the field; then Talbot, who had been working at it from 1834 to 31st January, 1839, when he published his Talbotype process. Hunt and others followed, and the scientific world was astonished at the discoveries made known from time to time.

Till America produced the single combination lenses it took from half-an-hour and upwards for portraits, whereas by the American plan a few seconds sufficed. Mr. Beard, in London, used it. Now, however, with the double achromatic lenses, much greater perfection has been attained.

I will now, so far as certain data and my memory serve me, trace out the *History of Photography in Glasgow*, and I hope that I may be corrected by any member present wherein I may be wrong.

One of our members, Mr. Samuel R. Brown, being in Paris in 1839, received from M. Daguerre one of his pictures, which on his arrival in Glasgow he exhibited in Royal Exchange-square, and which I recollect seeing. Dr. Paterson (to whom the photographers in Glasgow are largely indebted), as usual with him in anything new and worthy, set to work at it at once. Mr. Brown himself and another member, Mr. Hugh Wilson, were also engaged in it, but who has the precedence I cannot determine; perhaps they will be able to do so.

In June, 1842, I got over one of the American apparatus—I think the very first in Glasgow, and which I have still. The lenses are about four inches diameter. It has a very short focus and works only a one-sixth plate, and can be worked in a room at a common window. It was so powerful that I worked with it by the north light, and I exhibited two portraits in the exhibition of paintings as having been done by a northern exposure.

In 1841 the first professional photographer who came to Glasgow was Mr. Edwards, who opened in Buchanan-street (opposite the Arcade), and who in dull weather used to secure the loan of my camera. The glass of his place was entirely blue, as was then the custom. In the same year Mr. Treffray also began at the corner of Union-street and Argyle-street. Now came Mr. Pickering, and in 1846 Mr. Bernard commenced; then the art made a rapid advance—in fact his pictures were splendid. Messrs. Borthwick and Stanley next came, and in 1849 Mr. Hughes succeeded Mr. Bernard. Then Mr. Gardner, Mr. Young (1850), and Mr. White successively came forward, the daguerreotype process alone being worked by all the above.

In June, 1851, Archer's collodion process was published in the *Art Union Journal*, and within five months afterwards Dr. Paterson not only made the collodion, but produced excellent pictures by that process. He communicated the new mode to his friend Mr. King, Mr. Duncan Brown, myself, and many others, and he may fairly be said to be the father of the collodion process here, as he most willingly communicated any knowledge he acquired to all inquirers.

Professor Taylor has also been the means (through his interesting lectures) of producing many excellent photographers, both amateur and professional. I have met with many of them and they speak highly of the Professor's ability and knowledge of the art.

Our President, Mr. Kibble, must now rank and be awarded the first place amongst our amateurs (which are legion since the collodion process), not only for his great attempts but for their quality, and his indefatigable exertions in perfecting an instantaneous process in which he has been so successful, and specimens of which I am sure all of you have seen.

I hope I will be excused when I make no attempt at enumerating the names and abilities of such a multitude of amateurs and others as are working the art in all its various styles, as it would be both invidious and injudicious at this meeting.

Within two years (from the simplicity and cheapness of this new process) we had establishments for it alone opened by Messrs. Dessurne, (March, 1852) Urie, Taylor, and McNab (May, 1852), when the daguerreotypists had to follow in the wake; and now the collodion process has become general, I do not know if a daguerreotype could or would be taken in Glasgow. I think we cannot omit mentioning one name which for coloured positives stands almost unrivalled—I mean that of Mr. Douglas, one of your Council.

The month of June, 1856, ushered in a new feature in the art here when Mr. McNab exhibited his coloured specimens at the foot of Buchanan-street and elsewhere. I have seen crowds looking on admiringly at these pictures, and I am glad that Mr. McNab has not only reaped golden opinions but golden rewards for his bold attempt.

Mr. Werge, Mr. Urie, and Mr. Stuart (who commenced in 1855), Mr. Peebles (an excellent calotypist), Mr. W. Young, Mr. Bowman, and Mr. Cramb have all followed in this new channel, and Glasgow can now feel proud of her high position in the photographic world.

I have, therefore, given you the brief outline, which to have been filled up with all the details that might have been given would have occupied too much of your valuable time; and I would take it as a kindness if any errors that may have crept in may be corrected by those who can do so.

ANDREW MACTEAR.

PHOTOGRAPHY IN COURT

THE RIGHT TO A NEGATIVE.—In the Swansea County Court, on Friday last, the 21st instant, a case possessing interest to photographers was tried before Judge B. T. Williams, Q.C. It was a claim with respect to certain photographs of the Naval Volunteers.—Mr. Andrews, photographer, Wind-street, sued Mr. Robert Capper, superintendent of the Swansea Harbour, for £5 8s. 6d. Mr. Monger appeared for the plaintiff, and Mr. Glascodine for the defendant. The claim arose in connection with certain photographs of H.M.S. Dwarf, which was in Swansea in September last. Defendant commissioned the plaintiff to execute views of the vessel on her arrival in and departure from the port, together with groups of officers and men on board—an order which the plaintiff duly carried out. He delivered several copies to Mr. Capper, and supplied copies to others. The amount charged was £10 11s. 6d., £5 8s. 6d. of which was for "photographing" the vessel and groups, and £5 3s. for the copies supplied. Mr. Capper paid for the copies supplied, and offered to pay the £5 8s. 6d. if Mr. Andrews handed over the negatives, but the plaintiff claimed that the negatives continued his property.—For the defence, it was urged by Mr. Glascodine, that as the plaintiff claimed to charge for executing the negatives they belonged to the defendant, who gave the order, and was charged for making them.—The Judge: If you order a photograph, unless you make special terms for the purchase of a negative the photographer is not entitled to give it up.—Mr. Glascodine said if he asked a man to make something for him, and he afterwards asked for copies and paip for them, they were his. If a photographer charged him for taking a negative, did it not belong to him?—The Judge: No; it is part of the instruments used in the business. It is what a photographer uses in his business to make photographs. Why should he part with the instruments of his trade? A negative may be a secret in his trade, and he does not part with it unless there is a contract to that effect.—Mr. Glascodine: Suppose I ask a man to make me an engine for £500, and suppose he charges me £250 for the patterns, do the patterns belong to me or do they not? If he charges me for them they are mine. If he does not charge me for them then, of course, they are not mine.—The Judge: But here he does not charge for the negative. He charges for his work and for copies, and he makes an estimate accordingly. You want photographs for your friends. It does not matter to you how he makes or produces them. There might be other means to produce what you want; therefore what has this to do with you. He charges you for the expense in producing what you want. As I said before, he estimates the cost of producing, but does not sell the material used in the production. He wants it for other purposes. If you like I will give you leave to appeal.—Mr. Glascodine: If so that will be sufficient. Perhaps you will be good enough to note what I said about the making of an engine and the patterns.—His Honour: Quite so; I find as a fact that the photographer never sold the negatives to the defendant, and I give judgment for the amount claimed with costs and advocate's fees. I give Mr. Glascodine leave to appeal. I think, however, it will be useless to appeal.

Infringement of Copyright.—At the Mansion House Justice-room, on Friday last, the 21st instant, William Smith, a wholesale photograph dealer, in Vine-street, Minories, was summoned for an infringment of the Copyright Act in selling pirated copies of a photograph of Miss Mary Anderson. There were nine more summonses in respect of other photographs. Mr. Foote was counsel for the prosecution; Mr. Tickell for the defence. Evidence was given that the copyright of the photograph in question of Miss Anderson was vested in Mr. Henry Van der Weyde, of 182, Regent-street, and it was alleged that the pirated copies had been sold by the defendant to hawkers at the rate of six shilliegs per gross. Among other places at which they were sold was at the recent World's Fair at the Agricultural Hall, and it was asserted that the defendant when selling them advised that they should not be publicly exposed. Mr. Tickell submitted that the defendant had no guilty knowledge that the photograph was a piracy, and stated that he had sold none since his attention had been drawn to the matter. The Lord Mayor said the defendant had been before the Court previously in discreditable circumstances connected with the sale of photographs, and he thought the case was proved. The defendant then pleaded "Guilty" on the other nine charges, the circumstances being said to be the same. The Lord Mayor fined the defendant £10 in each of two cases and £3 3s. costs in each, and respited judgment in the remainder of the charges. The defendant paid the fine.——On Saturday last, the 22nd, the same defendant, William Smith, was also prosecuted at the Worship-street Police Court, by Messrs. Poulten and Son, of Lee, Kent, for selling pirated photographs.

Supreme Court of Judicature—Queen's Bench Division.—On Saturday last, the 22nd instant, before Mr. Justice Denman and Mr. Justice Manisty, the case of Martinucci *versus* Martinucci was tried. This action arose out of the following circumstances:—Lombardi, the elder brother of the defendant, came to England, and subsequently carried on the business of a photographer at Brighton and in London. He was followed by the defendant Eugenio; and they became connected together in business. The elder brother made various advances to the younger, who, on the 26th February, 1880, gave him an I O U for £642 2s. 1d. On the 28th May following £200 was paid off this debt, and the widow of Lombardi now sued to recover the balance. The case for the defence was that on the 10th July, 1880, his brother brought the I O U, gave it up to him, saying "Let all the past be buried, and begin again," and it was arranged that the defendant should from that time manage the London house. Lombardi died in August following, and in January, 1881, the defendant was applied to for the balance due by him, and he then produced the I O U and gave that account of how it had been delivered up to him. It bore upon it, in the handwriting of Lombardi, "Received on account, £200, 28th May, 1880," and it was suggested by the plaintiff that the defendant might have improperly possessed himself of the document. The trial took place before Mr. Justice Smith, when the verdict was for the defendant, but the present application was for a new trial, upon the ground that the verdict was against the weight of evidence.—Mr. Willis, Q.C., and Mr. Glyn were for the plaintiff; and Mr. Lockwood, Q.C., and Mr. Sharp for the defendant.—Mr. Justice Denman, in giving judgment, went elaborately through the facts of the case, and said that the question raised was one which was eminently with the jury. The Judge who tried the case said that it was one of some doubt and difficulty, and there was a great deal to be said in favour of one view and of the other. The whole thing was fully discussed before the jury, and he was not dissatisfied with the verdict. The Court, on their part, could not say that it was an unreasonable verdict, and therefore they could not interfere.—Motion dismissed with costs.

RECREATION IN ART.*

Photography, of all the arts, is one of the most *practicable* as a source of recreation in the largest and widest sense. It gives opportunity for the employment of every faculty. Brain and hand, muscle and nerve must equally come into play. But not only these, which are but the generalities of our possessions - there must come into full occupation taste, judgment, observation, a quick sense of harmony, of space and time, of cause and effect, and, above all, a deep knowledge and love of nature. To him who possesses these qualities not only will photography be an *available* art, but one in which he will find endless and ever-widening recreation.

On the other hand, to him who is content to learn merely the technicalities of the art, going no further than the acquisition of such knowledge as will enable him to secure a *plate* and a subsequent print therefrom, the word "recreation" does not characterise his work in any great degree, and much less the term "artistic." There is always the question of degree in every subject, and it would be folly not to admit that occupation in its humblest form is not rest and recreation to some. To that extent the manipulative details involved in the taking of a photograph may be called "recreation." But it is not in that sense that I would speak of photography as a recreation. It is only recreation in a true sense when it draws out slumbering talents, unused faculties, discarded aims, or faded aspirations.

To the man who has been engrossed all his life in the drudgery of business, occupying a certain round of faculties, day by day, in unvarying monotony but exhausting pertinacity, it is evident that by far the larger and, it may be, the better part of his being is entirely unused. These, by their inactivity, are liable to languor and die; and, as a matter of fact, I believe that most people suffer the loss, through time, of many powers which were in their youth latent and waiting to be developed, but which, in the exigencies of the calling which they had to pursue, were allowed to become fallow, and ultimately dropped out of sight.

There are village Hampdens occurring every day in the crushing system of *specialities* demanded by the nature of our civilisation, and it is only by an accident, by sickness or some such cause, that we discover in a full-fledged medical man, for instance, such a consummate artist and etcher as Symon Haden. Artists do not lie hidden in *every* doctor any more than wisdom lurks under every gown; but it may be safely affirmed that there are possibilities of art-culture latent in every one, be his daily calling what it may, and no better instruments exist for calling these possibilities into play than the camera and the sensitive plate.

With these a man may discover a whole continent *in* himself of powers and capacities that were known neither *to* himself nor his friends. Many in this Society, I have no doubt, could verify that assertion in their own experiences. By the use of the camera they have come to realise what beauty and grandeur *is* in nature, and their great ambition as well as delight is to be able to secure transcripts of these as momentos of things their souls now love. Before they knew it *form* had no poetry, no enchantment for them. Outlines and space were but elements of objects that were so common, and of "the nature of things," as to be unworthy of observation. Now the camera has shown to them that all things, the commonest and the meanest, have a beauty, a charm, and a character that is not only worthy of passing observation, but of transcription and preservation. Need I refer, in illustration of this, to the last popular entertainment of the Society. On that occasion (as well as on many former ones) there were representations of objects the charm of which lay entirely in the delineation of form. This was particularly the case in groups of cattle and of birds. Few people but would confess to a liking of either horses or swans from their boyhood up—that liking resting, however, chiefly, if not entirely, on the intelligence and gentleness of the creatures rather than on their æsthetic qualities. Those, on the other hand, who "took" those groups I have referred to, took them because they had come to appreciate and love *form*. I say nothing about the *sentiment* that may exist in a picture of cattle listlessly standing knee-deep in a stream, or of sheep browsing on a quiet hill-side. Their motions are not the least of the aspects that strike the mental excitation. But where you find an amateur "catching" horses standing heads and tails in a stubble field, with no picturesque accessories to enhance or even to form a picture, be sure that he has his mind bent on securing those graceful lines, those fascinating contours that have ever made the horse a favourite with artists and lovers of nature. He has caught the infection of beauty, and is on the way to understand its principles without the tedious drudgery of studying definition, explanations, and all the paraphernalia of science and literature. Already he has mastered, perhaps, more than Hogarth could impart to him in his interesting *Essay on Beauty*, with his investigations into the secrets of the ancient masters, and his laborious conclusion that it consisted after all in the use of the curved or spiral line—the line of beauty and of grace.

But, besides *form*, which is the *chief* object of the camera to secure, there is the indication of air, space and distance, tone, colour, and definition to be obtained; and these must first be seen and appreciated before they will find their proper representation in the finished picture. This also, it is gratifying to say, was well illustrated in the collection shown at the last meeting. Some sea-pieces, with yachts in full sail and steamers *en route*, showed considerable feeling of tone and air effect, both sky and sea being in many cases harmonised remarkably; so soft and at the same time so firm were the relative tone-values that no difficulty was experienced in distinguishing degrees of distance and local effects. Those who set themselves to take "pictures from nature" by the camera are thus bringing themselves into contact with the very spirit of nature, from which contact, with its deeper knowledge and keener insight, there arises love and admiration—a desire ever to be with it, to share its bounties; and *this* is the essence of real æsthetic recreation.

J. Hutchison Simpson.

* Concluded from page 187.

RECENT PATENTS.

PATENTS APPLIED FOR.

No. 5,134.—"Engraving by Photography without Retouch on my System of Metal." L. DE ROUX.—*Dated March* 19, 1884.

No. 5,353.—"Photographic Exchange Boxes, with Sleeve for Preventing the Penetration of Light to the Plates." (Complete.) H. KAYSER.—*Dated March* 24, 1884.

SPECIFICATION PUBLISHED DURING THE PAST WEEK.

MANUFACTURE OF PLIABLE PLATES AND SURFACES AS A SUBSTITUTE FOR GLASS FOR PHOTOGRAPHIC PURPOSES, &c.

THE following is the specification of JOSEPH JULIUS SACHS, London, a communication to him from Messieurs Fickeissen and Becker, Villingen, Baden, Germany.

This invention relates to the manufacture of pliable plates and surfaces for various purposes. These plates or surfaces can be prepared from paper, cloth, or other suitable fabrics or materials, but by preference from white paper which contains very little size and does not possess much grain. This paper is first extended on a frame or other arrangement, according to the size of the plate or surface which is desired. After it is dry, the surface is covered in any convenient manner with a fine varnish or composition, such as copal varnish, for the purpose of rendering the fabric transparent; it is then dried, and after it is quite dry the surface is rendered smooth by the application of powdered pumice stone or other suitable material, or it may be smoothed by suitable machinery. This process of smoothing may be repeated, if necessary, two or three times until the surface or plate is smooth or transparent. The surface so prepared is then covered on one or both sides with a solution of gelatine, isinglass, or other substance possessing similar properties, and allowed to dry. The surface so prepared may, if desired, be further treated with a preparation of ox-gall from which the fatty matter has been extracted by acetate of alumina or similarly acting agents which will precipitate the fat of the gall, the resulting preparation being then passed through a filter, whereby a clear solution will be obtained with which the plate or surface may be covered so as to secure the safe reception of the emulsion for photographic or other use. Instead of ox-gall any similarly acting substance or material may be used.

The plates or sheets prepared as above may be used with great advantage in reproducing photographs from nature in lines or stipples for calico and other printing, as the stipples or lines can be printed first on the material before it is made transparent. Any photographic design or drawing can be put on the transparent surface in the usual way, and by using the said film as a negative or positive in photographing from nature or from a drawing half-tones will be reproduced in lines and stipples available for any kind of printing. As these plates or sheets are waterproof they can also be used as surfaces upon which can be printed or produced all kinds of ornamental and useful work.

Having now described and particularly ascertained the nature of my said invention, and the manner in which the same is or may be used or carried into effect, I would observe, in conclusion, that what I consider to be novel and original, and therefore claim as the invention secured to me by the hereinbefore in part recited letter patent is—the manufacture of pliable plates or surfaces by treating paper or other fabric in the manner hereinbefore described.

ON BICHROMATED GELATINE FILMS AND THE STANNOTYPE PROCESS.

[A communication to the Glasgow and West of Scotland Amateur Photographic Association.]

THE action of light on the bichromates in presence of organic matter has been known for a very considerable period. Mungo Ponton, in 1839, was the first to base a process on this reaction. He applied a solution of potassium bichromate to paper, dried it in the dark, and on exposing to light he found that it darkened very considerably. The chromic acid in the salt was reduced to chromic oxide. Placing paper prepared in this manner behind a copperplate engraving, and exposing to light, a negative copy of the engraving was obtained. To fix such a picture all that was necessary was to wash in water so as to dissolve away the unaltered bichromate. Here is a print obtained in a similar manner from a copperplate engraving, and which you see is a negative reproduction that is capable of producing in its turn a picture having the lights and shades as in the original.

Becquerel (1840) demonstrated that the reduction of the bichromate was due to the presence of the size in the paper. He devised a process which consisted in mixing the bichromate with starch paste and applying it to paper. On exposing to light under a copperplate engraving, and afterwards immersing in an alcoholic solution of iodine, a blue reproduction of the engraving was obtained. The *rationale* of this change was due to the fact that in those parts where the light had not penetrated (the dark parts of the engraving) the starch remained unaltered, and was able to form blue iodide of starch. This iodide of starch is, however, a very unstable substance, and although the picture appears strong enough when wet, it loses a good deal of its character in drying, changing from blue to a pale violet. Here is one of Becquerel's pictures.

Hunt worked also with the bichromates, and to the various processes he brought forward he gave the generic name of "chromatype." They consist essentially in forming a chromate of copper in the paper, and, after exposure behind the engraving, developing the picture by means of gold, silver, or mercury salts. Some of these early light pictures I have here reproduced.

While it was sufficiently apparent that light had wrought a change in the bichromate employed in these examples, it was further discovered that the organic matter was itself altered in its physical character; in fact, Becquerel's method of producing a picture with the lights and shades the same as the original, shows clearly that the starch had been acted on where the light had access in such a way as to lose its characteristic property of forming a blue compound with iodine. Mixed with a bichromate and exposed to light, gelatine, gum, starch, albumen, &c, were all found to be rendered insoluble.

Now, what is the cause of this insolubility? Two theories have been put forward to account for it:—1st. That the organic matter is oxidised at the expense of the chromate which is reduced to chromic oxide, and the insoluble body is virtually oxidised organic matter.—2nd. That the organic matter forms a true compound with the chromic oxide reduced by light. This view was first propounded by Mr. J. W. Swan, of Newcastle, in a paper read before the Photographic Society of Great Britain on May 10th, 1870, and it is the one which has the most evidence in its favour. There is, however, much complexity involved in the chemistry of the matter.

Mr. J. Spiller has been making some experiments with the various chromates and bichromates with a view to unravel some of these reactions, and those interested will find a short article by the gentleman in question in the *Year Book* for the current year, giving some details of what he has done and intends doing.

In addition to the prints already shown, where bichromate of potash has been employed as the sensitising agent, I have one or two here prepared with ammonium bichromate and the normal chromate of ammonium. In the case of normal chromate, or yellow chromate of potash, light has no great reducing action. In the case of the normal chromate ammonium it is a very sensitive body indeed. A very curious fact in connection with these changes was demonstrated by Captain Abney. Taking a piece of paper coated with gelatine rendered insoluble by alum and duly sensitised with a bichromate, and exposing under a negative, he placed it in contact with a piece of carbon also impregnated with a bichromate, and the two surfaces were kept in the dark and under pressure for some ten to twelve hours. The paper that had received the impress of light communicated the action which the light had started to the pigmented tissue, the result being that a picture is obtainable on the film which had never been exposed to light.

The great experimenter in this field of work was undoubtedly the French chemist, Poitevin. It is by his researches more than by any other that the whole superstructure of carbon printing, autotype printing, the powder processes, the various collotype or printing with lithographic ink processes, has been raised. As far back as 1848 we find Poitevin devoting himself to the production of photographic relief pictures. He named his process "helioplastie," and his *modus operandi* was as follows:—A bichromated gelatine film was exposed to light under a positive or negative, according to the nature of the relief picture wanted. It was developed by being allowed to swell in cold water, whereby those parts acted on by light refused to swell, while those that had been protected swelled. This relief picture was hardened in a solution of sulphate of iron, and, after draining, a plaster cast was taken of it. From this again, by means of a fusible composition, another casting was taken, to utilise which he coated with copper by means of a galvanic current. Poitevin, however, does not seem to have carried his researches sufficiently far to have made his process a truly practical one. In reading the record of these early experiments Poitevin seems always to have worked with gelatine in the moist state.

It is to Woodbury that we are indebted for a rational process of relief printing, and the reaction by which he obtains his reliefs is the solubility in warm water of those parts of a bichromated film which have been protected from the light. Woodbury's patent for the production of those pictures known under the name of or "Woodburytype" was taken out in 1866. We are more or less familiar with these productions, and their beauty, apart from the fact of their absolute permanence, attests the value of this very perfect photo-mechanical process. It may be interesting to note that all those pictures of actors and actresses which appear in the magazine, *The Theatre*, are done by Woodburytype. In France the process does not bear the name of its inventor, but is known under the designation of "photoglyptie." The Woodbury process, while giving such excellent results, is by no means one which amateurs could avail themselves of, as it necessitates the employment of a hydraulic press, whereby the hard gelatine relief is pressed into a bed of lead or other soft metal, which forms the printing mould. However, Woodbury, within these last two years, has brought forward a process which meets, I think, the requirements of amateurs. To this he has given the name of "stannotype," inasmuch as the relief picture is covered with tinfoil. "Tintype" might have expressed the same idea more graphically, but I think you will admit it lacks dignity.

In Woodburytype the start is made with a negative, in stannotype with a positive or transparency; and Woodbury recommends that this be produced by the carbon process. The negative from which this is produced will require to be masked, so as to give clear glass all round the finished transparency. The reason for this will be obvious as we go on. The timing of the exposure of the tissue under the negative must be regulated by a photometer, and Woodbury's form of this instrument you have here. After the exposure has been completed development of the tissue is to be made on a collodionised glass plate well washed to free it from the ether and alcohol. The tissue having been allowed to soften in water for a short period is squeegeed on to the glass plate, and, after remaining some little time in contact, the plate with the tissue is plunged into water about 95° Fahr., when the development of the picture takes place as soon as the original paper of the tissue comes away.

You thus have a positive picture reversed as regards right and left, and outside of the picture you have clear glass. The reversal of the picture at this stage is necessary, otherwise your mould would throw off reversed prints. These carbon transparencies require, as a rule, strengthening, and for this purpose a solution of permanganate of potash is made use of—a quarter of an ounce of permanganate to one pint of water. This gives a non-actinic colour to the picture the character of which you can judge of from the example I now put forward. You will see that this picture has been masked in such a way as to leave a margin of about one-eighth of an inch clear glass all round the picture. For my own convenience I have made the transparency on a whole-plate, but of course the half-plate would have been the correct size on which to have produced the transparency.

W. Lang, Jun.

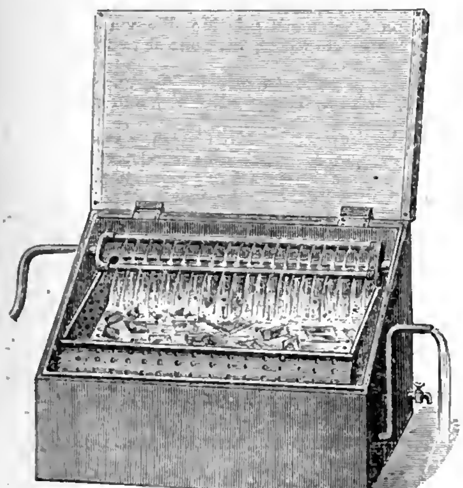
(To be concluded in our next.)

Our Editorial Table.

MARION AND CO.'S REGISTERED WASHING APPARATUS.

We have recently had the pleasure of inspecting a new apparatus for washing prints, just introduced by Messrs. Marion and Co., which possesses several novel and interesting features. The main principle of the apparatus consists in the fact that the prints are kept in constant motion during the period of washing, and this, combined with a very perfect system of in- and out-flow of the water, greatly curtails the duration of the operation, and thus contributes to the brilliancy and permanency of the prints.

The apparatus, of which we give a diagram, consists of an outer casing of wood enclosing a perforated metal vessel of peculiar form, which, in conjunction with the system of in-flow, causes the prints to partake of a constant rotary motion during the whole period of washing. As will be seen by the figure, the water is admitted by a double series of jets playing in different directions, so as to set up two separate currents. The front of the inner metallic chamber is shaped in a circular form, the result of which is that by the action of the in-flow the current takes a rotary direction, carrying the prints below the surface until they encounter the force of the second series of jets, when they are again driven into the first current. The direction of the jets may be varied to such a degree that, on the one hand, the prints may be driven into one corner of the apparatus; or, on the other, it becomes impossible for a single one to find a resting-place anywhere—in fact, so long as the water supply lasts the prints are in perpetual motion.



The out-flow is from the bottom of the outer vessel, the water entering the inner one. From this it results that a constant circulation is proceeding through the perforations of the latter, and, consequently, a most perfect and rapid diffusion of the hypo. So perfect is this diffusion that an hour's washing serves to entirely remove all traces of the obnoxious salt.

The apparatus is compact and self-contained. It can be closed and left to work by itself, requiring no attention after the in-flow and out-flow pipes have been once regulated; and, as there are no mechanical arrangements to become disarranged, there is little chance of any damage from accidental overflow. The apparatus, which is registered, is made in various sizes to suit different requirements, and we can recommend those of our readers who are in search of such a thing to pay a visit to Messrs. Marion and Co.'s establishment.

"LUTHER MILLER'S AMBITION," AND "TWO SAXON MAIDENS."

These are two volumes which have been sent to us by the Wesleyan Methodist Sunday School Union. With their literary merits we need not concern ourselves, the *raison d'être* of their being submitted to us consisting in the photographic aid that has been lent to certain illustrations with which they are embellished, the process of "ink-photo." printing having been pressed into the service.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
April 1	Sheffield	Freemasons' Hall, Surrey-street.
" 1	Halifax	*Courier* Office, Regent-street.
" 1	Bolton Club	The Studio, Chancery-lane.
" 1	Glossop Dale	Glossop Coffee Palace, High-street.
" 2	Benevolent	181, Aldersgate-street.
" 2	Edinburgh	Hall, 5, St. Andrew-square.
" 2	North Staffordshire	Town Hall, Hanley.
" 2	Photographic Club	Anderton's Hotel, Fleet-street.
" 3	London and Provincial	Masons' Hall, Basinghall-street.
" 3	South London	Society of Arts, John-st., Adelphi.
" 3	Bolton	The Baths.
" 3	Leeds	Philosophical Hall.
" 3	Glasgow	177, Buchanan-street.
" 3	Dundee	Lamb's Hotel, Reform-street.
" 3	Coventry	Coventry Dispensary.
" 3	Yorkshire College	College, Cookridge-street.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

At the technical meeting of this Society, held on Tuesday last, the 25th instant, the chair was occupied by Mr. J. Spiller, F.C.S., Vice-President.

A question was read, emanating from Mr. W. M. Ashman:—"Information is desired as to the probable cause of the albumen leaving the surface of the paper in the case of prints," a number of which were shown. These prints were sent up to Mr. Ashman from a well-known large establishment, and the effect was certainly very curious. In parts the surface of the paper appeared to be gone, as though two prints had been stuck together and torn apart. The appearance came on in the washing, when the surface was so soft that it might be rubbed away.

Mr. T. Sebastian Davis inquired whether the strength of the bath upon which the paper had been floated was known.

Mr. Ashman replied that he had no information on that head.

Mr. Davis thought that the bath was probably too weak.

Mr. W. England suggested that the paper might have been doubly albumenised, and that the two coats had separated.

Mr. Ashman said that samples of the same paper had been sent to him, and he had not found the disintegration to occur. He thought that the paper had been sensitised in too cold a room, in consequence of which the bath had its tenacity or hold upon the paper. Some two years ago, when sensitising in very cold weather, the same thing had happened with him. If the drying-room had been kept at a temperature of 60° he thought that the bad result would not have occurred.

Mr. England thought hard sizing of the paper might account for the result. With Saxe paper such a thing did not happen.

Another question was read:—"In using Mr. Spiller's method of reducing the intensity of gelatine negatives by a solution of salt, alum, and sulphate of copper, may the same liquid be used a second time?"

The Chairman said that all the ingredients were so inexpensive that it was not worth while to do so; the strength would be reduced by use, and the operator would not, with a varying solution, so well know what he was about.

Mr. Ashman showed a printing-frame for holding opal plates in register-ing with the negative, so that the course of the printing might be watched. He produced a print upon opal glass which had been, in the course of of printing, lifted and replaced six times, and no indication of shift was perceptible. A description of this frame will be found in our report of the London and Provincial Photographic Association.

The Chairman considered the idea a very good one.

Mr. Best showed some cabinet portraits illustrating the difference of width and length produced by cutting the paper the length or cross way of the sheet.

Mr. W. E. Debenham observed that the immediate cause of the difference was not the cutting of the paper, but the mounting of the prints when damp. If they were dried and mounted in the manner shown some time since by Mr. A. Cowan, they would be alike, whichever way the paper had been cut. As it was, neither those which seemed the longer nor those which appeared the broader were true, but a medium between them would be.

Mr. F. W. Donkin measured the prints, and found the difference to be about seven millimetres in 150, or nearly five per cent. The actual distortion would be half that amount.

Mr. Debenham then showed a folding lantern for travelling. For a friend whose eyes had suffered from the red light given by the cherry fabric with which it had been originally fitted, he had substituted deep yellow paper and two thicknesses of the green oiled silk sold at chemists' for surgical purposes. Of the two illuminating sides one was furnished with a single thickness of the yellow paper in addition to the silk, and the other side with two thicknesses. A candle was placed inside.

The Chairman considered the light through the double paper side sufficient to read by and ample for development.

A negative was produced which had been developed with the dish about six inches distant from the light without showing any indication of light fog. The plate was a quick one of about three times the rapidity of the average rapid commercial plate.

It was inquired:—What was a proper test for judging of the visual luminosity of any particular light.

Mr. Debenham said that he had judged from the ease with which he could see the details of a negative; but a book might be used, and the distance noted at which certain type could be read. Plates exposed a given time at this reading distance could then be developed together and examined as to which gave the least image.

Mr. T. Bolas remarked that the printed matter used should be black and white, as colours would show with varying distinctness under lights of different colours.

Mr. Debenham said that a gelatine plate was yellowish, and he thought that to be more exact the paper should be as nearly as possible of the same colour.

The Chairman remarked that he had a work on photography, published in 1854, in which gelatine was mentioned as a vehicle for the photographic image. He believed that that was the first publication of the suggestion. It was mentioned as the objection to its use that, although the image came out well, the film dissolved in the developer.

Mr. Bolas observed that that was Poitevin's process.

Mr. Herbert B. Berkeley showed a spring shutter, known as Reynolds and Branson's. An adaptation had now been added which enabled the operator to give at choice, instead of the very rapid exposure, a controlled one of from one-quarter of a second to three seconds.

On the subject of measuring the speed of shutters being discussed,

Mr. Debenham said that Mr. A. Haddon had measured one which he had in use, and found that from the commencement of the opening of the lens until it was quite closed occupied $\frac{1}{35}$ of a second. As the lens was only entirely open a very small portion of this time, it was about equal to an exposure of $\frac{1}{70}$ of a second if the lens had been entirely open all the time. The means employed by Mr. Haddon was a vibrating spring furnished with a bristle, which registered its motion upon a smoked glass.

Mr. C. Ray Woods said that Captain Abney had described this method before the Society of Arts about three years ago, but with the difference that he used a tuning-fork, which was superior to a spring, as the rate of its vibrations was known.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society, held on the 20th instant, the chair was occupied by Mr. J. Traill Taylor.

Mr. W. M. Ashman showed a frame for use when printing upon gelatino-chloride plates, made by himself from the construction of Mr. Offord. An ordinary half-plate printing-frame of the kind in general use is taken, and a plate is put in as a bed for any smaller-sized negative: close to the ends of the plate, and as near to the corners as the frame will permit, four pins are inserted vertically into the wooden frame. The back consists of a sheet of metal, such as ferrotype plate, pierced with holes to fit on the pins and ensure registration. On the middle of this back is a broad ring of india-rubber, which, being firmly riveted to the metal back with a metal ring or washer between it and the sheet metal, is depressed in the centre and forms a sucker or pneumatic holder for lifting the opal for examination, and replacing it in the same position upon the negative. The ordinary back is then put in place and fastened down by springs as usual.

Mr. A. L. Henderson said he thought the old plan of working against fixed stops was better, as there was then no play and the registration was consequently truer.

Mr. A. Cowan considered that there was an advantage in some such arrangement as the one exhibited, as it prevented any sliding motion of the two surfaces of the negative and transparency. This sliding movement with both surfaces was very liable to produce scratches. He (Mr. Cowan) then handed round a portrait negative taken on a plate given him for trial by Mr. Henderson. The exposure had been one second and a-half, with diaphragm $\frac{f}{8}$ or No. 4 on the universal system. An ordinary rapid commercial plate under the same conditions required three times the exposure which had been sufficient for this one.

Mr. Henderson said that the plate was prepared by a method of which he would give details at a future meeting. For the present, however, he would state that there was a new departure, in that the silver bromide had been formed by double decomposition, in the absence of all colloid bodies, the gelatine being subsequently added.

Mr. J. B. B. Wellington inquired whether there was much silver in the emulsion.

Mr. Henderson replied that there was 240 grains of nitrate to fifteen ounces; and, in answer to another querist, said that it had been added to the gelatine at a temperature of 120°.

Mr. A. Haddon remarked that some years back it had been suggested to form the bromide from chromate of silver.

Mr. Henderson said that an easy method of making a pellicle negative was to stretch fine paper—such as that known as *papier mineral* —over a glass plate and paste the edges over the back. When dry, the plate was coated with emulsion in the usual way, and could at any time be separated from the glass by cutting round the edge.

The Chairman said that the objection to paper for negatives on account of its grain was not so real as was supposed. He had seen Talbotype negatives where the paper grain did not prevent the titles of books, which were in a picture of a library, from being legibly depicted. With the gelatino-bromide process, as the image was upon, and not in, the paper, the grain should be even less objectionable. *Papier mineral* was, he believed, made translucent with paraffine; but he would be glad if any gentleman gave details of its preparation.

Mr. W. Coles said that a firm who prepared gelatino-bromide paper for negatives had two negatives on views—one on glass and one on paper. Prints from these were shown to those likely to be interested, and in most cases they selected the print from the paper negative as that which they would consider to have been produced from the glass one.

Mr. Mous thought that if the paper were made transparent with castor oil in ether the grain would not show. Some time since he had exhibited prints at this Association which had been made from negatives thus prepared.

Mr. J. J. Briginshaw showed a lantern transparency of French manufacture, the two glasses of which were only as thick as one ordinary glass. This made such slides very portable.

Mr. Cowan said that there was great difficulty in obtaining such thin glass, and the price was about four times that of glass of ordinary thickness.

Mr. W. E. Debenham observed that, while both glasses were thin, one was much thinner than the other. A question being asked as to ready-sensitised paper,

Mr. W. M. Ayres said he considered it inferior to that which could be sensitised in the ordinary way, and as it contained less silver the prints upon it were not so likely to be permanent. In his own practice he used a sixty-grain bath, floated for three minutes, and added one ounce of silver for every ten sheets sensitised.

Mr. Debenham formerly used a sixty-grain bath, and floated for three minutes, but, with paper now sold, he found a forty-grain solution bath and floating one or two minutes to answer better. After each six sheets had been floated, two ounces of a ninety-grain solution of silver were added, which kept up the strength and quantity.

Mr. R. Chipperfield and Mr. F. G. Nichols were elected members of the Association.

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION.

This Society had a special lantern evening on Thursday, the 20th instant, at which there was a very large attendance of members and their friends. Mr. J. C. Cox presided.

The principal feature of the exhibition was a lantern slide competition open to members, the number of slides being limited to three each. Voting papers were distributed amongst the members present, and 300 marks were allowed to each voter for each set of three slides. The following were the results of the voting:—Jno. Mathewson, 4,111 marks; D. Ireland, 3,980; D. Ireland, Jun., 3,961; J. Y. Rogers, 2,595; A. Simpson, 2,532; J. R. Wilson, 2,355; W. M. Martin, 2,002.

Many of the slides were on Chapman's gelatino-albumen plates and several on Cowan's chloride plates—the whole, with one or two exceptions, reflecting great credit on the exhibitors.

A lantern exhibition then followed, to which Messrs. Valentine, Mathewson, Ireland, Wilson, Martin, Rogers, Ritchie, and others contributed.

A frame of transparencies, kindly sent by Mr. Cowan, was shown and very much admired, and several members expressed their determination to make a trial of these plates, which as yet are not in general use here.

Mr. Jno. W. Lawdon exhibited and explained a new American camera, embodying a number of ingenious movements.

The usual votes of thanks brought an exceedingly enjoyable evening to a close.

BERLIN ASSOCIATION FOR THE CULTIVATION OF PHOTOGRAPHY.

This Association met on the 15th ultimo,—Professor H. W. Vogel, President, in the chair.

The Chairman read the programme of an industrial and electrical exhibition which is to take place in August, at Teplitz. He then showed a number of photographic views of Colorado, by Mr. Jackson, of Denver, and afterwards reported concerning his experiments with two of Dallmeyer's wide-angle lenses.

Herr Geheimrath Busse, director of the State printing establishment, showed a number of excellent *photogravures* printed in that establishment, representing statuary and other objects, principally antiquities belonging to the royal museum.

The Chairman exhibited a couple of photographs of coloured pictures—one an old Italian fresco, and the other a fresco by Cornelius. These pictures were photographed in the one case by a Berlin firm with ordinary collodion, and in the other by M. Braun, of Dornach, with collodion especially intended for photographing coloured objects by staining the collodion film. The result obtained in the last case was pronounced quite a photographic triumph, the subject appearing with great fidelity.

Some annoyance the Chairman had experienced in connection with a recent case in which he was referee brought up the subject of the payment or non-payment by the customer for a sitting when the proofs resulting did not give satisfaction.

The subject was discussed at some length, the general feeling seeming to be that in the long run it would do the photographer more harm to exact payment in such cases than he should gain by the small sum he would obtain.

A variety of subjects of no general interest were then discussed.

Herr Joop recommended a reducer of the following proportions:—Ferrous oxalate developer, two parts; concentrated solution of cyanide of potassium, one part. The latter must be filtered, otherwise a grey precipitate will form upon the film.

The Chairman remarked that he preferred to use iodine water for reducing plates.

Shortly afterwards the meeting was adjourned.

Notes and Queries.

Suttonian is a beginner, and finds that his fingers become stained by the developer to a greater extent than he likes.——He should obtain rubber finger-stalls, which are sold for photographers' use by most dealers.

"Southend" encloses two ferrotypes, both badly fogged. It is evident that his silver bath is quite out of order. Let him neutralise it with bicarbonate of soda, expose to sunlight for a few hours, then filter and acidulate. During the time it is being subjected to this treatment he ought to make use of a new bath. In reply to another query: there are no plates sold ready sensitised on which to obtain collodion positives.

THE REV. B. P. is desirous of ascertaining a reliable process for silvering a glass concave mirror which he has had ground for photo-astronomical purposes, and wishes to be referred to any good formula for this purpose. We advise him to procure copies of our ALMANACS for the years 1873 and 1879 respectively, and in these he will find two processes nearly allied to each other, both of which are equally good.

"Is there a reasonable chance of a collodion transfer remaining unchanged for a few years? Or do you consider an enlargement upon gelatino-chloride (or bromide) paper likely to be more durable?—FRED. B. RUSHTON."——There is no reason why an enlargement made according to either of these systems will not last several years, provided care be taken in the manipulations. It has been stated that collodion transfers fade; but, in most cases, these have been specimens finished in transparent oil colours, many of which colours, as known to artists, will bleach on exposure to strong light. But this does not prove that the photographs in themselves fade. What we have said applies to gelatine as well as to collodion pictures.

S. S. K. inquires:—"What advantage is claimed on behalf of carbonate of soda over ammonia in alkaline development? I have tried both methods most carefully, and find that the soda developer necessitates a lenger exposure being given to the negative than when ammonia is employed. What, then, constitutes its advantages, and have others found the same thing to result from its use?"——In reply: Mr. H. J. Newton, who is one of the most strenuous advocates of soda, claims that it is more stable in its action, and that the developing power is more continuous, if rather slow. We do not think that many photographers have recognised in it the possession of any virtue over ammonia, which, from its greater energy, occupies the position of prime favourite. The yellow stain imparted to the gelatine film by soda development is also by many held to be objectionable, although it can doubtless be removed by treatment with hydrochloric or oxalic acid and alum.

PYRO. asks:—"Are there any means by which I can effectively mask or otherwise alter a negative so as to cause it to print less harshly than it does at present? It was made by the collodion process, and is varnished."——We advise that the intensity of the negative be equalised in the following manner:—Make the back quite clean, and give it a coating of greatly-diluted albumen, following with an application of collodio-chloride. When dry, expose to a diffused light through the negative film. It is obvious that the shadows or transparent portions of the negative only will be acted on in the greatest degree by the light, the strong lights undergoing no alteration. When this process of equalising has been seen to have proceeded far enough, apply a weak solution of cyanide of potassium to the collodio-chloride to fix the image thus produced on the back of the glass, and which will serve as a mask for effecting the subduing of the harshness or intensity complained of by our correspondent.

"I HAVE been trying a dusting-on process for producing portraits on opal glass plates and have not been successful. I may, in fact, say that I have been unsuccessful in a singular degree. The formula I adopted was—

Saturated solution of potassium bichromate	4 drachms.
Albumen	4 ,,
Water	1 pint.

I exposed under a negative and obtained a visible image. I then took the print into a damp room and applied a fine powder by means of a soft brush, but none would adhere. Where am I wrong?—J. F. D."——In reply: Our correspondent has omitted an important ingredient in his sensitive mixture, viz., honey, or grape sugar. Let him add three or four drachms of honey to the above, and he will succeed in forming a surface to which powder will adhere when applied in the manner described. But by this process he will, from a *negative*, obtain only another negative. For opal glass portraiture he must employ a transparency, not a negative.

W. B., writing for information concerning the relative covering powers of the triple achromatic and the single landscape objective, says:—"I have not proper appliances for ascertaining the difference between them; but in looking over some literature of a former period in my possession I find that opinions appear to have been then divided as to their relative merits in this respect. May I trouble you for information as to how the question stands at present? I have been out of photographic practice for several years, which may account for ignorance on a subject that I presume is now well known."——In reply: Since our correspondent retired from the active pursuit of the art many changes and improvements have been made in the optical branch of photography, including the discontinuance of the manufacture of the "triple" lens mentioned. But, as between it and the single achromatic landscape lens, there is not a shadow of doubt that the latter will embrace a much wider angle of view; and the deeper the meniscus form of the lens the greater will be the included angle, because the diaphragm may then be brought closer to the anterior surface of the lens.

THE REV. DR. BROWNE writes:—"I have been in the same trouble with regard to blackening brass that your correspondent Mr. Conway has sought advice upon. Many months ago a method appeared in the Journal, which, unfortunately, I have lost. My method of working was to dissolve copper wire in nitric acid [N.B.: do not perform this operation indoors] until it would take no more. I then carefully cleaned the brass, heated it over a Fletcher's gas burner, dipped it in the strong nitrate of copper, when a considerable efflorescence went on for five minutes or so, removed it to the gas burner, and heated. The result was that where there was an amount of nitric acid left on the brass the heat converted it into green crystals easily rubbed off, and the whole operation was a failure. Where was I wrong? I have just made a new set of diaphragms for one of my lenses, and it is very discouraging, after cutting the openings to almost perfect exactness—thanks to the slide-rest in my lathe—not to be able to finish them with the same black stain that our opticians are such adepts in."——We shall endeavour to have some practical remarks on the subject of staining brass in an early number.

G. F. V.—Our correspondent desires to photograph gold and silver brooches the same size as the original, and is at a loss how to effect this end.——He should ascertain the focus of the lens he employs, and extend the camera so that the ground glass be twice that distance from the lens, the brooch being an equal distance in front. The photograph will then be the same size as the original.

A BOTHERED PHOTOGRAPHER writes:—"Upon looking over a number of negatives I took when in Portugal seven years ago, I am greatly annoyed to find several of them covered all over with a perfect network of cracks, as if the film had shrunk and cracked. Is there any remedy, such as causing the film to expand, and thus have its parts joined together once more? The cracks are exceedingly fine, but for all that they show very badly. Would immersion in alcohol or ether be of any use?"——In reply: By treating the film with alcohol and ether it would all dissolve away. The proper treatment consists in charging a pledget of cotton wool with lampblack and rubbing with a circular motion all over the surface. By doing so every crack will immediately disappear. Then pack the negatives with a sheet of blotting-paper between each, and no further cracking will occur.

Exchange Column.

Wanted, a binocular microscope in exchange for slides, cells, troughs, &c —Address, W. H., 2, York-street, Covent-garden, London.

Wanted to exchange, interior cabinet background, by Marion, for seascape same size.—Address, F. JACKSON, 16, St. Alban's-terrace, Sherwood-street, Nottingham.

Wanted, a complete tourist's set of photographic apparatus in exchange for opals, vignettes, cutting-shapes, &c. — Address, W., 2, York-street, Covent-garden, London.

Wanted, a *Le Merctoire* camera, in exchange for a strong home-made camera, half-plate, and part cash.—Address, A. CHAMBERS, 8, Gordon-road, West-hill, Hastings.

I will exchange a gentleman's gold hunting-watch and gold Albert chain for a cabinet or whole-plate lens by a good maker.—Address, C. T., 36, Orbel-street, Battersea Park.

I will exchange a cabinet burnisher and cabinet rolling-press, equal to new also cabinet lens. What offers in accessories?—Address, G. A. ROBINSON, 1, St. Mary's-place, Castlegate, Berwick-on-Tweed.

I will exchange some modern oil and water-colour drawings, framed, and cash, for an $8\frac{1}{2} \times 6\frac{1}{2}$ tourist camera and Ross's rapid rectilinear lens for same.—Address, JAMES MALINS, Crosswood, Aberystwyth, S. Wales.

I will exchange a sliding-body, half-plate camera, a 5×4 porcelain water-tight bath, and a repeating-back for a quarter-plate camera. Wanted, a half-plate landscape set.—Address, KENYON, Church-street, Blackburn.

I will exchange a whole-plate portrait lens, two quarter-plate ditto, all fitted with Waterhouse diaphragms, and in condition equal to new, for a quarter-plate portrait lens by a good maker.—Address, C. VERNON, Tonbridge-road, Maidstone, Kent.

Wanted to exchange THE BRITISH JOURNAL OF PHOTOGRAPHY, from January, 1882, to October, 1883, for rack and pinion or winch screw suitable for quarter-plate camera. — Address, G. LYONS, 12, Little George-street, Portman-square, W.

I will exchange a 15×13 photographic rolling-press, by Knox, of Glasgow, new last season, good condition, guaranteed, cost £7 10s., for a 12×10 Rouch's bellows-body camera, which must be in good condition.—Address, W. WESTOBY, St. John-street, Goole.

I will exchange a splendid new interior Seavey's background for any good studio accessories or a Dallmeyer's $8\frac{1}{2} \times 6\frac{1}{2}$ rapid rectilinear or Ross's rapid symmetrical lens, same size; difference in price adjusted.—Address, W. M. HARRISON, Falmouth, Cornwall.

Wanted, offers of accessories in exchange for the following:—Wall background, by Marion, interior and seascape, by Seavey, also whole-plate lens, by Slater, good for cabinets, and splendid half-plate view lens.—Address, J. WHITE, 32, High-street, Littlehampton.

I will exchange a whole-plate short-focus "J. S." portrait lens, perfect condition, cost £5 last summer second-hand, with rack focus, for Lancaster's or other half-plate set and small rectilinear or symmetrical, or offers.—Address, E. BASIBE, 10, Wellington-street, Gloucester.

What offers for 126 numbers of THE BRITISH JOURNAL OF PHOTOGRAPHY, from 1881 to 1883? I will exchange a good, old violin and bow, grand tone, fit for a soloist, worth three guineas, for accessories, also a good guitar, patent head.—Address, D. BLAGROVE, 73, High-street, Lewes.

Wanted, a small gem camera and lenses, also a large camera not less than 18×16 (if the dark slide is in good condition other part not of so much consequence) in exchange for first-class printing-frames and accessories; or what offers for same?—Address, C. R. TRUEMAN, Southwold, Suffolk.

I will exchange a Ross's No. 2 *carte* lens and a quarter-plate mahogany camera, good as new, cost £7 15s., also a portable dark box to carry same and develope in. What offers together or separate? A half-plate bellows-body camera, with two backs, preferred.—Address, SULPHITE, 52, Goldsmith-road, Peckham, London.

I will exchange Jones's £9 sewing-machine, also a balcony, five pieces, and a good photographic desk (photograph sent), for interior and exterior backgrounds, posing-chair, No. 3 or 4 rapid rectilinear lens, 15×12 bellows-body camera, or anything useful in photography; offers requested.—Address, W., photographer, Ropergate, Pontefract.

I will exchange a mahogany sliding-body camera, for plates $6\frac{1}{2} \times 4\frac{1}{4}$, with three dark slides, and a quarter-plate portrait lens, all by Hocking and Co., also a portable tripod, with sliding legs, and an air-tight glass bath, with dipper, for plates 10×8, with a quantity of silver solution, for a good 10×8 or larger size bellows-body camera.—Address, THOS. HIRST, Main-street, Ledbergh, Yorkshire.

I will exchange a gem camera, with twelve lenses, to take twelve, twenty-four, or thirty-six on a plate, in good order, also a Ross's compound portrait lens for *cartes*, very rapid, very good for taking babies or ordinary photographs in a short studio, and for copying, equal to new, for an $8\frac{1}{2} \times 6\frac{1}{2}$ bellows-body camera, with three double backs, must be very light and modern, or a good landscape lens, or two, either single or double, by a good maker, 10×8; will either give or take cash.—Address, W. Ferguson, photographer, Keswick.

Wanted, a half-plate and a whole-plate camera (or larger), with bellows-bodies, swing-backs, rising-fronts, and three or more double backs to each camera, also tripods for same, Dallmeyer's rapid rectilinear, Ross's rapid symmetrical, or other good lenses by same makers, suitable for the cameras mentioned, also hot rolling-press by a good maker, in exchange for Wheeler and Wilson's No. 6 sewing-machine, equal to new, having only been used a few times, a number of Bewick's prints, first-class mahogany supper tray and stand, bronze tea urn, gasogene, also the following books:—*Circle of the Sciences*, two vols., *Art Journal*, two vols., *History of Protestantism*, three vols., *Shakespeare's Works*, eight divisions, published by Mackenzie, or other valuable exchange.—Address, William L. Knott, 68, King-street, North Shields.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

*** Several articles in type are left over this week, and we ask the forbearance of contributors during the present pressure on our space.

E. E. Hibling.—We regret our inability to render you effective aid.

T. G. S.—The address is "Optician, Lord-street, Liverpool." Thanks for enclosure.

W. G. (San Remo).—The gentleman named is at present in America. The address, "Florence, Italy," is sufficient.

London.—The affair appears to be a hoax. Have nothing to do with it, or you may find yourself become the laughing-stock of your neighbours.

R. Sedgfield.—Thymol, or thymic acid, is derived from thyme. It may safely be employed for the purpose you suggest. It will be quite inert on the photographs.

G. J. Hill.—You are not the only one who has experienced a difficulty in electrotyping on a gelatine film. More perfect blackleading is the best suggestion we can make.

A. G. B.—We know nothing more than is stated in the communication referred to. That form of shutter, we fear, cannot be made to work in so short a time as you require.

B. Bennett (Galway).—Messrs. Stanton Brothers, Shoe-lane, E.C., will probably supply tinfoil the size you require. If they cannot, we know not where you will be able to procure it.

Stephen.—If the wooden vessels are not to contain hot solutions there is nothing better than paraffine wax for coating them with. If you require them for hot solutions your best plan will be to line them with thin sheet lead.

Tyro.—1 and 2. Neither of the lenses are suitable for drop-shutter work. It is better to procure one of the "rapid" type, which will enable you to work with a larger aperture.—3. There is no method by which the stains can be removed.

S. Rhodes.—The process looks very well on paper, and many have tried to put it in practice: but, so far as we are aware, no one has yet succeeded. However, the theory is correct, and you may possibly succeed with more extended practice.

A. J. Worsley.—The metallic spots on the drawing-paper, after it is sensitised, is caused by small particles of metal in the paper itself. There is no remedy but to discard the paper and procure a fresh sample from another source.

A. S. B. (York).—If the collodion become red immediately the iodiser is added it shows that free acid is present. In all probability you have not washed the pyroxyline sufficiently. Test it with litmus paper, and if our surmise prove correct the remedy is obvious.

T. P. B.—If you are successful in coating small sizes of glass we do not see why you should meet with a difficulty in sizes of such moderate dimensions as those to which you refer. Probably a larger coating vessel is all that is required, together with a little more practice.

Mungo.—There is no practical method, that we are aware of, by which you can print in silver on real ivory. You might possibly succeed by transferring a collodion picture picture on to it—*à la* collodion transfer; but this, we surmise, will scarcely answer your requirements.

Ixion.—From your description we imagine that, at some stage of the development, light has been allowed to act upon the plates. If not, we cannot suggest the cause of the tinting. The opaque deposit is doubtless due to oxalate of lime. A little dilute hydrochloric acid will remove that.

G. H. Weatherly.—India-rubber solution is a very good mountant for photographs, except that, after they have been mounted for a time, the rubber is liable to "perish," and then the prints leave the mounts. Were it not for this, india-rubber would be largely employed for mounting purposes, as it does not cause expansion of the paper like aqueous mountants.

G. Weller.—If the gas-bag has perished to the extent described there is no means of repairing it so as to render it again serviceable. If you attempt to patch it up you will find it will always be leaking in fresh places, entailing, consequently, a great waste of gas, and possibly causing you to break down in the midst of an entertainment. Our advice is—Do not purchase second-hand bags in future without a thorough examination.

S. Sidey.—The address is "G. M. Kenyon, Esq., M.D., The Poplars, Fluker's Brook, Chester."

B. J. T.—The spots on the collodion transfers are clearly due to specks of coarse particles in the paper to which you have transferred the picture. Of this you may satisfy yourself by examining the back of the paper, and you will see that they go quite through. To avoid such defects in future you will have to employ a better quality of paper. Saxe or Rives paper—or, indeed, any paper of good quality—is free from these imperfections.

Received.—*Universal Attraction: its Relation to the Chemical Elements.* In our next.

Photographic Club.—At the forthcoming meeting of this Club, at Anderton's Hotel, Fleet-street, on Wednesday next, April 2nd, the subject for discussion will be—*On the Best Lenses for Large Portraits on Gelatine Plates.*

South London Photographic Society.—At the next meeting of this Society, to be held at the Rooms of the Society of Arts, John-street, Adelphi, on Thursday next, April 3rd, at eight o'clock, Messrs. C. and F. Darker will exhibit some objects in the lantern polariscope; and the following (from the question-box) will be discussed:—*Does the Burnishing of Prints Produce any Chemical Change in them?*

A Difficulty Overcome.—M. D——, a photographer at Eidhoven, had made a dozen *cartes* for a gentleman living at Walkenswaard. When about to send them off he discovered that he had forgotten the name of his client. What was he to do? After he had long but uselessly racked his brain he at length uttered a sigh of relief. He gummed one of the likenesses on the envelope and wrote underneath:—"To the above gentleman in Walkenswaard." The *cartes* were duly delivered.

Opening of Studio for Lochee Amateur Photographic Club.—There has just been erected in Marshall-street a new studio for the Lochee Photographic Club. The studio is an exceedingly neat and commodious structure, and is fitted with all the most recent appliances for the efficient prosecution of the art. On Tuesday evening, the 17th inst., the formal opening took place, when there was a large attendance of members. Bailie Ogilvie, the President of the Club, occupied the chair, and, in the course of a brief opening address, congratulated the members upon the realisation of their great desideratum—a studio. He referred to the success which had attended the club since its commencement in April last, the membership at present being thirty. The ample facilities they now possessed for carrying on their photographic studies and experiments would, he had no doubt, be taken advantage of, and the club in this way would have its efficiency and influence largely extended. They would be all most willing to afford every information and help in their power to beginners who might connect themselves with the Club. After consideration, certain rules for the guidance of members in using the studio were agreed to by the meeting. Seven gentlemen were also proposed for membership. Mr. Robert Keir, in proposing a vote of thanks to the Chairman, referred to the great interest he had taken in the development of the Club and in the erection of the studio. But for the Bailie's enthusiastic encouragement of the venture the Club would not have prospered so remarkably. This Club has our best wishes for its continued prosperity.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician,
For two Weeks ending March 26, 1884.
These Observations are Taken at 8.30 a.m.

March	Barometer.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max Shade Temp.	Min. Tem.	Remarks.
13	30·08	SW	49	47	—	57	43	Cloudy.
14	30·17	S	50	47	—	61	47	Cloudy.
15	30·12	SW	53	50	—	68	49	Foggy.
17	30·07	SE	52	49	—	69	45	Hazy.
18	30·09	SW	53	51	—	67	49	Hazy.
19	30·14	SW	48	46	—	57	45	Overcast.
20	29·95	W	47	43	91	55	43	Bright & Clear.
21	29·98	NW	43	40	85	53	39	Cloudy.
22	30·11	W	42	39	80	53	35	Hazy.
24	30 16	N	44	41	86	53	40	Hazy.
25	30·18	E	40	38	—	48	37	Hazy.
26	30·12	E	41	38	—	45	38	Cloudy.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1248. Vol. XXXI.—APRIL 4, 1884.

IMITATION OPALS.

The recent advances in popularity of both bromide and chloride gelatine dry plates for positive work, either in the form of transparencies or opals, marks a new era in the practice of many professional photographers, and has caused an increased demand on the part of the public for a class of picture that has not hitherto been greatly patronised except by a select few. In fact the opal picture has until quite recently been almost the speciality of the more aristocratic amongst our professionals, whose *clientèle* comprises those classes whose pockets enable them to pay high prices.

The introduction of gelatino-bromide and gelatino-chloride opal plates has caused a change. Not only is the price so moderate, and the consumer saved so great a proportion of the trouble involved in the production of the pictures, but the results are rendered far more certain than was formerly the case when wet collodion and pyro. development was almost universally adopted. Then it was almost a necessity to retain a special operator, whose sole duty consisted in making opal enlargements, and competent artists of that class were always able to command large salaries; consequently, it was, with rare exceptions, that the production of opal pictures was confined to photographers of the first class.

With the modern dry plates as supplied commercially the greatest difficulties in manipulation are entirely removed, and the production of a positive image suitable for opal—that is to say, an image of suitable tone—is as easy as the development of a negative. The operator who can perform one duty is equally competent to undertake the other. But still many professionals are deterred from embarking extensively in the opal business, because their clients can not or will not pay a price which will reimburse them for the extra cost of opal glass.

Many attempts have been made in previous years to introduce substitutes for opal glass, with more or less success; and there seems to be now a renewed demand for some method by which results at least approaching those on opal glass can be obtained. Probably none of the methods yet introduced can be said to equal the real article, owing to some peculiarity of the tint of the opal, which is never quite matched; but we shall mention one or two simple methods by which a very close approximation to opal pictures can be effected. These are based upon the employment of an emulsion containing a white pigment, which renders it opaque, and which may be applied to the glass either before or after the picture is produced. Its tint may be varied at will, as will be shown, and in all cases it will be in optical contact with the picture.

Some few years ago a number of so-called "imitation opals" were exhibited at a meeting of one of the metropolitan societies, the basis of their production being a collodion transparency backed with paper; but the results were so wretchedly poor that few cared to examine them twice. The fault lay in the paper backing and the method of cementation to the glass—the mountant having partially sunk into the paper, destroying the purity of its colour and bringing out painfully the irregularities of its texture. With an emulsion there is, if properly managed, no chance of this taking place.

The oldest plan of procedure is to form an emulsion by incorporating finely-ground sulphate of barium with gelatine. In order to secure the best results it is, of course, necessary to reduce the pigment to a state of the utmost possible fineness—an operation which requires both time and care. Those who are not afraid of the trouble may proceed as follows:—Dissolve separately in hot water one ounce of sulphate of zinc and one ounce and a-half of nitrate of barium. Mix the two solutions and allow the precipitate to settle; decant the supernatant liquid, wash the sulphate of barium in two or three changes of hot water, and then transfer to a piece of fine calico placed in a funnel to drain. Now take a sheet of ground glass and place a teaspoonful of the pasty mass on its centre and proceed to grind it, using as a muller a smaller piece of glass cemented to a wooden handle. When this is found to be fine enough it is incorporated with a warm twenty-grain solution of gelatine, and the mixture is then passed through several thicknesses of cambric to remove the coarser particles.

This method is, as we have said, a troublesome one, if an extremely fine result be required, for which reason we prefer to proceed by double decomposition. Take one ounce of gelatine, one ounce of barium nitrate, and ten ounces of water; dissolve the barium salt in the water by heat and then add the gelatine, previously swelled, and dissolve. In another vessel dissolve 300 grains of zinc sulphate in five ounces of water, and pour, with constant stirring, into the gelatine solution, just as in making a gelatino-bromide emulsion. After keeping the resulting emulsion liquid for four or five hours it is poured into a dish to set, and is then washed free of the zinc nitrate in the ordinary manner, after which it is ready for application to the glass.

Either of these emulsions may be slightly tinted to obtain a closer imitation of opal glass, different samples of which vary from bluish to pink and cream colour; but great care must be taken not to overdo this. An alternative method of tinting will be referred to further on.

A third method which, in some respects, we prefer, differs materially in the details of its manipulation, though the resulting film is identical with those produced by the plans already described. The main difference consists in the formation of the barium sulphate by a process analogous to the sensitising of a wet plate instead of by double decomposition in the vehicle itself. For this purpose take one ounce of gelatine, one ounce of barium nitrate, four ounces of glycerine, and ten ounces of water. Dissolve the barium salt in the mixed glycerine and water with heat, and then add the gelatine previously swelled. Dissolve and filter carefully.

This solution is applied in the same manner as the emulsions previously described, and allowed to set thoroughly. The purpose of the glycerine is to permit the film to set hard—that is, for some time—without the barium nitrate crystallising at the edges and elsewhere, and thus causing irregularity. When used in the proportions given it enables the film to be kept for some hours, if necessary, in a warm, dry place without crystallisation, during which time a great portion of the original water will have evaporated.

The next operation is to immerse the plate in a saturated solution of alum for from five minutes to half-an-hour, according to the thickness of the gelatine. This serves the double purpose of forming the barium sulphate by double decomposition, and of hardening or rendering insoluble the gelatine. The plate must be immersed in the solution in such a manner that the latter flows over its surface in an even wave, a flat brush or a tuft of wet cotton-wool being passed gently over the surface to remove air-bubbles. After a sufficient immersion in the alum bath the plate is again washed and left to soak for half-an-hour, when it is ready for drying.

The emulsions made in this manner may be applied to the glass as a substratum before coating with gelatino-bromide or chloride, which, of course, necessitates the preparation of the plates by the operator himself; or they may be applied after the development of the image, in which case commercial plates are available. In the one instance an unreversed image will be obtained by contact printing, in the other a reversed; this latter is of no consequence in enlarging, as the negative may be reversed, but the fact should be borne in mind.

If the barium emulsion be applied to the glass first, the result will more nearly approach that of real opal; but it will have to be observed that the utmost perfection in the gelatine surface is necessary. Dust, "pits," or other inequalities will, of course, produce their corresponding effect on the overlying emulsion film, and thus detract from the good effect. On the other hand, when applied *over* the picture, the latter must be viewed through the glass, and the charming matt effect of opals is impossible. The slight colour, moreover, of the glass is sufficient to give an unpleasant tone to the lights, which, however, may be overcome by suitably tinting the film.

Next week we shall say a few words on the mechanical portion of the manipulations.

SUBSTITUTES FOR THE LIME LIGHT.

Notwithstanding the lime light is one of the safest systems of illumination conceivable when its management is under the control of a competent person, certain accidents which have recently happened in connection with its employment appear, unfortunately, to have engendered a feeling of dislike to its use, more especially in the case of school entertainments; and this antagonistic feeling seems to be increasing rather than diminishing.

We have already heard of two cases in which applications for the use of rooms of a semi-public character for lantern entertainments have met with a negative response, this refusal being, however, subject to withdrawal if the intending exhibitors will stipulate that the lime light shall not be used in connection with the entertainment. This, as we all well know, is very arbitrary and hard, as well as unwise; still, we must accept the facts as we find them, and wait till a more intelligent wave of enlightenment sets in and drowns existing prejudices. But this leads to the contemplation of methods of illumination other than that in which oxygen directly takes part.

Marvels have already been effected during the past ten years as regards improving the intensity of illumination of lamps burning petroleum, until, at the present time, this source of illumination is sufficiently good for every purpose except that of displaying pictures on the scale of magnitude necessary for a large hall and a considerable number of spectators. For such a purpose the lime light has hitherto remained without a rival. There is no finality, however, to improvement; and, seeing that our lamp manufacturers have already effected so much, can they not do still more? Quadruple and quintuple wicks represent a very high degree of flame power, and we suppose that no gain of any appreciable value will result from a further numerical increase. The perfection of the burners in themselves being assumed, there are two directions in which we may look for further improvement. The first of these is the oil, and the second the condition of the air by which combustion is supported.

In the former times of solar and argand lamps, when fixed oils of strong body were employed, we all know how greatly the illuminating power, or at all events the purity, of their light was increased by oil having been previously saturated with camphor. Now, if sperm and colza oils of even the very finest quality be thus amenable to improvement of a marked character, it is not too much to hope that our best paraffine oils may also yet be found equally amenable to the enriching influences of either the same or other hydro carbon. This is one direction in which we may not unreasonably cherish the hope of an improvement being effected in lantern illumination.

Again: ever since the invention of the hot blast furnace the effects of heated air as a supporter of combustion in other directions than that of the furnace mentioned have been recognised, and gas-light engineers of the greatest eminence have taken, and in quite recent inventions are still taking, advantage of heated air to increase the illuminating power and purity of the flame of gas through the instrumentality of burners, which ever and anon are being brought forward and placed under the protective ægis of our patent laws.

Now, among the various lantern lamps we have examined we have not seen any application of this recognised power in the improvement of illumination, nor have we heard of any such application. This, therefore, forms a direction in which we may look for securing some increase in the illumination of oil lanterns. We throw out the idea for the consideration of lantern engineers.

An electric light having an illuminating power equal, or nearly equal, to the lime light would prove an inestimable boon to the lanternist, provided its first cost was not very considerable, and its bulk not so great as to prove an incumbrance when required to be moved from place to place. Whether the electric generator were a battery or a dynamic machine would be a matter of secondary importance, provided one could, under the conditions above-mentioned, obtain a reasonably-good light for two hours at a time. Doubtless, the most perfect system of all would be a storeage battery capable of being charged by manumotive power applied to a small magneto machine. Dynamic electricity may yet prove a friend to those who, from what motive soever, have to discontinue the employment of the lime light.

To those whose avocations and abilities lie in either of the directions indicated in the foregoing we cheerfully dedicate this article.

THE OWNERSHIP OF NEGATIVES.

In last week's issue will be found a report of an action recently tried in a court of law to decide in whom is vested the right to a photographic negative taken in the ordinary course of business. The result of this case will certainly be considered very satisfactory to most of our readers, and particularly to those correspondents who have, during the past few weeks, solicited our opinion and advice in cases where their *clientèle* have positively refused payment for their pictures unless the negatives themselves were delivered up to them. Now, several of our correspondents' cases are precisely on all fours with that which has just been tried in the Swansea County Court, except that in most of them portrait negatives are in question.

Briefly stated, the case stands thus:—Mr. Andrews, the plaintiff, a photographer of Swansea, was commissioned to take certain photographs of a vessel and of groups of her officers on board. It appears the charges amounted to a little over ten pounds, about half of which sum was for "photographing" the vessel and groups, and the remainder for duplicates supplied. The charges for the duplicates were not disputed, but payment for taking the photographs was resisted on the ground that the negatives were not delivered up to the defendant. The point, therefore, for the judge to decide was simply in whom the ownership of the negatives was vested, and this he did in favour of the photographer. The judge remarked to the defendant's advocate that when ordering a photograph, unless a special stipulation be made for the purchase of the negative, the photographer is not entitled to give it up. It was argued for the defendant that, as a special charge was made for photographing, the negative should belong to him; but the judge ruled otherwise, saying that the negative was only part of the instruments used in the production of the photographs.

The point cannot yet be considered as finally decided, inasmuch as notice of appeal against this decision was given and permission granted. Until the appeal has been heard in one of the superior courts the matter must not be considered as definitely settled. If the appeal be prosecuted (which, after the remarks of the judge, is somewhat doubtful) the point of contention will probably be that when a definite charge is made, as it was in this case, for "taking" a photograph, in law that must include property in the negative. Against this will be argued, no doubt, the "customs of trade" and "usages of business," both of which, as we explained when writing on this same subject in our volume for 1879, are nearly, if not quite, as binding as the law itself.

Is a negative a photograph? In the eyes of a photographer, and literally, it is; but in the eye of the public it is not. To them a photograph is the picture itself, and not the plate from which it is produced. Indeed, many of the general public are not even aware that a negative is necessary at all for the production of their photographs, and it really is not with some processes.

The custom of the trade with regard to a photographer and his *clientèle* is consistent with all his dealings in every branch of the profession. If he send a negative to have a number of Woodburytypes made from it, he does not expect to get the gelatine relief and the lead matrix from which the impressions are produced. Nor does he, in the event of his ordering a number of collotypes, expect to receive with them the plate from which they are printed. Again: if a photographer send a negative to have an enlargement from it, either in carbon or platinotype, he does not consider himself entitled to the transparency and the enlarged negative as well as the print. But all these should become his property if anyone who gives him a commission to take a photograph is entitled to the negative as well.

In the event of the appeal being prosecuted, and its being decided that the negative is not the property of the photographer, he will be awkwardly placed in many ways beyond its loss. In the event of his receiving a commission for (say) a carbon enlargement he would not only supply the enlargement and have to deliver up his original negative, but he would also be compelled to hand over as well the transparency and enlarged negative, to neither of which, according to the custom of the trade, is he at present entitled, supposing he has put the enlargement out to be made. With most houses that make carbon enlargements it is a rule—and a recognised one, too—not to part with the transparencies under any conditions whatever; indeed, they almost look upon a transparency as a "trade secret," although they permit the purchase of the enlarged negative.

In the projected new Copyright Bill, which has been before Parliament now for several years past, the ownership of the negative is provided for (or at least implied), there being a clause which stipulates that all negatives executed for a consideration are not, under a heavy penalty, to be used except to the order of those for whom they were produced. If this bill ever become law the ownership of the negative will then be established. In the meantime, and pending the appeal (if it ever come off) in the case previously referred to, we suggest to our readers the advisability of abstaining from making a definite charge for taking the negative, or it may happen that if the point were again contested the legal meaning of the term "photographing" may not be interpreted in the same sense as it was by the judge of the Swansea County Court. In making the charge it should be simply for so many photographs, or (say) a photograph and so many copies. In no case should the term "negative" be mentioned, or, indeed, "taking" a photograph.

From the communications which have been received by us of late it appears that the Swansea case is by no means an isolated one, and that a certain portion of the public do at present consider themselves legitimately entitled to the negative. To dispel this idea our correspondents will do well to bring the decision recently given respectfully under their clients' notice. By so doing they may possibly avoid litigation, which, in all instances, it is very desirable to do between a photographer and his customers.

THE DECANTATION OF LIQUIDS.

In our contemporary *La Nature*, of last week, is figured a very simple and effective arrangement for pouring from large carboys the whole of their contents, even to the last drop, with ease and safety, which we may with advantage describe to our readers. Of all the simple operations of the dark room or laboratory there is none which shows the trained worker more readily than the mode in which he takes up a bottle and pours out a portion of its contents; and when he handles a large carboy in which corrosive acids—nitric, sulphuric, &c., not to speak of acetic acid and other more innocent liquids—are stored, he does it with safety if not with ease.

When, however, the inexperienced hand attempts (say) to draw off a pint or two of acid from one of these cumbrous vessels he does it at great risk of spilling its contents, and runs a considerable chance of blinding himself by returning the vessel to a perpendicular position so quickly as to cause it to spirt or splash out. The *vide-tourie*, or carboy-pourer, of M. Serrin (the inventor of the electric lamp that bears his name) obviates these and other difficulties, and renders the pouring from carboys a matter of ease and safety when the act is performed by a single workman without aid. It is so simple that the wonder is it was not invented before, and it may be described without the aid of a diagram.

It consists, in effect, of a base or platform to hold the carboy, a couple of uprights at its back, and attached to each of these uprights a construction exactly like the half of a small wheel cut through its diameter. The two semicircles are directed outwards, and when the structure is tilted forwards the carboy follows suit, the whole rocking to and fro upon the wheels with great ease; thus any inclination, even to turning it upside down, is given without jerk or splash and with perfect ease. The apparatus seems so simple and useful that we consider we are doing its inventor justice in bringing it before the notice of our readers, many of whom, no doubt, have experienced the difficulties and dangers of carboy-pouring.

Pouring from a carboy, however, is by no means the only operation of the kind in which a little knowledge may be imparted with advantage, and, indeed, for the pouring itself, in some cases, syphoning may be substituted. When corrosive liquids are decanted by a syphon one with a double limb is best employed, and the limb filled, not by suction with the mouth, but by exhaustion with an india-rubber ball. Where a syphon of this kind is required a very useful home-made one can be constructed out of any round bottle and a large cork or bung. The bottom of the bottle is cut off by any of the well-known methods, and its place taken by a large cork, in which two holes have been bored—one for the insertion of the end of the syphon, and the other for an extra tube which should extend a little higher than the bend of the syphon. Placing the finger (protected, if necessary, by an india-rubber stall) upon the neck of the bottle, the air may be exhausted by the extra tube, and the liquid, thus brought into the syphon, caused to flow through the bottle upon removing the finger.

Another form of syphon useful for general purposes is made by blowing a bulb near the end of the long limb, which holds sufficient liquid to keep up the flow when the short limb is immersed quite empty into the liquid to be decanted, till both tubes are full and a complete flow is established. We are inclined to believe that one reason why a syphon is so little seen in the photographer's laboratory is the difficulty experienced in "setting it to work"—a difficulty quite obviated by making it in this form or buying it so made.

But, really, for photographic use a syphon in ninety-nine cases out of a hundred is used for decanting liquids from a bottle, and then, mainly, for one or two particular liquids—collodion or varnish. By far the simplest method to employ is to keep the syphon permanently fitted with a cork and blow-tube on the shorter limb. A very well-tapered cork should be selected, and two holes bored into it—one for the syphon leg and the other for a small extra tube slightly bent. This latter tube should fit tightly, but the syphon tube only just sufficiently so to allow it to slide stiffly in and out of the cork. Then, if each syphon be kept for one especial purpose, this little arrangement will be found particularly useful. All that is required to set the syphon flowing is to insert the short limb in the bottle, the cork being adjusted at such a height as to allow the limb to be clear of the bottom; then, applying the lips to the small tube, a slight puff of air through it will force the liquid into the syphon, whence it will flow until either the bottle be empty or the instrument withdrawn. The only difficulty that could arise with the apparatus so arranged would be when the cork would not fit into the bottle it was desired to empty; but this drawback, which would be little likely to occur with a well-selected cork, could be easily overcome by placing the cork, if too large, upon the mouth of the bottle and pressing strongly while blowing, or, if the cork were too small, wrapping a few folds of paper round it till it fitted. Where small quantities only at a time were wanted a plan might be adopted like that we have seen in one dark room. The syphon was replaced by a bent tube with a short limb outside, and the liquid would only flow as long as the blowing was kept up. By this means an exact quantity could be drawn off and no trouble caused by the presence of the small quantity contained in the syphon when its action was stopped by withdrawal from the liquid.

We have more than once been amused by the mishaps of an inexperienced hand, after spending much time in boiling a bath to clear it of ether, &c., or, evaporating down a solution required in a more concentrated form, in pouring the liquid from the evaporating dish into another vessel. The first time this is done there is generally a spill; yet if the operator had but placed a glass rod against the lip of the dish and poured gently he would not have spilled any of its contents, and the liquid would have flowed precisely where he desired.

Sometimes a liquid is perforce contained in an awkward-shaped vessel from which, through being provided with no proper lip or spout, it is next to impossible to pour; if the edge be very slightly greased at one part the regular flow of the liquid will be greatly facilitated. We will conclude by alluding to the mode of pouring out of a bottle, which simple operation is usually performed in the most slovenly manner, with the result of a loss of neatness and cleanliness that might well be avoided.

Firstly, stoppered bottles are decidedly best where the liquid is in frequent request; secondly, the stopper should be withdrawn by the third and fourth fingers of the left hand, the thumb and forefinger holding the measure; thirdly, the bottle should be held so that the pouring is away from the label, which thus need never be stained if a drop should run down the sides; and, fourthly, to prevent as much as possible any drop running down and so soiling the bottle and the hands the next time it is handled, the lip of the bottle should be just touched with the lower part of the stopper before replacing it. The drop just hanging ready to run down will be taken up in the stopper and returned to the bottle. These instructions may seem intricate to read, but they are not so in practice; indeed, they indicate not only the best but the quickest mode of performing the simple act of pouring out of a bottle. Stress is laid upon it from the idea we hold that neatness of manipulation aids in improving the quality of the work, and in the comfort and ease of all details concerned in carrying it out.

AMONG the scientific *Transactions* of the Royal Dublin Society, recently issued, we find an account of an equatorial telescope of new form by Mr. Howard Grubb, F.R.S., which will greatly facilitate stellar observation. It is constructed, optically, on the dialytic principle, the mechanical arrangements being such that the light, after passing through the dialyte, falls upon a plane mirror and is reflected up through a stationary tube (containing the eyepiece) pointing towards the mirror, and the eyepiece end of which is introduced into the room, in which the observer sits at his ease. The slope of the tube, *down* which he looks at the heavenly bodies, is similar in degree to that at which a microscope is placed when the microscopist has got it comfortably arranged to inspect the minute objects in nature.

WE have received from the Rev. T. E. Espin, Director of the Observatory of the Liverpool Astronomical Society, a photograph of the cluster of stars round (Alpha) Persei, which is a most successful piece of stellar photography. The exposure given was one hour, the instrument used being the equatorial stellar camera, which forms an important item in the equipment of the West Kirby Observatory, and which has already done good work. The perfection of the mechanism and the accuracy of its timing are shown by the sharpness with which the large number of stars of varying magnitudes are rendered, there being an entire absence of the oval or egg-shaped distortion so commonly seen in stellar photographs. The picture, which is of quarter-plate size, is, except in the importance of the subject, quite as interesting as Mr. Common's famous *Nebula in Orion*, and Mr. Espin is to be congratulated on his success.

WE are much pleased to learn that arrangements are being made to establish a photographic society in Nottingham, to be designated the "Nottingham and Provincial Photographic Association." We trust that all success will attend the efforts of the founders.

IN our issue of March 7th, the Rev. H. B. Hare called attention to a peculiar example of green fog which had come under his notice, and some of the negatives to which he referred have since been submitted to us. The opinion expressed by the photographer by whom the pictures were taken was that the green fog was absent from "the portion about the middle on which the plate rested on the pneumatic holder while they were being coated." But this is, we think, from an examination of the negatives, scarcely a true explanation of the clear patch which certainly appears near the centre of each plate. From other markings we should judge that dirty glass is the cause of the green fog, and that the fog-inducing matter, whatever it may be, has been cleared away from that part of the plate upon which the emulsion was poured in coating. The transparent patches are not large enough, nor are they sufficiently regular in form, to be caused by the pneumatic holder. If we had information that a substratum of any sort had been applied to the glass before coating with emulsion, we should not have the least hesitation in connecting that with the result; but present appearances decidedly favour the theory of badly-cleaned plates, as the marks of the polishing-cloth are clearly visible in more than one case.

As an instance of the use of photography in illustrated journalism, we may mention that Mr. W. H. Harrison's pictures, in the last number of the *Graphic*, of the Carnival at Lucerne were chiefly founded upon his photographs.

A FRIENDLY recognition of the services rendered to photographers in New York and neighbourhood by Mr. T. C. Roche, the photographic demonstrator at Messrs. E. and H. T. Anthony and Co.'s, Broadway, New York, was made on the 18th ult., when a large number of photographers met together under the presidency of Colonel Wilcox, the junior member of the firm named. After dinner a handsome gold watch and chain were presented to Mr. Roche, who made a fitting response. Speeches on various topics connected with the art followed. From all that has come to our knowledge respecting Mr. Roche, this recognition of his valued services to photography is richly deserved.

OUR readers will be interested to learn that the first public exhibition of the results of the French expedition to observe the eclipse of last year was made on the 10th ultimo, M. Janssen having delivered an address to the Alpine Club on that day, and illustrated his discourse by magic lantern projections of the photographs obtained.

THE exhibition of thermometers, illustrated also with photographs, &c., to which we have already alluded, was opened to the Fellows of the Metereological Society and their friends on the 19th ultimo, and was of a most interesting character. There were one hundred and thirty-six exhibits. At the monthly meeting of the Society, held the same evening, the President gave an interesting paper on the history of thermometers, from which it appears that the actual inventor of the instrument is really unknown. He stated that most of the improvements in the instrument had been made by Englishmen. The freezing-point was the suggestion of Robert Hooke, and the boiling-point of Halley, who also first suggested the use of mercury instead of spirit. Fahrenheit, though a German by birth, was a *protégé* of James I., and died in England. Réaumur's thermometer owed its origion to De Luc, while the centigrade thermometer, usually credited to Celsius, was really invented by Linnæus.

IN the revision of the atomic weights by Mr. F. Wigglesworth Clarke, S.B—to which we have alluded on a previous occasion, and the results of which are in course of publication—he states that an experimental revision of the weight of gold is very desirable, as it is a metal which can be readily applied to the determination of the atomic weights of other elements. He gives as the result of his revision a mean of 196·155, with a possible error of *plus* or *minus* ·095. When, however, it is noted that Berzelius obtained 196·186 in one set of experiments and 195·303 in another, while Luvol (the only other experimentalist whom Mr. Clarke considers worthy of consideration) obtained 195·794, it may be readily seen how desirable such revision really is.

It will be noticed that, taking the difference between the highest and the lowest of these readings, we find, on a basis of arithmetical calculation, a difference of about threepence an ounce in the estimated price of chloride of gold.

The question as to the usefulness of photographic guns and revolvers for the amateur photographer is, for the present, solved by the manufacturers; they make them and must endeavour to sell them. That they are likely to attain a certain popularity seems probable; for we see in our foreign contemporary, *La Nature*, a capital illustration of a photographic revolver just invented (it states) by M. Enjalbert. The apparatus is ingenious enough, and for taking "pot shots" is, under certain conditions, likely to be very useful. The barrel of the pistol forms the sliding tube for holding the lenses, and the revolving chamber contains a dozen dry plates, necessarily of diminutive size—about three-quarters of an inch in diameter. The arrangement for exposing and changing the plates is very ingenious and apparently serviceable. A pull of the trigger opens and closes the shutter, giving what is estimated to be the one-fiftieth of a second's exposure. A turn of the revolving-chamber by the hand removes the exposed plate, and substitutes a fresh one ready for the next "shot." The whole instrument forms a compact and ingenious apparatus. But the doubt of the usefulness, except under limited conditions, of any such apparatus still remains; indeed, the editor of *La Nature* seems to see this difficulty himself, for he says—"The photo.-revolver only offers one inconvenience: in certain cases it may be particularly terrifying to those at whom it is pointed. It is easy to avoid this inconvenience by covering the apparatus with a handkerchief or veil, and so hide its alarming aspect." As a matter of fact, we find it difficult to see what could be done with such an instrument by an amateur. In a crowded street he might be roughly handled, or, during the prevalence of such outrages as have of late so alarmed the public, might meet with unpleasant attentions from the police; while, if he attempted to secure single studies, the probability is he might find that his target could hit straight out from the shoulder. The latter, we consider, would be a contingency as probable as justifiable, from its similarity to the foolish and dangerous practice of pointing firearms in joke at any one sufficiently near to be alarmed—a practice that has led to the sacrifice of many a useful life, followed by a lifetime of self-reproach consequent on the unintentional homicide. For this reason we would far rather see a similar amount of skill and ingenuity expended upon a more innocent-looking form of apparatus.

SULPHITE OF SODA IN THE ALKALINE DEVELOPER.

Some discussion seems to have arisen lately in these columns as to the use of the sulphite of soda in the alkaline pyro. developer; and, as I have used it with success and to my complete satisfaction for a considerable time—in fact, since first it came into notice—I venture to make a few remarks concerning my experience of it. In discussing the merits of a process or of a material of any kind the question of who first invented, originated, or introduced it has but little bearing on the real issue; but in the present case I have no hesitation in saying that I never heard of sodic sulphite, much less of its use as an ingredient in an alkaline developer, until I first noticed, or heard of, Mr. H. B. Berkeley's recommendation of it in conjunction with the pyrogallol used in the ordinary development of gelatino-bromide plates.

There can be little doubt that pyrogallic acid—an extremely light substance and very easily blown about a room—is a dangerous article where sensitive plates are being used. It is also pretty certain that, while weighing a few grains of this light material is a great nuisance, guessing at the requisite quantity for a plate is an operation at once risky, inaccurate, and indicative of laziness. A freshly-opened bottle of pyro. is a very different affair to gauge by the eye from a bottle that has been open for some time; and one grain of pyro. more or less in an ounce of developer makes a serious difference in the qualities of a negative. Many a plate I have all but spoiled for want, or by excess, of a grain or two of pyro. For these reasons I deprecate what I must admit was at one time my own practice—the guessing at the quantity of pyro. used in the development of a plate. We must then fall back on a solution of pyro. in some proportion or other. Solutions of the reagent in question may certainly be made at the time and in the quantity required, but, as I said before, pyro. is not a nice substance to weigh more frequently than necessary. I never, when I can help it, use grain weights, and if a larger quantity be required (say fifty grains) the pans of an ordinary chemical balance are too small to carry such a bulk, and the flaky and expensive pyro. falls or is even wafted about the room. It remains, therefore, to make up a solution of pyrogallol more or less concentrated. But here arise other troubles consequent upon the nature of pyro. It rapidly oxidises, becomes coloured, and loses its reacting powers. Various have been the methods recommended and adopted to prevent this discolouration and loss of power, and to a few of these expedients I must now allude.

Not having at hand a file of The British Journal of Photography I cannot guarantee that I shall give the various means used to preserve the pyro. in their chronological order. I shall take them as they occur to my memory. First, I recollect some person recommending and myself using a small quantity of citric acid added to the solution of pyro.; but I also remember that even with this addition strong solutions of pyro. kept only a short time in good condition, while weak solutions, though keeping the pyro. colourless by itself, immediately ceased their good offices when the ammonia was added to the pyro. to make the alkaline developer, and at the end of the operation of developing a landscape negative the plate was densely black either by transmitted or reflected light. As a result of this staining it was impossible to tell accurately what stage the development had reached; and, further, as a rule the negative when fixed was so stained as to require "clearing" with alum and acid to a very considerable degree. More than all this, the presence of acid in the pyro. solution inculcated an extra amount of ammonia to render the developer sufficiently alkaline to help the pyro. in its duty of reduction. With sulpho.-pyrogallol this last objection does, I admit, appear to hold good also, but to a much less extent, according to my experience.

Another custom I remember was that of making a strong solution of the pyro. in strong or even absolute alcohol. This kept the pyro. in good order so long as there was no ammonia present, but on the addition of ammonia the same drawback appeared as in the citric acid case—the complete staining of both solution and film—and, what was quite as serious, the plate required far more washing after development. Anyone who has travelled and developed negatives *en route* as I have understands the frequent trouble consequent upon a necessity for prolonged washing at any stage of the proceedings.

Then we had the pyro. dissolved with alcohol and glycerine. I used this (Mr. Edwards's) system for a long time, and, indeed, stuck to it till what I considered, and still consider, a better method became known. *Why* the glycerine preserved the pyro. I never discovered; but it did preserve it fairly well for a long time. The glycerine, however, like the alcohol, entailed a washing—not, perhaps, formidable with a tap of water at home, but a nuisance for tent work, and a marked impediment in certain places, among which I may instance Venice.

I do not remember how I first came to use Mr. H. B. Berkeley's sodic sulphite formula, but since I began to work it I have never ceased to make it my standard developer. There have been times when I rejected it in the development of instantaneous negatives, because I had an idea that under-exposed plates gave more detail without its use; but I have long since recanted, and I am now aware that the appearances which led me to suspect it of retarding or impeding development were completely deceptive. In fact, if I did not habitually use sulpho.-pyrogallol for development I should use it for rapidly-exposed plates, for the simple reason that under prolonged development the plates will not stain with sulpho.-pyrogallol, while without it they would be very seriously stained.

The commonest indictment against sulpho.-pyrogallol is that it "slows development." I am not quite certain that it does prolong the operation; but admitting that it does—it can only be slightly—I deny that it in any way *prevents* it. I mean to say that all detail and density obtainable by any other method can be obtained with sulpho-pyro. The fact is the opponents of sulpho.-pyrogallol have mistaken its best quality for a great disadvantage. The point of all others that I like about the sulphite is that under its influence details and shadows remain to the very climax of development fairly visible, while with all the other processes the details and shadows—especially in landscape negatives—are all but homogeneous in appearance before the development can be called complete. I have always been an advocate for close examination of the progress of development. I like to see the gradual and subtle changes taking place all over the plate. With sulpho.-pyrogallol my wishes are fulfilled; with other developers I may stare my eyes out of my head at what seems a black curtain being drawn over the stage on which I wish and require to study the figures. This, then, I submit to be the prime advantage of sulpho.-pyrogallol in the developer—even on a fully-developed plate I can examine *almost* every detail. Other preservatives of pyro. may—though I think they do not—rival sulphite in their preserving powers of pyro. without ammonia, but once mix ammonia with them and staining starts and proceeds to "outer darkness."

This fact entails another advantage of some consequence to the impecunious or lazy: the same solution of sulpho.-pyrogallol will develope negative after negative. The ammonia may be reinforced from time to time, but the solution will keep wonderfully clear for I don't know how long. I have now some sulpho.-pyrogallol solution that developed three plates at least eighteen months ago, and it is clearer than an ordinary pyrogallol solution ten minutes after ammonia has been added. Those who allege that sulphite slows development ought to remember that development must not reach *apparently* the same stage with the sulphite as without it.

A cry I frequently hear, but never yet understood, is—"the appearance of a wet plate." This similarity to a wet plate probably consists in the colour of the metallic deposit constituting the image in a negative; sulpho.-pyrogallol produces this similarity to a marked degree. What I consider *the* greatest defect in gelatino-bromide plates is want of detail in the high lights, which is mainly due to the dense black colour of the deposit in these high lights. This density is partially obviated by the use of sulpho.-pyrogallol, and hence arises one similarity to a good feature of wet-plate negatives. But the weak point of collodion negatives and the strong point of gelatine ones is certainly detail in the shadows, and, in this matter, plates developed with sulpho.-pyrogallol do certainly not resemble wet plates. My favourite developer answers the cry I have mentioned so far as it ought, but fails to apply to the undesirable qualities of the vaunted collodion.

I have said that a sulpho.-pyrogallol solution *plus* ammonia having developed three plates has kept well for eighteen months, so I need not say that its keeping qualities are almost infinite when isolated from temptations to go astray from the path of purity. Sulpho.-pyrogallol, whether bought from the originator or made by myself, keeps far better than any other solution I ever made or saw.

I care nothing in what proportions a person keeps his chemicals dissolved, provided he knows precisely what his proportions are, and has to extract a required quantity of the chemical in solution; but I cannot suggest a more convenient proportion than the ten-per-cent. solution recommended by Mr. Berkeley. For that reason I prepare any solution exactly in those proportions. I can conceive nothing more easy to remember or more simple to act upon than "ten drops equal one grain."

Lately I have been repeatedly asked to give my formula for the preparation of this sulpho.-pyrogallol. It is simply Mr. Berkeley's formula, which can be found in the last ALMANAC, and I never gave a formula with greater pleasure or more confidence; when once fairly tried it will be constantly used. I take four ounces of sodic sulphite, and I "see that I get it." It is a white crystal, and when washed leaves a very nasty sulphurous taste on the palate for a long time. It can be purchased for sixpence per pound, but I will not answer for it. I always use Hopkin and Williams's at two shillings per pound. The four ounces I dissolve in about six ounces of water. I am told Mr. Berkeley does not like the water to be hot; I make mine boil and find no harm. In a test tube I make about three drachms of saturated citric acid solution also hot, and I pour into the sulphite solution about a drachm of the citric acid solution to begin with. I then stir well and test with *good* test papers—one red and the other dark blue. (Pale blue is not to be trusted.) I add, by about twenty to ten drops at a time, citric acid until, first, alkalinity disappears, and then a slight acid reaction on the good litmus-paper appears. The solution must be very thoroughly stirred after each addition of acid, and, finally, the whole solution must be distinctly, but not largely, acid. The success of the operation depends on the solution being acid. If too acid it neutralises the ammonia in development; if alkaline the whole, or a great part, of the advantage is lost. When cold I again test, and if correct, I make up to ten ounces, pour the lot into a bottle of pyro., filter, &c., and the operation is complete. Label "Sulpho.-pyrogallol, ten drops = 1 grain pyro." Date your label, and, keeping a little of your solution, examine your sulpho.-pyrogallol a year from date, and "report progress." If you are satisfied, thank Mr. Berkeley and not the writer.

ANDREW PRINGLE.

STANNOTYPE.

No. IX.

WE have now arrived at the stage at which the relief, so far as its photographic manipulations are concerned, may be considered as finished, the only remaining operations being the removal of chance defects and the facing with tinfoil to fit the mould for printing purposes. Neither of these operations should be attempted until, as directed in the last chapter, the relief has been completely desiccated.

The process of removing defects from the relief or retouching is a very simple one, and the results attainable by its means are of a character unattainable by any other method. For instance: a cracked, broken, or badly-scratched negative may be made to yield prints in which the faults of the negative are absolutely undetectable, and this in the simplest manner possible. It consists, briefly, in removing, by a sort of planing process, the inequalities in the relief which represent the defects. This is effected by means of a strip of glass about half-an-inch wide, with a clean cut fracture, which is applied at a very oblique angle with a half-cutting, half-scraping, action to the parts to be removed.

This method is clearly only applicable to one class of defects, namely, such as are in *relief* in the stannotype mould, and would appear white in the print. It is, therefore, necessary to make special preparation of a negative which contains blemishes both of a transparent and opaque character. The former must, in fact, be converted into the latter by painting out in the negative so as to be represented as white or transparent markings in the intermediate transparency. The opaque defects, such as spots or stains, require no treatment at this stage.

Let us take as an example a broken negative which is also badly scratched. The example we have in view is one actually shown to us by Mr. Woodbury. The broken pieces are first of all placed together and cemented to an extra glass, the junction being painted over with opaque colour to form an even line free from irregularities caused by diffraction from the broken edges. In the same manner the scratches are also carefully gone over in order to render them opaque. The positive produced from such a negative presents anything but a sightly appearance; however, that is of little consequence. The relief represents all the defects as black lines, which, by means of the strip of glass, are gradually planed down to the general level.

Until this operation has been witnessed the ease and certainty with which it is performed and also the rapidity are incredible, and the results are such as it would be practically impossible to attain with any amount of care and skill by other means. The negative to which we have referred above is one many years' old, which has apparently been knocked about amongst dirty glass until it had become apparently hopelessly scratched and finally broken; and yet the prints show no vestige of a defect of any sort. This is an extreme case, that would probably not be mastered on a first or second attempt; but very little practice will enable the careful operator to treat any ordinary cases with perfect success.

It may be asked—Why go to the trouble of blocking out transparent defects in the negative, when, if left alone, they might be removed from the *transparency* in the same manner as opaque ones from the relief? The reason is that, though the removal of the defects from the transparency is perfectly easy so far as the *relief* is concerned, yet the abrasion of the surface leaves the gelatine partially opaque, and in printing the blemishes are reproduced with all the force of the original. This semi-opacity is, of course, present under similar conditions in the relief, where, however, it is of no consequence whatever.

The defects having been carefully removed, it only now remains to "surface" the mould, which is effected by cementing to it in intimate contact a sheet of tinfoil. The first step towards this end consists in applying a thin coating of adhesive material to cause the tinfoil to adhere to the gelatine surface. Supposing the relief itself to be perfectly sharp—that is to say, to possess the greatest degree of sharpness it is possible to secure—it will be plain that every addition to its original surface, whether of varnish or tinfoil, must necessarily detract more or less from that perfection of minuteness in detail. Hence it is important that the film of adhesive material be as thin as possible.

The best material for the purpose is pure india-rubber dissolved in chloroform to the strength of about one or two grains to the ounce. Chloroform makes a better solvent than benzole; it dries more rapidly, gives greater adhesion, and is more likely to be free from grease. This solution is applied to the plate in the same manner as collodion, the surplus being returned to a separate bottle to be filtered before again being used. The plate is then set on one side for ten minutes or a-quarter of an hour, or until it has become quite dry and only presents the slightest possible "tackiness," like a newly-cut surface of india-rubber. A brush dipped in a much stronger solution of india-rubber is then passed round the edges as an extra safeguard, and the mould is ready for the tinfoil.

This must be perfectly smooth and free from holes, and should be as thin as possible consistently with the amount of usage the surface will have to undergo. As has been pointed out, every interference with the original surface of the mould reduces its sharpness to some extent, and, clearly, the thicker the tinfoil the greater must be the loss of sharpness. Where, therefore, but a few prints are required, a thin tinfoil may be used; but when a larger number are wanted a stouter and more durable surface must be provided. Tinfoil faced with steel is supplied for this purpose, and possesses far greater durability in proportion to its thickness than tinfoil alone.

The foil, having been cut to the size of the relief, is smoothed out on a sheet of glass by means of a pad of velvet on a soft hat brush. Examine it against the light in order to be assured that there are no flaws or holes in it. These, by admitting moisture from the ink in printing, would produce white marks in the print from swelling of the gelatine relief.

In order to secure perfect contact between the tinfoil and the gelatine surface a considerable degree of pressure is necessary. The best method of securing this is by means of an ordinary domestic wringing-machine with rubber rollers, which, with slight modification, answers every requirement. The modification necessary consists in an arrangement by which the rollers can be drawn apart so as to admit of the relief, with the tinfoil in contact, being passed in between them without touching. The rollers are then brought together in the centre of the plate, and, suitable pressure having been applied by means of the screw, a backwards and forwards motion of the rollers is given, extending gradually from the centre of the plate to the edges. In this manner all air is driven out from between the tinfoil and the relief, and the most perfect contact secured.

Where the double-roller arrangement is not available, a hand-roller, like a printers' inking-roller, may be used as a substitute, but the results are not so good. Direct pressure in a screw press with a sheet of soft india-rubber and a thickness or two of felt laid over the tinfoil also answers tolerably well; but the double-roller is both simpler and more perfect in its results.

After leaving the surfacing machine the relief is ready for printing from, which operation will be dealt with in another chapter.

ILLUMINATION OF THE DARK ROOM, AND SOME OPTICAL EXPERIMENTS.

[A communication to the Photographic Society of Great Britain.]

In turning over some old specifications of patents I came across one by Claudet, in 1844, in part of which he says:—"The fifth and last improvement consists in performing all the operations (of taking a daguerreotype) upon the plates, which were formerly carried out in the dark—now in a room lighted through media of various colours; but red I prefer, which, having very little effect upon the plates covered with the sensitive coating, allows the operator to see how to perform the work without being obliged, as before, to remain in a dark room." I suppose, then, we may conclude Claudet was the first to use any light whatever in the early days of photography. Forty years later we still had the subject of illuminating the dark room occupying our attention, though I had thought that the question as to which light was the best and safest had been pretty well settled. The subject of the canary medium has, however, revived; and, like others, I have examined its qualities.

At the January monthly technical meeting of the Society I brought some samples of what I supposed to be canary medium, and showed the results I had obtained with it. The canary medium that I had manufactured was made by emulsifying chromate of lead in gelatine by means of the double decomposition of acetate of lead and bichromate of potash, and applying it to glass and paper. I also soaked paper in acetate of lead and then in bichromate of potash, and got a very good imitation of the canary medium. The results were not satisfactory. With three gelatinised glasses in front of the negative, in three and a-half minutes I was able to obtain a fully-exposed transparency, whilst, with the paper in a lantern, two thicknesses of same paper impregnated with the lead chromate enabled me to get a transparency in three minutes, the source of light in the lantern being a candle and the negative placed a foot from it. The illumination was brilliant—much more so than when I used the common orange packing-paper, which I show. With the orange paper, after five minutes' exposure, I got the very faintest trace of an image.

So far, then, my test went to prove the superiority of the orange paper. After I had made my remarks at our monthly technical meeting, Messrs. Scorah and Co., of Bradford, kindly sent me a sample of the true canary medium, and with this I have experimented. The paper you will notice is thick—I may say very thick—much thicker, indeed, than the orange paper. Now, about the illuminating value of the two:—I show a lantern in which we have one side formed of a square of canary medium, another of a square of orange paper, and the third side a square of stained red glass, of which I shall have to speak by-and-by. I think that the members of the Society will agree with me in saying that of the two paper panes the orange is the more brilliant. Now, appearances may be deceptive, of course; so, to avoid all cavil, I made photometric tests of the two. The candle being lighted, a piece of printed matter was held in a vertical plane. The eye was kept at a fixed distance from the paper and the lantern moved till the letters of the words could not be distinguished. In the case of the canary medium I found that at two feet and a-half inch the letters first became confused, whilst at two feet six and a-half inches they became confused when the orange light was tested. Though not absolutely exact, the relative intensities of illumination may be taken as the squares of the distances, which would make them about as sixteen to twenty-five, or the orange paper had one and a-half times as much illuminating power as the canary medium. Testing the stained red glass, I found that the light had to be moved to four feet four inches distance, or was four and a-half times more luminous than the canary medium. Thus, the illuminating values of the three were about as follow:—

Canary.	Orange paper.	Stained red.
1	1½	4½

To further test this matter, closely-ruled black lines, on a white ground, about one-fiftieth of an inch apart, were taken and placed at six feet distance from a small observing telescope, and the lights moved as before. In the case of the canary medium the lamp had to be moved three feet two inches from the ruling, the orange four feet one inch, and the stained red six feet seven inches. These were all the mean and three closely-accordant readings. This gave the relative illuminations as—

Canary.	Orange paper.	Stained red glass.
1	1·63	4·32

The reading test and the more accurate test, here adopted, are closely accordant in every way. In fact, this is very much the plan that is adopted for star magnitudes, though in this case the surface of the object-glass is diminished by diaphragms, instead of the stars themselves being deprived of luminosity.

So much for my own readings. It seemed that it would be curious to note any differences in individual eyesight as to the intensity of colour in these media, and yesterday I had the good fortune to secure Mr. C. Ray Woods as an observer, and later Mr. Cadett. In this case the experiment had to be slightly varied, from my dark room being only partially available, and the light and the eye were kept in a constant position, whilst the ruled lines above mentioned were moved to and from the observer. The following table gives the result of the comparison of Mr. Woods's eyesight for colour with that of my own:—

	Mr. Woods.			Captain Abney.		
	First Experi.	Second Experi.	Mean.	First Experi.	Second Experi.	Mean.
Canary paper ..	1·00	1·00	1·00	1·00	1·00	1·00
Orange paper ..	1·87	1·86	1·86	1·51	1·44	1·47
Stained red glass..	5·14	4·76	4·90	3·00	3·12	3·06

To sum up: Mr. Woods made the illuminating powers 1, 1·86, and 4·90; whilst I made mine 1, 1·47, and 3·06. It will thus be seen that as the green was cut off, so Mr. Woods's vision became more acute than mine.

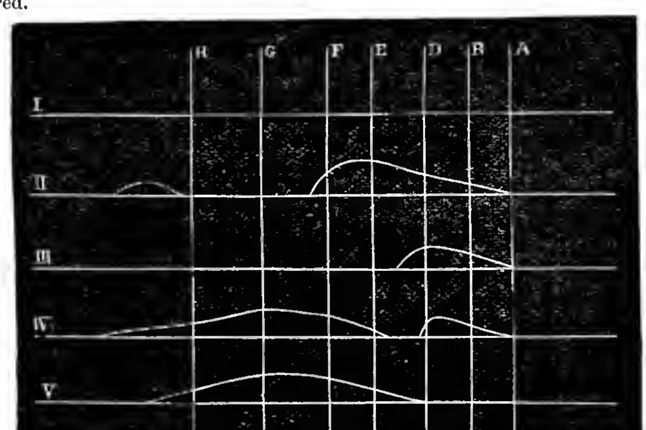
Mr. Cadett's figures were again different to mine; and here I must interpolate that I have never met with a more exact observer. His observations did not vary more than a-quarter of an inch on each side of the mean. His reduced readings were 1, 1·39, and 2·70. We see, therefore, that his eyes are less susceptible to red rays than mine, and still less so than Mr. Woods's. This last method of testing is inexact, of course, and cannot be compared for accuracy with that of the fixed lines and telescope, and apparently the results do not accord. I think, however, it will be seen that the want of accordance is more apparent than real. Taking my own observations of printed matter for instance: when the printed matter was moved, the distances, in the last experiments, from the eye (not from the light) were twenty-one inches, twenty-four inches, and thirty inches.

The angles subtended by the writing at the three distances would be inversely as the distance, and the confusion of lines would be sooner arrived at than if they always subtended the same angle, as was the case in the first experiment. To make the two readings comparable one with the other—the orange paper and stained glass readings—the last experiments must be multiplied by $\frac{34}{21}$ and $\frac{90}{21}$ respectively. This would give the reduced readings as 1, 1·63, and 4·37, which is very nearly the same as 1, 1·69, and 4·32, which were the figures of the telescope reading. However, one thing has been apparently proved—that the eyes of three persons chosen at random are not equally sensitive to the red rays. Mr. Woods informs me that he can scarcely see H and K in the extreme violet limit of the spectrum; whilst I can see not only H and K, but L, and, in bright light, M as well. It seems then as if there were in his case a general lowering of sensibility and wave-length. I have not taken into account colour-blind people. This I may deal with at some subsequent period.

I may remark that with a sheet of white tissue paper in front of the glass the figures came out as—

Canary.	Orange.	Stained red, with tissue.	Stained red, bare.
1	1·63	2·93	4·37

By means of the pocket spectroscope it was possible, by placing two pieces of paper alongside one another in the lantern, to examine their absorption spectra comparatively. The result showed that the red and yellow of the canary medium were decidedly fainter than in the orange paper, whilst in the former appeared more green and a little blue. *Primâ facie*, then, the orange should be the best medium to use for photographic purposes. So far, we have had merely a theoretical test for the chemical value; the question is, what is the practical one? A plate was exposed behind a negative with a piece of orange paper across one half, and a piece of canary medium across the other, with the result that, after one and a-half minute's exposure to candle power two feet off, there were traces of an image through both, the two being nearly alike. Perhaps the orange paper had a little the best of it. Behind the stained red glass not a trace of an image appeared with the same exposure. Thus, then, the practical test leads to this conclusion, namely, that of the three media stained red glass is the best, both as for illumination and want of effect on a plate, whilst the canary and orange papers acted alike as to their effect on the plate; but the illumination was fifty per cent. in favour of the latter. I must confess that the canary medium behaved much better than I expected in candle-light. I may add that with daylight it is not such a good protection as the orange paper. Stained red glass behaves better than either of these two; and when I say stained red, I do not mean orange or flashed silver glass, which is often spoken of as stained red.



Ultra-violet Violet Blue. Green. Orange. Red. Ultra-red.

I have to lay before the meeting a photograph of the absorption spectra of different glasses, taken by the electric light. The first plate shows—

1. Chromate of lead.
2. Orange glass.
3. Stained red.
4. Flashed ruby.
5. Green glass.
6. Green glass and chromate.
7. Green glass and ruby.

Another plate I show is the same as the first, with the exception that it was taken with a candle as the source of illumination, and that in No. 4 a very deep ruby flashed on two sides was used, and for No. 7 cobalt glass and ruby superposed were spectroscoped.

The orange glass lets through the ultra-violet with the electric light, but does not do so with the candle, as there are few ultra-violet rays in its light. The ruby glass lets through the green and blue in both cases. In the second plate the impression made by these colours is only faint, but still it is there; and when it is recollected that the two minutes' exposure was given to a slice of light $\frac{1}{200}$ inch broad, spread out into a spectrum four inches long, and that an impression was made by it on a seositive plate, it will readily be seen that two minutes' exposure to undispersed light would make a far greater impression.

The use of green glass is not to be recommended, since it only cuts off red rays, which are comparatively harmless, and materially diminishes the light. In regard to canary medium, it is, I should say, paper impregnated with chromate of lead. It must be recollected, however, that chrome yellows are of different tints. Thus, ordinary chromate of lead can be altered in tint by the addition of nitric acid, and much deepened in colour. It may be, perhaps, advantageous to use such a deepened colour; but as to this I speak with some hesitation, since my experiments in this direction have been very meagre. Let me, in conclusion, say that I have no bias one way or another, and that I should not hesitate to use canary medium of such a quality as has been sent to me in the development of plates. At the same time, I should not care to expose very sensitive plates long to the light coming through it, since I should expect disaster. The point is to use the *safest* light possible—for no light is absolutely safe—and to use the greatest quantity of it within the margin of safety. This was a point laid down by one of the speakers at the January technical meeting, and cannot be too much insisted upon. W. DE W. ABNEY, F.R.S.

LECTURES AT THE ROYAL INSTITUTION.

PHOTOGRAPHIC ACTION.

THE lecturer commenced, on Saturday last, by explaining how it was the vibrations given to the sensitive salt of silver were not visible in the same manner as those in the phosphorescent material. In order to create visibility these two factors were necessary—1. Large amplitude of vibration. 2. An appreciable time. In the case of the sensitive salt the time factor was absent, since the swing of the atoms caused them to separate almost immediately from the molecule. After alluding to the increase of phosphorescence by the application of heat to a phosphorescent plate, and its decrease by the application of a cold body, such as ice, Captain Abney went on to show that precisely the same phenomena were to be found with a sensitive salt of silver. Taking a hot flat iron, which he was apparently just able to touch with comfort, he placed it against the back of a bromide dry plate, and whilst still hot he exposed the latter to light for a brief period and then developed it.

Whilst the greatest part of the plate showed want of exposure the part which had been heated by the flat iron was fully impressed by the light, and a distinct image of the iron was shown. It was pointed out that the application of cold acted in precisely the contrary way, the image of a piece of ice being shown by diminished sensitiveness of those parts which had been in contact with the ice. In both cases the application was made to the back of the plate. It was stated that this action was only transient and did not indicate a permanent change in the molecular state of the sensitive salt, since, if the same process were gone through, and the plates allowed to regain the temperature of the air before exposure to light, no traces of the cold or hot body would be seen on development. This struck us as novel, and we shall probably hear more about the subject outside the Royal Institution, since a reference was made to the fact that it was a phenomenon of practical importance to photographers. An allusion was then made to the probability of a connection between the above described experiments and the shearing stress caused by writing on a sensitive plate.

The next part of the lecture was devoted to the enunciation of the absorption of radiation, and the work performed on the molecules when such absorption took place. The lecturer seemed to think that the heating effect of a body was chiefly confined to causing increased vibration in the molecules where the chemical action was due to the increased vibration of the atoms. The relation of absorption to chemical action was illustrated by spectra taken and developed on the chloride, iodide, and bromide of silver, all of which experiments were successfully carried out. The absorption was illustrated by passing the different films through the spectrum. The connection of absorption and chemical action were further exemplified by comparing the absorption of bichromate of potash, perchloride of iron, and nitrate of uranium in the spectrum with the work performed on them, as shown in the spectra they impressed. The penetration of actinic rays through yellow glass was also shown by direct experiment, allusion being made to an experiment that had failed in a former lecture from that reason.

The different molecular states of bromide were next shown on the screen, an orange, violet, blue, and sap green form being well seen. The lecturer then proceeded to demonstrate why the green bromide should be most sensitive to the ultra-reds, since it absorbed them more completely than did the blue form. A spectrum on paper coated with this kind of emulsion was then taken through ruby glass, the whole of the red end and some of the ultra-red being developed before the audience. A photograph of the carbon points of the electric light were taken through a thickish piece of ebonite, which concluded the experiments.

The lecturer finally called attention to a diagram which showed that the sensitive salts of silver he used had undoubtedly maxima in two localities of the spectrum—one in the blue, and the other an octave below that which lay in the ultra-red.

MISCELLANEOUS SUBJECTS.

So many subjects reappear for consideration again and again before the English photographic societies, it may be useful to point out that one of the utmost practical value is comparatively unworked, namely—

The Influences Affecting True Gradation in Negatives.

Two principal factors will enter into the examination—1. The character and make of the plates. 2. The nature of the subjects and light, these latter being the minor considerations. In England true gradation can be better judged by portraiture than by landscape operations, but in certain localities abroad the difference disappears. When mountains far in the distance, more or less covered with snow, come into the picture the view within a few miles of the camera may be all right; yet the magnificent background may be blotted out entirely if it be more than a few miles distant. The background is then as difficult to catch efficiently in bright sunshine as are natural clouds with the exposure necessary for normal slow landscape plates. Now that commercial plates are improving in uniformity, in being cut to proper size and in absence of elements of spottedness, simple and scientific tests as to their relative power of yielding true gradation, and, if they do not, tests as to *why* they do not, are more wanted than anything else.

Will you allow me to put another than the sulphite-of-soda question to Mr. B. J. Edwards, in whom I have strong confidence, although till your promised exact experiments are produced he has not persuaded me from using the soda salt, perhaps because he printed no comparative way of proving his point. He has published that after fixing a negative in hyposulphite of soda it should not be held up for examination, as the delay may cause stains, but that it should be washed at once. These stains I have never been able to see. Is that because of my use of the sulphite of soda developer?

Recently I corroborated Mr. W. Brooks about the economical advantage of using the pyrogallic-sulphite developer over and over again. Since this corroboration I have been using gelatino-bromide plates extensively for transparencies, because local Swiss photographers do not copy my negatives quickly enough on paper to get off copies expeditiously to London newspapers. Such transparency work shows small differences in the developer much more perceptibly than does negative-developing work. I now find the second use of the developer to give more veil, to lower the intensity, and to prolong the time of appearance of the image. This may be to some extent remedied by the addition of a few drops more pyrogallol and ammonia; but I now never adopt the plan of using the developer a second time when seeking for the very highest results. If a picture I do not much care about has to be developed—such as one containing some additional pictorial details on a larger scale, specially taken merely to guide the engravers—I use the developer a second time, but not to bring out a valuable negative for permanent use. The small economy does not warrant such risk. These objections may possibly be hereafter overcome for first-rate work, but meanwhile the utilisation of the old pyrogallol developer is a subject which requires working out. One use for it is to pour it into old fixing solutions to throw down the silver by long action thereupon.

Wrong speculative ideas may influence large numbers of men for years to their injury, as in the long time during which developing-room operators have been ruining their eyesight in the fetish worship of ruby light. Another species of fetish worship is probably the objection to the addition of the bromide retarder to the pyrogallic acid and soaking the film with the mixture before applying ammonia to the plate. It is known that strong bromide will efface the invisible image; but in the developer the bromide is infinitely weak, and that weakness is further reduced, if not quite counterbalanced, by the developing power of plain pyrogallol. There is a great advantage in pouring these two on the dry film first. The first liquids applied rapidly penetrate the dry, spongy layer, and ammonia is not long in following them, because it is volatile, in which respect it has an advantage over the new potash accelerator. Thus, good fresh developer attacks all depths of the film, which is not the case with the usual method of operating. The advantageous results have so far been to me practically evident in clean, brilliant images and good intensity. When ammonia and bromide are applied together after the film has been soaked there is not alone slowness in the penetration of the sponge by both, but a layer of decomposed, discoloured, and comparatively inert pyrogallol lies between the bottom and top of the sponge, through which the latest chemical additions have to work their way, and probably the ammonia gets through faster than its companion, which separation does not conduce to brilliancy.

Harrison's Theory of the Nature of Gelatine.

Sooner or later I think that gelatine films will have to be supplanted by our old friend, collodion. From a year's series of industrious experiments—not yet available for publication because they are connected with patents—I came to the conclusion that gelatine, like starch, consists chiefly of organic vesicles, and that the same is the case with collodion and gluten; in short, that in photographic films we are dealing with an infinity of what may be called "bladders," more or less filled with organic matter. Here the word "less" more especially applies to collodion, the vesicles of the cellulose having become hardened, dried, and cemented together with resinous coatings, which coatings are softened or dissolved by the acids in the manufacture of pyroxyline, thereby destroying the fibrous texture. If too much action of the acids be imparted the vesicles themselves get destroyed, hence one necessity for carefully regulating times and temperatures when making pyroxyline. To apply these principles to that exceptionally-valuable and closely-reasoned scientific article recently published in these pages by Dr. Vogel, I would suggest his repetition of his experiments by adding various kinds of organic matter to his alcohol before precipitating the silver therein. The specific gravity of the liquid in which the precipitation takes place seems also to have to do with sensitiveness; for in making ordinary gelatino-bromide emulsions the extra concentration of the watery solution in which the precipitation takes place is experimentally proved to increase sensitiveness. It is possible that Dr. Vogel's results were partly due to the specific gravity of the liquid as well as to its chemical nature. Would air or vapour pressure on the surface of the liquid, mechanically applied at the time of precipitation of the silver salt, affect the results? Agar-agar and seaweed gelatines, with which I have experimented for months over other than photographic researches, I believe to be scarcely anything but washed-out vesicles, and think that by adding organic matter to them they may be made to substitute animal gelatine in ordinary plates with very great economy.

As to the best kind of organic addition, that is a point for experiment; but such as Hardwich added to collodion at times and such as were found useful in old dry-plate processes, might be first tried, on the presumption that their use is already backed by a certain amount of practical experience. On this theory, gelatine from different animals consists of different forms of vesicles—differently more or less loaded with organic matter; hence there was much reason in a suggestion a medical man once made to some Scotch photographic society that the photographic properties of the gelatines of various animals—the sheep, rat, horse, pig, and dog, for instance—should be separately tried for dry plates to ascertain their relative properties. What is wanted is to reduce the sponginess of the film, and to increase its quickness of permeability by liquids, without sacrificing any good photographic qualities.

In what has been said herein, of course I know that vesicles are "organic matter," but in a very stable state. By the addition to them of organic matter is meant more unstable animal or vegetable compounds richer (say) in nitrogen. It may also be objected that the vesicles of starch can be seen under the microscope. I know that those of gelatine cannot, but possess strong experimental presumptive evidence that they are present.

The solvents of the colloids I think to act by being solvents of the coatings of the vesicles. Fibrous cellulose is recognised by chemists to be accompanied by hardened resinous matter which it is difficult to separate. My conclusion follows that pyroxyline is, therefore, naturally soluble in ether and alcohol, after the resinous matter has been partly broken down chemically by acids. Gelatine requires warm water to dissolve it. If it be long boiled its setting power is destroyed; in other words, the skins of the vesicles are more or less destroyed, but the chemical composition of the liquid remains the same. Ammoniacal solution of oxide of copper is a most remarkable solvent of the coating of cellulose vesicles; hence its use in limited quantity in making Willesden paper.

Green Light in the Developing-Room.

That those speakers were in error who, at the last meeting of the Photographic Society of Great Britain, made utterances against the value of green screens for light in the developing-room, can be proved experimentally by making a polychromatic negative, as recently described in these pages, with a variety of pairs of green tissue paper. Some of the superimposed greens will be found to print through freely upon gelatine plates; others will be found to stop photographic action as well as Mr. Debenham's green and yellow. Had his combination given a perceptibly yellow or red light, "hot" to the eyes, which it does not, I should now be using a green light exclusively. When doctors supply eye-shades to persons with weak eyes, they would be thought mad if they coloured them ruby or yellow, so black or green are the colours always chosen. It would be bad for the eyes if fields and forests were of a burning red or bright yellow colour, and this is the strongest argument for the use of green. A proper green can be found and used with safety and advantage in the developing-room, if moderate artificial light (I have no experience as to daylight) be used as the original source of illumination, and the earlier parts of the development be conducted not too close to the screen, which should always be at a low elevation in relation to the surface of the plate. Unless the paper screens, tested spectroscopically, be of equal thickness and transparency and amount of staining, comparative experiments are vitiated in scientific value as to the practical utility of different colours. Plates can be developed in safety with any tolerably non-actinic, translucent (not transparent) screen, whatever its colour, if the operator be but careful at what distance and elevation he works from it, so he may as well use a colour good for the eyes. I develope Monckhoven's plates with sulpho-pyrogallol in a good light, without fog, and easily see upon lifting the plate when it is developed to the right intensity, so that after-intensification is never necessary. The question of distance is of more importance than that of colour, and the advantage of a green screen in abolishing light hot to the eyes is beyond doubt to those who try it practically. The error about green light is worth correcting, because it may help to save men from injuring their eyes unnecessarily.

Dry Plates in Switzerland.

The Editors ask for information about English sizes of dry plates in Switzerland. Dr. Monckhoven keeps the English half-plate sizes (perhaps others), at local prices, on sale by his agent in Geneva; with this exception I believe that no plates cut to fit English cameras are on sale in Switzerland. The delays, expenses, and way in which plates ordered from England are spoilt by light admitted by custom-house officers are something awful—in fact, prohibitory. Several English makers sell plates on the continent, but in nearly every case cut only to the sizes used in foreign cameras. W. H. Harrison.

Lucerne, Switzerland, March 18, 1884.

A SUMMER HOLIDAY.

[Abstract of a communication to the Manchester Photographic Society.]

On a Friday night in July, two summers ago, I was deliberating on the wisdom or otherwise of going alone to Switzerland on a tour which I had planned out. I had packed most of my requirements, and, although anxious to go, still I did not relish the idea of solitude, when fortune favoured me in the person of a friend who consented to accompany me on twenty-four hours' notice. It was a great risk going such a long journey with an untried companion for the first time, as I do not think anything tries a friend more than travelling and living together; but, I am proud to say, my friend proved to be the most pleasant companion it was ever the lot of any one to have. Our "out" was the means of forming a deep attachment to each other, which only ended by his lamentable death from an accident.

My apparatus consisted of a Rouch's whole-plate camera, three double backs; Ross's rapid symmetrical lens, eleven-inch focus; Dallmeyer's rapid rectilinear, eight and a-quarter-inch focus; Dallmeyer's $7\frac{1}{4} \times 4\frac{1}{2}$ W. A. P. landscape lens; a Rouch's folding stand, a good supply of Swan's plates, and our esteemed President's collodio-albumen plates. I may here say that during the whole of my travels I have never had the least difficulty with regard to passing the customs with my photographic kit. The moment I get to the examination room I immediately open my kit and portmanteau, courteously explain that it is a photographic apparatus, that I photograph for pleasure, offer to show the contents, and never, in the course of my experience, have I had any further prying, but have passed on at once. The customs officers have a very disagreeable duty to perform, and they can make that duty a very unpleasant one for any shortcomings of courtesy or *hauteur* shown.

We started on the Saturday night with light hearts by the 11 p.m. train for London, and were soon quickly speeding away through the semi-darkness of a summer night. We arrived in the metropolis too early—aye, and had to leave too early—for any chance of a breakfast; so, having two hours to spare, we whiled away the time by taking a walk along the Thames embankment, where many a shocking sight presented itself of the wretchedness of men, women, and children asleep on the seats as we strolled along that beautiful summer morn. Unfortunately I had left my camera at the station, or I should certainly have been tempted to depict this sad state of human existence.

We left about ten o'clock for Dover, and on the steamer we did get something to eat, having fasted nearly sixteen hours. A short, smooth passage, and we were at Calais. There was no time to spare; we started again, through the flat and dreary landscapes of France. A little more patience, and we were at Paris. *Anglais!* the magic word sent us through the customs without trouble. We stayed in Paris until next day, as we thought it better to break the journey there, our next stopping-place being Geneva. Having decided to go by the night mail, we started by the train from the Gare de Lyon about 8 p.m. for Switzerland.

Geneva is the richest and most populous town in Switzerland, and abounds with lovely views, both lake and architecture. The banks of the Rhone are flanked with broad quays and substantial buildings; but the interior has a corresponding effect, the streets with few exceptions being narrow, steep, and crooked. Between the Pont du Mont Blanc and the Pont du Bergues is Rosseau's Island. In the centre stands the bronze statue of the wild, self-torturing sophist himself (by Praden, in 1834). The national monument also is good, and the Duke gorgeous. They are both well worth a plate or two being exposed on them.

Next morning saw us loading a *voiture* (the driver of which looked like a brigand's apprentice, but turned out a very jolly fellow) with our baggage and selves for Chamounix, *viâ* Bonneville Cluses, St. Martin, and Sallanches. The road traverses the new village of Chêne. A few miles further on the scenery becomes more picturesque. Near Bonneville, on the right bank of the Arve, stands a monument to the natives of the department who fell in the campaign of 1870-71; and on the left, 100 feet high, another to the memory of King Charles Felix of Sardinia. Cluses, the next small town, is chiefly inhabited by watchmakers.

The hills here begin to assume the stupendous height and size which so thoroughly defy the traveller to judge distances in this part of the world. The road traverses a district devastated by mud and detritus. At the village of St. Martin we suddenly obtain a magnificent view of Mont Blanc, and though its white and solemn peaks rise majestically into the heavens it is no less than twelve miles distant in a straight line, and seems almost to convey the idea that there is no world beyond. A collodio-albumen plate was exposed here from the bridge, which turned out a very fair negative. Passing onwards through Sallanches we came to the small but popular watering-place of St. Gervais-le-Bains, situated in the wooded ravine of Montjoie. The building is something after the Chinese pagoda style, and I exposed a plate on it with success. As we drove along the glaciers were now visible; but, owing to the vastness of the mountains in which they are framed, it is impossible at first to realise their extent.

At last we arrived at Chamounix, where the hospitable and attentive landlord of the Hotel de Londres received us as brothers and immediately had us ushered up to our bedroom, a metal plate on the door of which bore an inscription to the effect that it had been occupied by Albert Smith, whose famous caricatures of the "Ascent of Mont Blanc" were so famous. Of course this was too good a chance to be missed, so I photographed Mont Blanc from the window. There was a large enclosed yard in front of the hotel, and this was filled with villagers waiting to see the diligences arrive or to hire themselves to excursionists for the morrow. The long porch of the hotel was populous with tourists, who sat under the vast, over-shadowing bulk of Mont Blanc and gossiped or meditated. Mont Blanc is 15,781 feet high. There was a red signal light glowing in the darkness of the mountain side, and it seemed but a trifling way up. That light was on the Grand Mulets, 10,000 feet high above the valley; but in the day-time, even, the foreshortening effect of the mountains create curious deceptions.

Next morning saw us off on mules to Montanvert for the Mer de Glace. From Montanvert we crossed the glacier in safety, but had many misgivings; the crevasses yawned deep and mysterious, and it made one nervous to traverse them. I gave the guide my apparatus to carry, whilst I made good use of the alpenstock, for the huge, round waves were slippery. It was a blazing hot day, and as we climbed along the moraine on the opposite side we could not help thinking that for *pleasure* it was pretty hard work. I exposed several plates on the glacier, also on two pretty waterfalls, and by-and-by came to the Mauvais Pas. It is a winding foot-path round a precipice, with nothing to hold on but some loose iron railing here and there plugged into the rock with wedges of wood, and perhaps 1,000 feet straight down. I got safely across, and wanted my friend to stand in the middle of the pass whilst I exposed a plate, but he declined. However, I made one exposure on it, when another party was coming over.

We now arrived at the Chapeau, where our mules (sent round from Montanvert) awaited us. Of course I had to mount, although I would have much preferred walking; for the mule in mountaineering will persist in walking on the very edge of the precipice. The habit is occasioned, I am told, by the mules carrying packages up the mountain passes, and they take the outer edge so that they can clear the mountain side without scrubbing the sides of their panniers. In a short time we arrived safely at our hotel, after being well shaken up by the mules, for their gait is neither a walk, nor a trot, nor a canter, nor a gallop, but a jogging, shuffling kind of gait which takes all the fun out of one. After that day's excursion I swore off mules, and have never crossed the back of one since.

We left next morning for Martigny by *voiture*. On our way we made a *detour* to the Cascade-de-Bêrard—a picturesque waterfall, in a wild district. Beyond Poyaz the road leads through a valley containing the church of Valorcine, which is protected from avalanches by a barrier of masonry. Pursuing our way we soon afterwards reached the famous rocks of the Tete-Noire. The scenery at this point is indescribably grand and beautiful, and two or three plates may be profitably employed. Proceeding on our journey by a good road we at length arrived at Martigny—a pretty village in the valley of the Rhone.

The next day was spent in visiting and photographing the Gorges-du-Durnant. It is a gorge through which the Durnant is precipitated in a succession of four cascades. It has been made accessible by means of a gallery 870 yards in length, and well repays a visit. The Gorge-du-Trient was another trip. The view is imposing—the rocks, 420 feet high, almost close in overhead, looking like a large cavern. I did not expose any plates here, as it would have required a long exposure and we had not the time to spare; but I often regretted that I came away without doing so, even had I been compelled to stay another day. Cretinism in its most repulsive form exists in this valley, and will ever be remembered by anyone who has seen it. From here we took train for Vernayaz, where we stayed the night, previously making arrangements for an early start next morning by *voiture*.

We left at 5.30 a.m. for Leuk, and soon reached Sierre—a small town situated on a height and commanded by a picturesque old castle. The valleys and mountains really repaid an early start. Just before arriving at Leuk we passed the curious little village of Albinen; it can only be reached by means of eight rude ladders attached to the perpendicular face of the rock, the descent of which is more difficult than the ascent. Shortly afterwards we arrived at Bad Leuk—a village composed principally of wooden houses. It is famous for its springs, twenty-two in number, chiefly beneficial in cases of cutaneous disease. The patients spend two or three hours at a time in the baths, which are something after the style of swimming-baths, and there are floating tables on which coffee and tea and other refreshments are placed.

The huge, perpendicular wall of the Gemmi here presents the appearance of inaccessibility. However, that was our route; so after making preparations and engaging a guide and mule for carrying our baggage, away we went, quite unconscious of the task before us, except we knew it was "a big walk." The road wound in corkscrew curves up the face of the colossal precipice—a narrow way, with always solid rock at one elbow and perpetual nothingness at the other, the upper part actually projecting at places beyond the lower. We met very few travellers, but we always took the inside, and flattened ourselves against the solid rock. Every few hundred yards, when we came to a bad place or sudden corner, there was a little protection by wooden rails.

When we had climbed two or three thousand feet, and looked for a last view of the place we had left, there was presented the charming view of the bright green level, with a pretty town in its midst, and a silvery stream winding amongst the meadows, its background of gigantic precipices clothed with pines, and above all the snowy domes and peaks of the Monte Rosa region. We were soon afterwards amongst the snow, enveloped in cloud and mist, and had to put on our waterproofs. Shortly afterwards we passed the Daubensee—a lake a mile and a-half in length, fed by the glacier waters, with no visible outlet, and generally frozen for seven months in the year. A short distance from here we reached the Schwarenbach, and pulled up for refreshment.

On our downward track, which now began, the path lay through a wild and uninteresting country, enlivened only by the pretty alpine flowers, which seem to grow at any height, until we reached the level of vegetation again. Now beauty after beauty began to be unfolded to our view in the most marvellous manner; and oh! for one half-hour without those fleecy clouds now below, then above, and again all round, dancing and drifting in most fantastic beauty, but never leaving us long enough to permit us to have a "shot." Every turn revealed a new and lovely scene; and, although the journey was long and hard enough to have satisfied a professional pedestrian, I can never forget how enjoyable it was, nor its ever-varying charms. The only view I did get was in one minute afterwards enveloped in cloud and thoroughly hid. However, all things end, and, after eight hours' walking, we reached Kandersteg, where we stayed for the night.

From Kandersteg we left next morning by *voiture* (there is no other method of escape), and soon reached the square tower of the ruined Felsenberg, passing the road which diverges to the Blane See or Blue Sea, picturesquely embosomed in wood, and remarkable for its brilliant effects of colour. The road now was very level, and passing Fellenburg (now a prison), we were soon at Fruitegen—one of the cleanest and prettiest villages I ever saw, situated in a very fertile valley.

Driving on through pretty villages and country brought us to Aeschi, which is situated on a height commanding an extensive view of the Lake of Thun, and here we first saw the Swiss waitress in all the pride of her native costume. Leaving here the rain now began to fall rather heavily, which caused us to have the carriage closed, and drive on quickly to Interlaken. Interlaken attracts numerous visitors, and is noted for its mild, equable climate. The "whey" cure is an inducement for some, whilst many select it as a starting-point for excursions.

We were off in good time next morning for Lanterbrunnen, and had not proceeded far when the Jungfrau, with her dazzling shroud of eternal snow, appeared in all her majesty. Our *voiture* had soon to be abandoned for horses to ascend the path of the Mürren, which leaves the valley and rapidly ascends to the right of the stream. Close by here is the celebrated Staubbauch Fall, which descends in an unbroken fall of 980 feet. Passing along we ascended through a wood to a bridge over the Staubbach; then we crossed two small streams and quitted the wood. We then descended to the valley on the other side on foot (the horses having been left at the top on the Mürren), and are soon in the *voiture*, which has been sent round to meet us. From here we drove merrily, beguiling the time with song and story, until we got back to our hotel.

Next morning our journey was to Grindelwald and the Eismeer. The road gradually ascends the picturesque and well-wooded Lutschenthal, enlivened by numerous farm houses; it then crosses the river four times within a short distance, and ascends more rapidly, passing a small restaurant, at the top of the hill, where there is a good retrospective view. A little further on, beyond a narrow part of the valley, opens the Grindelwaldthal, inclosed by imposing mountains—Eiger, Mettenburg, Sneckhorn, and Wetterhorn. Grindelwald owes much of its reputation to its two glaciers, which descend far into the valley and are easy of access. To obtain a survey of the glacier a visit should be paid to the Eismeer. A narrow but well-kept path ascends the slope to the left, whence a steep flight of steps decends to the glacier. Returning, we turned to the left to view the ice tunnels, which are very wonderful.

Next day we turned towards home, taking train for Darlingen, and embarked on the steamboat for Thun. Arriving there we deposited our baggage at the station, and were soon rambling through this quaint old town, where the guide book informed us 600 people *peacefully* make their living by the war. We left about eight o'clock in the evening, *viâ* Berne and Neuchatel, for Paris, changing at Pontarlier (border customs), and arriving at Paris about ten o'clock next morning. After staying two or three days we arrived safely home, after one of the most pleasant "outs" I ever had.

JOSEPH R. GREATOREX.

ON BICHROMATED GELATINE FILMS AND THE STANNOTYPE PROCESS.*

BEFORE going on to consider the process by which the mould is obtained, a word or two regarding the special form of tissue that is required may be necessary. For those who may work the process prepared tissue can be had from Mr. Woodbury. Here is a specimen of it. As you will see, it has very little colouring matter in it. The colouring matter here, as far as the mould is concerned, is superfluous; but it was found necessary to have a little, so as to judge of the developing of the mould. The tissue can be prepared by the amateur should he be so minded, and the formula for preparing the same is to be found in an article on stannotype which appeared in THE BRITISH JOURNAL OF PHOTOGRAPHY of February 18th of the current year:—

Gelatine	4 ounces.
Glycerine	½ ounce.
Sugar	180 grains.
Colouring	as required.
Water	16 ounces.

The sugar and glycerine are dissolved in the water, and the gelatine allowed to swell therein. The gelatine must be of an easily soluble kind. Nelson's is recommended. After all is dissolved by heat the colouring matter (liquid indian ink does very well) is added. The mixture, after filtering, is ready to be poured on to glass plates, accurately levelled and previously coated over with ox-gall. The plates can be made into shallow trays by surrounding them with pieces of wood, which can be removed so soon as the gelatine has set. The plates are now dried in an apartment or drying-cupboard at a temperature of about 70°. The gelatine takes about two days to dry. Sheets of paper, cut to the required size, are then wetted and applied to the film by means of the squeegee, and after two hours' further drying the paper will be found adhesive. The tissue can be kept on these glass plates till actually required. Here is a specimen of home-made tissue.

We come now to the sensitising of the tissue. A six-per-cent. solution of bichromate is required, and the time of immersion five to six minutes. After sensitising and allowing to drain, the tissue has to be dried; and, as drying by heat is objectionable, as the tissue might be thereby rendered insoluble, a special mode of drying has to be adopted. For this a drying-box with chloride of calcium is necessary, and such a box you have here. By sensitising over night and leaving the box in a somewhat warm room the tissue should be ready for use in the morning. It is necessary that the chloride of calcium be fresh, to give satisfactory results. The exposure of the sensitised tissue behind the prepared transparency must be regulated by the photometer. It should be stated, however, that behind the tissue in the printing-frame a piece of india-rubber cloth or oilskin paper, such as is used in copying letters, should be placed. As to the necessary exposure, experience will be found to be the *sine quâ non*. The exposure over, the tissue is developed on patent plate glass, collodionised as in the case of preparing the transparency. After the tissue is squeegeed on to the plate the glass should be covered with blotting-paper, a sheet of glass laid over it, and the whole subjected to some heavy weight. A quarter of an hour or so thereafter development may be proceeded with. This is a somewhat prolonged process, occupying from about three to five hours. It is evidently a matter of considerable judgment to determine when a mould has been sufficiently washed. The water to be used in the development must be at a temperature of about 110° Fahr.

When the mould is sufficiently developed it is rinsed with hot water, and then with cold. After draining it is removed to a dish containing fresh methylated spirit and allowed to remain for several hours. The gelatine is thereby deprived of its water, and on the mould being removed it very quickly dries. Black spots on the mould, due to defects in the transparency, can at this stage be removed; and for this purpose a strip of glass with a clean fracture across will be found most serviceable. The mould is now ready to receive its coating of tinfoil, only before doing so a solution of india-rubber in benzole is poured over the mould, as in coating a glass plate with collodion. A thicker solution of india-rubber is passed round the edges of the glass by means of a brush. Having cut a piece of tinfoil to the size of the glass, free from holes, the tinfoil and the glass are put together through the rollers of a domestic wringing-machine—one with india-rubber rollers. The rollers have to be separated sufficiently far apart in the first instance to allow the glass and foil to enter freely, and when the centre of the glass is between the two rollers pressure is applied and the glass worked gradually backwards and forwards, extending the motion till both edges of the glass be reached. It is necessary to start in the centre of the glass to avoid any bubbles getting between the mould and the tinfoil. When finished the mould presents an appearance similar to the specimen which I now put forward.

The press claims our next attention, and here it will be seen that Woodbury's mechanical ingenuity comes into play. As it is on the table there will be no need to describe it. The mode of using it is as follows:—Having cut a piece of stout blotting-board to the size of the glass, and, having steeped it in water and allowed it to drain, it is placed thereon, and all the screws having been loosened the top part of the press is allowed to lie freely of its own weight on the mould. The press is then closed by pushing the handle forwards, and the screw under the arch of the press screwed up as tightly as possible, thereafter the top screw, and lastly the screw which fixes the ball-and-socket joint. On releasing the handle the top part of the press lifts as a whole, and will always fall back again to the same position.

The mould is now greased with a mixture of salad oil and paraffine oil by means of a piece of flannel, and we are ready to draw proofs. A word as to the ink employed. It is simply gelatine dissolved in water—one ounce of gelatine to six to seven parts of water, and with colouring matter added to suit the particular requirements of each mould. The photographic tint, which we are all so much accustomed to, is arrived at by means of a mixture of carmine and indian-ink, or alizarine and indian-ink. A deep mould requires less colouring matter than a shallow one. The temperature at which the ink should be kept is somewhere about 120° to 130° Fahr.

At this stage it may be as well to close this paper and proceed to throw off a print or two from the mould which at present is lying on the bed of the press. The mould is not quite such a perfect one as I could have wished; but as I was afraid, on account of the defective light we have lately been having, that I was going to be "short shipped" altogether, I was only too glad to get one at all to show at this meeting. Since taking to stannotype I have only prepared two moulds altogether, so that I bring the process before

* Concluded from page 205.

your notice under somewhat imperfect conditions. Had the light been better than what we have been lately experiencing, I feel justified in saying that more perfect results would have been obtainable.

Mr. Woodbury, knowing that I was to communicate something regarding his process to our Society, has very kindly sent down some of his printing moulds. He has also sent down some magnificent examples of stannotype prints. I think for this attention he should receive our most cordial thanks. I think also you will admit that the work produced is magnificent; and that there is a great future for stannotype there cannot be a doubt. Mr. Woodbury deserves all success in the process which he has devised, and I am sure the members of the Glasgow and West of Scotland Amateur Photographic Association will join me in wishing him that his success may be of a kind that will benefit himself in no stinted degree. W. LANG, Jun.

PHOTOGRAPHIC NOTES OF A VOYAGE FROM LIVERPOOL TO TRIESTE IN A CUNARD STEAMER, JANUARY, 1884.

[Abstract of a communication to the Liverpool Amateur Photographic Association.]

MY photographic "kit" was a "scratch" one. The idea of the journey being sudden, there was but little time to scrape an outfit together. We left Liverpool in the S.S. "Aleppo," on January 11th.

As we neared Gibraltar I took a photograph of the old Moorish town of Tarifa, but, owing to the distance, it is worth nothing. A general view of the continent of Africa shares the same fate, and the views of the rock itself as we neared it towards sunset are not good.

We left Gibraltar at sunset, and as we rounded Europa Point the views were grand. Two plates were tried, but with the result of under-exposure. The fine red mountains of Cape de Gata formed the next subject, at 7.45 a.m. This picture is unavoidably a mere strip across the plate, owing to the distance and to being taken from the steamer. It seems almost impossible to get an artistic view of land while passing in a steamer. As a rule there is no object to form a foreground, and the straight line of the horizon is not picturesque. The next subject—a ship off Cape Palos—would have formed a lovely picture if the glories of the Mediterranean sunset behind could be portrayed. Every tint, from crimson to pale green, overspread the sky, and as a rule we generally had these grand effects.

On January 21st, at 8 a.m., we put in to Genoa for two days. Genoa is a splendid city of palaces, and possesses many ancient and picturesque buildings, as well as numerous streets so narrow that you could shake hands from the top stories with your opposite neighbours. The houses in these streets are taller even than those of Edinburgh, and are full of fascination for the photographer. You come upon large public washing troughs in open courts, with women all round at work; and clothes hang across the narrow alleys. I tried a plate at the head of a court looking down on a public washing-trough, but, unfortunately, it was under-exposed. A great but polite crowd stood round the camera watching the proceedings, even unto the packing up and shouldering of the same. Then, no doubt thinking that the "show" would open down the next "slum," these kindly Italians prepared to follow, upon which I took off my hat and handed it round. Result: *nil*; but the crowd dispersed, abashed, to their own homes. The people in almost all the towns were most polite, grasping the situation at once and actually helping to keep others from passing when they saw that the camera meant business. No mention of Genoa would be complete without the cemetery. It is a few miles from the city, and forms a fine collection of good Italian sculpture. In many cases life-sized statues of the sorrowing relatives ornament the monuments, and in others figures of angels, &c. Several hours might be spent there with advantage.

The views on entering Naples are numerous and fine. Here I must remark that if our Captain could have thought more of photography and less of his ship we might have steered closer in shore and obtained better results. Passing Ischia (six miles distant), we could well discern with a field glass the ruined houses and other results of the late earthquake, but the distance was too great to allow of details in the photograph. The town of Procida on its rugged height forms another fine subject; the distance here also was great. The smoke of our steamer rather helps the effect in the sky. Vesuvius, with the collection of small, dirty towns along its base came next—the steamer coming into the Bay of Naples at about twelve knots at the time. A view of Naples was also taken, but, owing to the lateness of the hour, the result was not pretty. Here we had only one day, and the time was too valuable even for photography. A slow train conveyed us to Pompeii in the morning, and in the afternoon we visited what must be one of the most interesting museums in the world—that of Naples.

Leaving Naples on the evening of the 24th we steamed into the beautiful harbour of Palermo at mid-day on the 26th. Here, as we rounded the grand mass of Monte Pellegrino, the subjects were very good and the light most brilliant; but, unfortunately, the most sensitive plates being in the slides at the time, the pictures were much over-done. Having only one afternoon on shore I could not attempt photography to the detriment of sight-seeing.

We left that night, and, rising early next morning, could see Stromboli behind us as we entered the lovely Straits of Messina.

Leaving on Monday night in a black thunderstorm, the contrast between it and the peaceful Sunday morning was great—the one a harmony in silver and grey, and the other a regular "Whistler" in indigo. A wild night succeeded, and had we not been under the shelter of the land there would have been dire woe on board. As it was, the wind howled among the rigging as we went along at half speed, in order to avoid reaching Catania before daylight. The steward having orders to call me early if anything photographic was about, at daylight he reported Etna on the starboard bow. The sight on reaching deck was very fine. The Queen of Volcanoes covered with fresh snow, and in a wreath of delicate, early morning mists was a lovely sight. The squall was still on, and the mountain rather distant for photography. We lay off the port, not daring to enter in the storm; but during breakfast the wind changed and we were soon in Catania. While entering, two views were taken, and we were soon ashore looking for subjects. The cathedral and street views were good, but the most interesting picture, and one that fascinated me greatly, was a congregation of more than one hundred women washing clothes. They were in four rows; two rivers of water ran between them, and through a garden to the sea. The brilliant sun and the many picturesque colours of the women and clothes formed a sight that would gladden the eyes of any artist. It was but the work of a moment to set up the camera and photograph the ladies before they knew what was going on. In the photograph many are in shadow, but if enlarged every figure would stand out.

January 30th being a hot summer's day, a few of us took a trap along the shore road for four miles to Aci Castello. Everything along the coast was volcanic, and seemed to have come down from Etna, whose summit is twenty-six miles off. We were told that Catania had been partially destroyed by Etna six times, but the hopeful natives still go on building.

Syracuse was our next port, and unfortunately we had only one day in this interesting city. There are many fine ancient remains. The Greek theatre is one of the finest sights. Situated high up it forms a good foreground to the distant city on an island. Many pretty studies might be made of the manners and customs of the villagers. The women stand outside their doors with a primitive distaff in one hand, and by a dexterous spin of a bobbin hanging therefrom they spin the flax as it passes glibly through the fingers. The small tradesmen sit outside in hot sun at their work without hats, apparently courting sunstroke and the blindness, for as soon as the sun is off their side of the street they convey their bench to the opposite gutter, and again bask in the afternoon sun. The old ladies enjoy a peculiar sport, and one is often to be seen at the house door, with the head of the pet of the family on her knee, diligently searching for something that is not wanted. This seemed to be the afternoon recreation of the grandmother. As all these little *tableaux* take place in the sunshine, the instantaneous shutter might be usefully employed.

Leaving the warm, sunny land of Sicily, with its groves of ripe oranges and lemons, we steered straight for Trieste with a large cargo of fruit on board. Nothing of interest came within range until we reached that fine port. The shipping of Trieste and the beautiful cattle which draw the carts make good photographic subjects.

Here we left our steamer and started for Venice in a small vessel, the ordinary length of voyage being seven hours. A heavy fog coming on, we did not reach Venice for seventeen hours. The steamer not being properly provisioned, our breakfast consisted of a cup of tea and dry bread, and on clamouring for dinner each passenger had the following sumptuous repast set before him:—Two sardines, a cut of dry salt tongue, a glass of wine, and some bread—so hard that it was all we could do to break it with a knife handle. We arrived at Venice at 6 p.m. in time for the *table d'hote*. The fog lasted four days, and we saw but little till Sunday, when we had perfect weather. Twelve plates were exposed on that day, the last two from the top of the Campinile of St. Mark's, at sunset.

The "Aleppo" had meanwhile arrived, and I took all my photographic things and one hundred plates (to be developed on my return) on board, on Monday morning, to be taken to Liverpool. My friend and I said goodbye to the captain, officers, and passengers, with whom we had passed a delightful three weeks. From a gondola we watched the good ship sail away for Liverpool, and for the moment felt alone in the world—without friends, and without camera. We quickly recovered, however, and much enjoyed four weeks more of travel, spending a glorious week of sunshine in Rome, and coming home by Florence, Milan, Brussels, and Calais. As far as I could judge, Italian photographers, for the most part, still revel in the dark ages of wet plateism, and the ancient chemical collodion is still largely in vogue. G. E. THOMPSON.

RECENT PATENTS.

PATENTS APPLIED FOR.

No. 5,647.—"Photographic Camera Stands for Use Out of Doors, on Land or at Sea." J. THOMSON.—*Dated March* 22, 1884.

No. 5,686.—"Frames for Stretching Paper for Photographic Purposes." W. R. LAKE; communicated by L'Abbé Raboisson.—*Dated March* 29, 1884.

Our Editorial Table.

UNIVERSAL ATTRACTION: ITS RELATION TO THE CHEMICAL ELEMENTS. BY W. H. SHARP.

Edinburgh: E. and S. LIVINGSTONE.

THIS is a work of fifty-three pages devoted to a consideration of the atomic theory, in which the author endeavours to render clear some of the less easily explicable points in already-accepted theories. Starting with the thesis that so far as we are taught up to the present time "the atoms used by Nature are of about sixty-five different kinds, and that if they are of equal weights they are of the oddest sizes, and if, as is generally assumed, of equal sizes, Nature has made them of the oddest possible weights," the author proceeds to express his opinion that it is a "libel upon Nature" to imagine that she chose these "odd" figures without a sufficient reason. He then goes on to develope his own views, which involve, in the first instance, the impeachment of the Newtonian law, and attempts to find satisfactory definitions of the terms "mass" and "weight," but confessedly without much success. We cannot, however, here discuss the matter in detail; suffice it to say that Mr. Sharp holds that gravity, like sound, light, heat, electricity, and magnetism, is propagated by wave-motion, and that gravitic force is at least as important a factor in physical phenomena as any of those mentioned. One short quotation will show the style of the author's argument. He says:—"Take a body which in the earth's field of force has a certain weight. By the scientific use of your imagination weigh it in the various portions of the terrestrial spectrum produced by admitting gravitic force through a prism into a room from which all other force is supposed to be excluded. Note the changes of weight, the special influence of certain waves, and that the body itself remains unchanged."

We must, however, leave those of our readers who may be sufficiently interested to study these purely hypothetical arguments for themselves.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
April 7	West Riding of Yorkshire	Godwin-street, Bradford.
,, 8	Great Britain	5A, Pall Mall East.
,, 8	Bolton Club	The Studio, Chancery-lane.
,, 8	Newcastle-on-Tyne	College of Physical Science.
,, 8	Glasgow Amateur	177, Buchanan-street.
,, 9	Cheltenham Amateur	
,, 9	Bury	Temperance Hall.
,, 9	Photographic Club	Anderton's Hotel, Fleet-street.
,, 10	London and Provincial	Masons' Hall, Basinghall-street.
,, 10	Manchester	Mechanics' Institution.
,, 11	Ireland	Royal College of Science, Dublin.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society, held on Thursday, the 27th ultimo, the chair was occupied by Mr. W. M. Ashman.

Mr. A. Cowan showed a machine for wiping the backs of plates to clear off, before putting them to set, any emulsion which might have flowed underneath whilst coating. It consisted essentially of two arms, nearly parallel, pivoted horizontally, at just such a distance apart as to allow the hand with the pneumatic holder to pass between them. The plate being laid upon these arms and held down upon them, a treadle was pressed which caused the arms to separate, wiping the under side of the plate in so doing. Long bands of flannel wound on rollers passed over the top edges of the wiping arms, and by a ratchet-wheel arrangement were wound off about three-eighths of an inch at each time of using, so as to present a fresh dry surface for each plate.

Mr. A. L. Henderson proceeded to demonstrate a new method of preparing emulsion. He said that the formula which he would then give was not perhaps the best that could be given; but it would illustrate the principle, and he would show the results of further experiences at a future meeting. Instead of converting the silver into bromide in the presence of a colloid body it was first formed into an acetate. He took a solution of 170 grains of nitrate of silver dissolved in six ounces of water and poured into another solution which had been prepared by dissolving 147 grains of carbonate of ammonia in water and neutralising with acetic acid, the quantity being made up to six ounces. Into the vessel containing the acetate of silver was now poured a solution of 120 grains of bromide of potassium and two grains of iodide of potassium. The precipitate having subsided and the supernatant fluid poured off, gelatine solution was added at a temperature of about 120°, and in a short time the bromide was found to have been formed into a fine orange emulsion. In order to obtain rapidity ammonia would be added and the solution kept warm for some time. In making an emulsion he preferred to use a small quantity of gelatine with the acetate of silver before adding the bromide, but he wished to prove that it could be dispensed with. He had now done what he had stated the week before he was prepared to do, namely, formed an emulsion of bromide of silver in the absence of a colloid body.

Mr. A. Mackie inquired whether, in forming the acetate of ammonia solution, it was important that either the acid or the alkaline should be in excess.

Mr. Henderson said that this was one of the points which required to be worked out, but he thought it was best neutral.

Mr. W. E. Debenham asked whether the rapid plate shown by Mr. Cowan at the last meeting, as being of Mr. Henderson's preparation, was made according to the formula given, and whether gelatine had been used in the first instance.

Mr. Henderson replied that some gelatine had been used before adding the bromide in that case. He would bring the formula used for that plate to the next meeting.

Mr. Debenham said that the formation of the bromide from the acetate instead of from the nitrate had evidently an important influence; for the coarse-looking precipitate became thoroughly emulsified, which it would not have done had it been formed from nitrate of silver in the absence of a colloid body under similar conditions. Some years ago Captain Abney had introduced his method of emulsifying a washed precipitate of bromide of silver. He (Mr. Debenham) had tried the plan, and found that for a slow emulsion it was successful, but that if he endeavoured to get rapidity by long digestion or other means weakness and fog supervened. On one point he must differ from Mr. Henderson: he could not consider that the bromide of silver was emulsified until the gelatine was added, as up to that time it was a precipitate, although a little of it might remain for some time suspended in the supernatant liquid.

Mr. A. Haddon agreed that there was not emulsification, but precipitation, in the first stage of the preparation.

Mr. Mackie said he had tried Captain Abney's method as it was first published, without any gelatine before precipitation, and could get an image. He requested that Mr. Debenham would define what emulsification was.

Mr. Debenham replied that there had been considerable differences of opinion on the point, and he could only give his view without pretending to consider the question as settled. He considered that emulsion consisted of a mixture of two substances—one of which must be a liquid—not chemically combined, but so intimately mixed that they would remain for a considerable time without separation.

Mr. Mackie was of opinion that emulsification was a mixture of two substances by the aid of a third. He inquired whether Mr. Henderson preferred to pour off the water containing the soluble salts, as he had done that evening, or to add the gelatine and wash afterwards in the usual way.

Mr. Henderson preferred the latter course. He could never get quite the quality unless the gelatine was subjected to the nitrates.

Mr. J. B. B. Wellington inquired how much emulsion the silver used (170 grains) would make.

Mr. Henderson replied that it would make from ten to twenty ounces. He preferred to make it up into the smaller quantity. In answer to a question as to the rapidity of an emulsion prepared as shown, he said that it would be fairly rapid, but would be more so if ammonia were added and it was then digested, the change took place very quickly.

Mr. Cowan remarked that if the rapidity depended upon the time of digestion with ammonia, the last plates of a batch that was being coated would be more rapid than the first.

A question was asked as to the heat at which the emulsion might be digested, after the addition of ammonia?

Mr. Henderson could not say.

Mr. Debenham said that in his experience the effect of a high temperature upon the emulsion that had been washed and had had ammonia added, was to render it foggy and useless. An hour or so at 150° was sufficient to spoil it completely.

A communication to the Society, sent by Mr. R. Offord, was read, *On Taking Stereoscopic Pictures on Quarter Plates*. The plan advocated by Mr. Offord was to pose the sitter on a revolving stand, to which a head-rest was attached. Between the two exposures a partial revolution of the stand was made to give the necessary different view. A contrivance was fitted up with cardboard in the camera back for shifting the quarter plate, so that one half of it might be exposed at a time if one lens only were to be used. Mr. Debenham said that a twin lens camera was best, as the silk was less likely to move; but that if made with one lens the principle of the old shifting camera known as "Latimer Clarke's" was better than that of moving the sitter. The use of such small pictures as the half of a quarter plate he thought a great mistake. The photographs should be as wide as the stereoscope allowed—that is, about two and a-half inches. It was, indeed, considered by some a disadvantage that wider prints than that could not be used. Stereoscopic pictures were certainly beautiful objects, and he thought it a pity that the fashion for them had so much gone out. Could not photographers do something to revive it?

Mr. Cowan said that it was certainly *the* best form for portraiture.

Mr. Debenham showed a travelling lantern fitted with yellow paper and green oiled silk, as described in our report last week of the technical meeting of the Photographic Society of Great Britain.

The Chairman announced that the next monthly lecturette would be given on the 10th instant, by Mr. W. E. Debenham, *On Lenses*.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

The eleventh general meeting of the session of this Society was held in the Religious Institution Rooms on the 20th ult.,—Mr. Robert Dodd, Vice-President, in the chair.

After the minutes of the previous meeting had been read and confirmed, and the question-box disposed of,

Mr. Wm. Lang, Jun., read an interesting paper *On Bichromated Gelatine Films and the Stannotype Process*. [See page 201 in our last issue.] He also demonstrated the working of the process, which seemed both simple and satisfactory. A number of specimens, lent by Mr. W. B. Woodbury for the occasion, showing first-class work at all the different stages, were very much appreciated by the meeting.

Mr. Robertson then gave a general description of the original Woodburytype process, and exhibited a number of lead printing blocks, and impressions from them, which had been sent to the Association by Mr. Woodbury at the time the process was patented.

Votes of thanks were then awarded to Mr. Woodbury and Mr. Lang, and the hope was expressed that more practical demonstrations would be given at future meetings.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

The monthly meeting of this Association was held in the Free Library, on Thursday, the 27th ultimo,—Dr. Kenyon, President, in the chair.

The minutes of the February meeting having been read and passed, Messrs. Archer, Durnford, McMurtrie, New, and Williams, were elected members of the Association.

The Hon. Librarian (Mr. J. H. Day) announced that he had received the following donations to the library:—A volume of the *Photo. News* from the Rev. H. J. Palmer, the records of the Photo. Society of Philadelphia, and eighteen lantern slides from the Hon. Secretary. Mr. Day expressed a hope that many members of the Association would now follow the good example which had been set them, and present numerous transparencies for the lantern to the small collection at present connected with the library.

The Hon. Secretary read a letter from an American amateur, enclosing some views of American scenery, and asking for English photographs in exchange.

Mr. B. Boothroyd gave some details with regard to Rufford Hall and its surroundings, and kindly consented to undertake the management of the excursion thither on the 26th instant.

Mr. G. E. Thompson then read his paper entitled *Photographic Notes of a Voyage from Liverpool to Trieste in a Cunard Steamer, January*, 1884 [see page 220], and exhibited a large number of interesting and beautiful pictures taken by him on his recent tour. He said, moreover, that he had used Mr. Kirkby's shutter, and also one recommended to him by Mr. Forrest. Both had given good results; but he had met with some difficulty in obtaining sharp pictures, owing to the vibration of the stand. He (Mr. Thompson) exhibited the whole of the apparatus used by him on his journeys.

The Chairman proposed a cordial vote of thanks to Mr. Thompson for his most interesting and useful paper, and, referring to the fact that some of the seascapes were over-exposed, said that lenses should be stopped down when rapid plates were exposed at sea.

Mr. Day spoke approvingly of the views of shipping, &c., taken years ago by the Rev. H. J. Palmer with a simple cardboard shutter; but he thought, on the whole, that the shutter devised by Mr. E. Roberts was the best for this class of subject.

Mr. R. Crowe remarked that over-exposed seascapes could always be saved by care and management in the development.

Mr. J. H. T. Ellerbeck spoke very highly of Edwards's shutter, and thought the results exhibited by Mr. Edwards were among the finest instantaneous pictures produced.

The Hon. Secretary reminded members of the neglected condition of the Society's album, no prints having been contributed to it for some time.

The Rev. H. J. Palmer gave an account of some further lantern experiments, which he had been making with the pamphengos and the pentaphane, since the last meeting. Mr. Watts had had one of Archer's reflectors substituted for the ordinary pamphengos reflector, but Mr. Palmer had failed to detect the slightest increase of brilliancy.

Mr. Blanchard passed round an album of views, among which were some extremely interesting pictures taken at Lagos, and other places on the coast of Africa.

Mr. A. Beer exhibited some very fine enlargements from 10 by 8 negatives belonging to him, made by Mr. J. Harmer, of Littlehampton, Sussex.

Mr. Thompson showed his camera, lenses, and shutters, a large number of views in the Mediterranean, Sicily, Naples, Trieste, and Venice, and also a portable Buckle stand with some improvements by Mr. Crowe.

The meeting was then adjourned to the last Thursday in April.

PHOTOGRAPHIC SOCIETY OF IRELAND.

The annual optical lantern exhibition of this Society was held on Friday last, the 28th ult., in the Royal College of Science, Stephen's Green, E. As on former occasions, the transparencies were taken from negatives the work of the members during the past year, nearly all being produced on collodion films, the majority of the pictures evidencing a marked improvement on former work.

The following pictures called forth well-merited applause:—*Interior of Ruins of Glastonbury Abbey*, by Mr. F. C. Allen; *Interior of Bruges Cathedral* and *Interior of St. Paul's, Antwerp*, by Mr. H. Bewley; *A Snow Scene*, by Mr. Conan. This was an exceedingly pretty picture, the snow being rendered very effectively. Mr. Pim's *Studies of Trees* were very interesting and beautiful, he having made a speciality of this "branch" of photography during the past summer. The yawl *White Rose*, by Mr. E. P. Johnson, was, as one of the members remarked, "a real gem." It was taken from a punt in Killiney Bay, Dublin, Mr. Johnson holding the camera in his hand while he made the exposure. A selection of views, taken by Mr. J. L. Robinson, in Normandy, Lisieux and Bayeux, were also much admired.

The evening was most enjoyable, and to judge from the attendance—nearly 400 ladies and gentlemen being present—the interest taken in the exhibition was most encouraging.

The following members also sent in contributions:—Messrs. Curtis, Baker, Webb, Robertson, Bewley, Mitchell, Scott, Roper, Watson, and others. The next ordinary meeting will be held on Friday, the 9th May.

PHOTOGRAPHIC SOCIETY OF VIENNA.

This Society met on the 15th February, when the chair was occupied by Dr. E. Hornig, President. The minutes of the previous meeting having been approved, and a new member admitted,

The Hon. Secretary (Herr Luckhardt) read the report of the committee appointed to award the Voigtländer prizes, which they did thus:—A silver medal to Lieut. David, for his studies in emulsion photography, for the results of his labours as a photographic amateur, and for the construction of various useful pieces of photographic apparatus. A silver medal to Dr. Bruno Meyer, of Karlsruhe, for his transparencies (numbering several thousands) intended for educational purposes, and for his catalogue, compiled with great industry. A bronze medal to Herr Bopp, of Innsbruck, for a collection of stereoscopic photographs on glass from injected anatomical preparations, and especially in consideration of the difficulties which had to be overcome in taking such subjects. A bronze medal to Herr Schapiro, of St. Petersburg, for a series of interesting physiognomical studies, with accompanying explanatory text, in which the actor Burlack represented various scenes from the life of a madman. A bronze medal to Herr A. Tockstein, of Vienna, for his efforts to construct apparatus practically adapted to photographic purposes, and particularly to the emulsion process. The committee, at the same time, thanked all those gentlemen who had assisted to make the meetings of the Society interesting either by communications made directly to the meetings or to the Society's organ—particularly Herren Gelpke, Mariot, Scolik, Scamoni, Major Volkmer, Dr. Lorent, and Captain Pizzighelli.

Baron Stillfried then gave an interesting sketch of the condition of photography in Eastern Asia, particularly in China, Japan, and Siam. In the last-named country it had for some time back met with little encouragement. In China and Japan there were some native professional photographers; but their productions were rather black and white affairs, and did not display much taste. The apparatus used was of a very primitive make, the chemical knowledge being of the slenderest description. For landscape photographs there is no demand at all, the only sale for them being amongst amateurs and collectors in Europe or the United States.

The Chairman, in thanking Baron Stillfried for his communication, announced that there would be an exhibition of that gentleman's Asiatic views, &c., on the 12th February, at the Imperial Royal Museum of Art and Industry.

The attention of the meeting was next directed to the objects placed upon the table for inspection, and Major Volkmer was asked to give a short account of the *heliogravures* shown by the Military Geographical Institute.

Major Volkmer remarked that, in the case of the picture of General Von Wanka—said to be by the Klic process—that expression was not to be taken too literally, but merely to be held as indicating that it was by a heliographic etching process.

The members of the Society had a good opportunity of comparing the process as worked at the Institute by Herr Sommer with Herr Klic's process. The following applies generally to both. An ordinary negative—such as can be used for printing from upon albumenised paper—is taken, and a positive upon glass printed from it by means of carbon tissue, consisting of very soluble gelatine with a rich addition of sugar (in order that the picture may not be in high relief) and fine lampblack. This positive upon glass may easily be retouched either with lead pencil or neutral-coloured ink. A negative picture, exhibiting a delicate relief, is then produced from this positive matrix upon a copper plate (rolled copper) having a granularity produced by asphalte powder, and which is also prepared with very soluble gelatine, sugar, and lampblack, but which also contains a suitable addition of carbonate of magnesia and albumen. This picture, in delicate relief, is then etched into the copper plate by means of a rather concentrated solution of chloride of iron. The iron chloride first hardens the gelatinous film; but at last the etching solution gradually penetrates through that film to the copper, the metal being, more or less, attacked according to the degree of relief at which the gelatine film stands out at the different places. After this first etching the gelatine picture and asphalte granules are both removed from the plate, which then shows but a flat and monotonous picture; but second, third, or even more subsequent etchings bring it up to the desired power and depth. Preparatory to this supplementary etching the surface of the plate is protected by a smooth leather roller, saturated with some fatty, acid-resisting ink, being passed across it and then warmed in order to close the particles of colour. The most delicate tones take on the ink, and those beyond, which require to be further etched, remain open and may be acted upon for a minute or two by the etching medium. On repeating this procedure the quantity of colour taken up by the roller and the amount of pressure with which it is applied to the surface of the plate are increased, and the time of etching may be doubled. A third or fourth coating of ink is applied, so that only the deepest shadows shall remain open, and these may be etched three or four minutes. The negative from which the particular picture shown was done was taken by Herr Luckhardt.

Dr. Eder showed a number of instantaneous views by M. Lugardon, and spoke of Mr. H. P. Robinson's method of introducing figures so as to give life to even the most monotonous landscapes. He (Dr. Eder) then communicated his latest researches in the region of gelatine emulsion.

Herr Scolik gave an account of his experiments with a variety of developers (particularly Nelson's).

The Chairman placed on the table the first number of the Portuguese publication, *La Arte Photographica*, to which La Senorita Relvas contributes a landscape illustration, and the first number of *Der Praktische Photograph*, which hails from Breslau.

The meeting was shortly afterwards adjourned.

Correspondence.

"FREE LANCE" AND THE MANCHESTER PHOTOGRAPHIC SOCIETY.

To the Editors.

Gentlemen,—I very much regret that owing to the unavoidable, and almost unprecedented, absence of the Secretary at the February meeting of the Manchester Photographic Society the discussion on the subject of swing-backs was not as fully reported as it was desirable it should have been; and I still more regret that Mr. Rishton's able lecture, which was mainly extempore, and illustrated by a very clever model, was not reproduced in the report of the proceedings. Had this been done considerable light would probably have been thrown on what "Free Lance" is pleased to call a series of "mixed statements."

As this vivacious writer has, apparently, "caught me tripping" I wish to point out that what I did say, had I been fully reported, was that the axis of the lens being placed in an oblique direction to the surface of the plate, and also pointing obliquely to the perpendicular front of a building, but at an opposite angle—a condition of things which obtains when the swing-back and tilted camera are used—*must produce distortion*. I further endeavoured to point out that this opposite angle formed by the axis of the lens with the front of the building, being photographed, was an important factor in the problem, and one not sufficiently taken into account.

I quite admit that the swing-back will preserve the parallelism of the perpendicular lines when the camera is tilted; but it does so at a serious expense of uniform definition, and leads to horizontal distortion, very noticeable near the top and bottom edges of the plate.

As the discussion on the subject will be reopened at the April meeting of the Manchester Photographic Society by a communication from one of the members, who will show the results of some test experiments, I will not at present proceed further to elaborate the argument.—I am, yours, &c.,

Manchester, March 31, 1884. J. S. Pollitt.

SODIC SULPHITE—"POST FINAL."

To the Editors.

Gentlemen,—Before the final close of this discussion, I should like to thank Mr. Herbert B. Berkeley for his kind and courteous offer; and in return—as it appears that gratuitous advertising is the order of the day—I beg to say that I shall be happy to supply him or others of your readers with extremely sensitive dry plates which, with ordinary skill in developing and without sulphite of soda in any form, will give the "wet-plate quality" so much admired by Mr. Berkeley, and also by—Yours, &c.,

March 31, 1884. B. J. Edwards.

SULPHUROUS ACID IN THE DEVELOPER.—SCREENS.

To the Editors.

Gentlemen,—As to the objection of "Free Lance:" if he read the article again he will see that by the method of development the film was well soaked with free sulphurous acid before the ammonia reached it.

Will Mr. W. E. Debenham kindly post me a small fragment of the green oil silk? Mr. Fry has sent me a fragment of "true" canary medium; but as its safety is due to its opacity, and as it blocks out twice as much useful light as my present screen, I prefer to work in the bright and cool light.—I am, yours, &c., W. H. Harrison.

Hotel du Lac, Lucerne, March 31, 1884.

MEASUREMENT OF SPEED OF SHUTTERS.

To the Editors.

Gentlemen,—I see from your report of the last meeting of the Photographic Society of Great Britain that Mr. C. Ray Woods claims for Captain Abney the tuning-fork method for determining the duration of exposure in connection with instantaneous shutters.

When I read a paper on this subject, some time back, I was not aware of the fact that Captain Abney had published anything in this direction. Had I known it I should most certainly have mentioned the Captain's name in my communication.

Will Mr. Woods kindly give date, &c., when Captain Abney *first* published his method? Awaiting reply,—I am, yours, &c.,

Royal Naval College, Greenwich, S.E., March 31, 1884. A. Haddon.

A QUESTION OF PRIORITY.

To the Editors.

Gentlemen,—In a paper by Mr. W. Lang, Jun., printed in your last issue, I see that he attributes to Captain Abney the discovery that an image impressed upon bichromated gelatine is capable of impressing in turn another bichromated film.

Will Mr. Lang be good enough to state where this was first published by Captain Abney, as I have an impression that it is a discovery of very long standing?—I am, yours, &c., A. Collier.

23, *West Hill-street, Brighton, April* 1, 1884.

Notes and Queries.

Geo. S. Pearce wishes to know if there be any solvent for the sulphur stains in silver prints which are caused by allowing fingers soiled by hyposulphite of soda to touch the prints previous to toning and fixing. ——Answer: We are not aware of any.

"Is there any restriction upon the manufacture of changing-boxes for dry plates?—J. B."——In reply: We are aware of none. Among the numerous photographic patents obtained during the present year some may have been for apparatus of this nature; but particulars concerning these will only be ascertained after the specifications are published.

J. B. says:—"Kindly tell me through your columns what you consider would be the effect in a silver bath which has been neutralised before sunning with *ammonia* instead of carbonate of soda. Would it be likely to induce fog? (Of course it would be acidified before using.)"——In reply: Under such circumstances ammonia would not cause fogging.

"Kindly inform me which side of the stop to use nearest the focussing-screen. I have a lens fitted with a stop. One side of the stop has a bevelled edge. I have looked through several books on photography, and can find no reference to it.—A New Hand, Hanley."——In reply: The particular side is immaterial, but it may be safer to keep the bevelled side to the front.

"Will some one kindly advise me as to the best photographic apparatus to buy? I know nothing at all of photography, but want an apparatus to photograph any pretty views, also portraits of persons and children.—Ignorance."——In reply: "Ignorance" should first of all obtain a manual giving practical information in photography, and then place himself in the hands of one of the numerous respectable dealers whose business announcements are to be found in the advertising pages of this Journal.

Geo. Thompson desires to know the best method for estimating the amount of moisture in the atmosphere. He has been made aware of some peculiar class of hygrometer in which the indications are made by the rising and falling of a column of mercury, and would be glad if any reader could afford some information with respect to the construction of the instrument.——We pass on this query to our readers, merely observing that the recognised best method of ascertaining the hygrometric state of the atmosphere is by means of the wet and dry bulb thermometer.

T. S. S.—Our correspondent has been making varnish by the solution of shellac in alcohol; but he quite fails in getting it made clear. He would not mind a little colour, but it is essential for the purpose for which he intends it that it be quite limpid.——In reply: There are two or three ways by which he can get a limpid solution, one of them being by allowing sufficient time to the varnish to become clear. Of course there will remain a sediment at the bottom, from which the clear portion can be decanted. Recourse may also be had to filtration in order to cause the clarification of the solution. It has been recommended to mix finely-powdered chalk to lac varnish, and then to heat and filter it in order to obtain a solution of great purity and brightness. The proportions are stated to be equal parts of chalk and lac.

A. A. B. says:—"After sensitising the albumen paper I float it one minute on a fifteen-grain solution of citric acid; but as it gradually weakens how am I to find out its strength, so as to know how much citric acid to add to keep it about fifteen grains to the ounce after several sheets have been floated? The argentometer is no use in this solution."——In reply: If A. A. B. will make a fifteen-grain solution of citric acid, and carefully note its specific gravity, as shown by the argentometer, he has merely, in making subsequent trials, to see that the strength is such as to permit the argentometer to sink to the mark originally noted. By means of a few trials, and entries in one's note-book, the argentometer may be made useful in determining the strength of every aqueous solution made use of by the photographer.

"I shall be very glad if you will say in your *Notes and Queries*, next Friday, if there are any collodion dry plates (emulsion or otherwise) suitable for negatives, which can be developed like ordinary wet plates, now in the market. If not to be bought, will you kindly give a formula, and state approximately how rapid they would be?—A. H. B."——In reply: While we are aware of numerous formulæ for the preparation of collodion emulsions, the plates prepared by which are developed by pyrogallic acid, we are unaware of any that are suitable for iron development in the same way as wet collodion. We know, of course, that by immersion in, or being freely treated with, solution of silver nitrate, protosulphate of iron may be employed as a developer of dry collodion plates under certain circumstances; yet, so far as we have been able to discover, it is considered as being quite unreliable, and is not practised. We shall be glad to hear the experience of those who have tried it.

Simonides inquires if there be any definite rule for placing the horizon in a photograph.——Very much depends upon the nature of the subject. We should like our correspondent to state a case with more definiteness. If the query have reference to the placing of the horizon in a landscape background of a studio, then we should say that, although it *ought* to be on the level of the head of the sitter, it is not quite expedient that it be so, unless the composition of the landscape background be of that undefined class in which it is rather difficult to say with precision where the horizon is really situated. A horizontal line of a marked character should never bisect the picture in a line with the head, as it distracts attention from the face. But, while certain sacrifices may be made to conventionalism, the error must be avoided of carrying this too far, as in the case of certain American portrait and figure subjects, excellent in themselves, which were described in this Journal some time since, and in which the horizon line of the background was frequently as low down as the knees of the figures.

Concerning photo-enamels, J. Berryman (Redhill) writes:—"Some time ago you were kind enough to give me your opinion on an enamel I sent you. I promised to give you the result of my further experience. I discovered that the fault was not in firing: it was through the toning operation being defective. From what I hear and read I am convinced that three-fourths of the failures in this process are due either to an undue *thinness* of image or *incomplete* toning. Having now acquired, by nothing but hard practice for several months, some ability with this process, I can positively say that its supposed uncertainties and mysteries do not exist. As to the burning: it is simple enough. The *great* point to watch is the character of the film before toning, and so nice, to a point, must it be that no after-operation can in the slightest degree make up for the slightest imperfection in it. If my experience should at any time be of service to you I willingly offer it, and should do so the more cheerfully because I have suffered a good many days' experiment through the ungenerous misleadings of others."——We thank our correspondent for his kind offer.

Exchange Column.

Wanted a really good dark tent or carriage for dry-plate work. Excellent exchange offered, or cash.—Address, H., 365, Lodge-road, Hockley, Birmingham.

I will exchange a thoroughly-good microscope and slides for a light, whole-plate camera and double slides.—Address, A. BUGG, Stowmarket.

Tricycle—"Woodcock," Coventry, excellent machine, cost £25, valued at £15, for good tourist photographic apparatus, &c.—Address, TEAR, 12, Clapham-road, S.W.

A half-plate wide-angle landscape lens and 12 × 10 glass bath, with ground top, in exchange for a short focus *carte* lens.—Address, T. J. LLOYD, 2, Bailey-lane, Coventry.

What offers for a dark tent and tripod, for 12 × 10 (new), 10 × 8 wide-angle view lens, Photo. Stores' make (new), and Solomon's magnesium lamp.—Address, C. TAYLOR, photographer, Chislehurst.

What offers in exchange for a half-plate bellows-body camera, a quarter-plate Lerebours lens, camera, head-rest, and nine double printing-frames? Address, JAS. DRIVER, 65, St. Mathew's-street, Ipswich.

Wanted, instantograph or quarter-plate camera, &c., in exchange for books, or part cash. Offered, Tymm's *Wyatt's Art of Illuminating*, *The Sea, &c.*—Address, S. WELLS, Gladstone-terrace, Goole.

I will exchange a quarter-plate walnut sliding-body camera, two single dark slides, and a quarter-plate lens, by Shepherd, for a 12 × 10 water-tight glass bath.—Address, C. W. G. USHERWOOD, Tonbridge.

I will exchange *Photographic Almanacs*, for 1858, 1860, and 1862, and Delamotte's *Practice of Photography*, 1857, for a single landscape lens, six or eight inches focus.—Address, PHOTO, 3, Cicely-street, Edge Hill, Liverpool.

Wanted, bellows-body camera, 8½ × 6½, and Ross's rapid symmetrical lens, for 10 × 8, and Shew's eclipse shutter, in exchange for Dallmeyer's No. 2B ordinary, and well-finished modern oil-painting.—Address, J. MALINS, Crosswood, Aberystwyth.

What offers in exchange for Watson's 10 × 8 bellows-body square camera, latest improvements, two backs, two of Ross's studio cameras, Oborne's Eureka camera burnisher, and Watson's dark tent, all in first-class condition?—Address, BERLIN STUDIO, 440, Old Kent-road, S.E.

What offers for a capital half-plate portrait and view lens, double combination, six and a-half-inch back focus, in good condition? Wanted, a cabinet, or larger, rolling-press, with steel plate, in good condition.—Address, PHOTOGRAPHER, Oxford Studio, High-street, Cheltenham.

Wanted, a large-size porcelain dish, two or three lenses, by B. French, Boston, for Victorias, large-size rolling-machine, or offers, in exchange for England's drying-cupboard, backgrounds, interior and exterior, head-rests, grass mat, half-plate bellows-body camera, three dark slides, three cabinet lenses, and two and a-quarter ditto.—Address, J., 126, Bold-street, Liverpool.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

S. WELLS.—By advertising your special want you will no doubt meet with a response from several dealers.

SMITH (Manchester).—See report of the last technical meeting of the Photographic Society of Great Britain.

W. H. HARRISON.—We should advise you to give longer exposure. Perhaps you over-estimated the value of bright sunshine.

P. SPENCER.—The plates are not made now. We cannot undertake to send private replies, particularly when stamps are not enclosed.

SAML. JUTSUM.—There is a work by Husnik on the subject, but it is in German. You can procure it through any foreign bookseller.

B. WESTON.—You have used far too much glycerine. Refer again to the formula, and see if you have not misread "drachms" for "ounces."

W. E. G.—Any working optician will construct a lens that will answer your purpose as a condenser. The cost, we imagine, will not exceed a few shillings.

J. H. H.—The meetings of the Photographic Club are held at Anderton's Hotel, Fleet-street, E.C. The subscription is a guinea annually. Write to the Honorary Secretary.

TYRO (W.C.).—The plates have, without question, been exposed to light before they were developed. It is not a case of green fog, as you suppose, but fogging by the action of light. There is no remedy. Perhaps all the batch are not in the same condition.

STEPHEN RAWSON.—You are in error in saying that your communication of the 17th ult. was not replied to. If you refer to the Journal of March 21st you will see that it was answered. Surely you cannot take much interest in the matter about which you inquire if you do not take the trouble to look for the reply.

T. A.—We fear you will not be successful in removing the stains of wine from a photograph coloured with water-colours. The best plan will be to send the picture to the artist who coloured it in the first instance; he may possibly be able to help you in the matter by washing off the colour and repainting such portions as are defective.

J. H. L.—To utilise a portrait lens for views you must remove the back combination entirely and screw the front in its place—convex side next the ground glass. You will have to employ a small stop—say not larger than [illegible] or [illegible]; that is, if you wish for good definition over a moderate-sized plate. We cannot undertake to recommend any particular maker; that is against our rule. Every optician mentions in his catalogue the focal length of the lenses he supplies. From such data you will be able to judge which will be most suitable for your camera.

WALTER GRANT.—The tissue has clearly been kept in a damp place, and so has become mouldy. Its age will not, we think, affect its working qualities; but the mould doubtless will, by producing spots of insolubility, or, possibly, of different solubility to the other portions. However, it will not be much trouble to sensitise a piece and try how it works.

D. C.—The best plan is to treat the solution to recover the oxalate of potash. Add to the solution carbonate of potash until all the iron is precipitated; you will then have a solution of oxalate of potash which you can use again with fresh iron. We cannot trace the article to which you refer. There is one on a similar subject in our issue for 8th February.

WM. SELTH.—If you send negatives by the parcels post and they arrive broken you have no remedy. You cannot claim compensation from the Post Office. In future, if you continue to send through that channel, you must exercise greater care in packing. If you forward through a carrier, or direct by rail, and the package be labelled "glass," you can recover in case of injury.

PICKWICK.—The paper marked "B" has evidently been sensitised on too weak a solution, which is the cause of its yielding such feeble prints. This does not apply to the sample print marked "A," for the defect there is that the print has been much over-toned. It is clear that that sample of paper will not bear toning to the extent of the purple tones you require. This is a common failing with many of the ready-sensitised papers now in the market.

S. S. S.—No advantage whatever. Some operators in the wet collodion process used to prefer fused nitrate of silver to crystallised for preparing their baths; but we never heard it claimed for fused nitrate that it was better for printing purposes than the ordinary nitrate of silver. However, it is still an article of commerce, and you can procure a sample and try it for yourself. If your competitor's prints are so much brighter than yours it must be due to something more than the use of fused nitrate of silver.

RECEIVED.—Rev. T. F. Hardwich; George Smith. In our next.

THE LATE MR. J. H. DALLMEYER.—From the *Illustrated London News*, we learn that the will of the late Mr. Dallmeyer, the well-known optician, of 19, Bloomsbury-street, W.C., and of Sunnyfield, Hampstead-heath, who died on December 30th last, was proved on the 13th February, by Mrs. Elizabeth Mary Dallmeyer, the widow, one of the executors, the value of the personal estate amounting to upwards of £78,000.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—The next meeting of this Society will take place on Tuesday next, the 8th instant, at eight o'clock, in the Gallery, 5, Pall Mall East, when the evening will be devoted to an examination into the mode of preparation of lantern slides, and their exhibition with the Society's optical lantern (oxy-hydrogen lime light). Amongst others—illustrating the various processes, old and new—transparencies will be shown by Dr. Huggins, F.R.S. (astronomical), W. F. Donkin, F.C.S., F.I.C. (Alpine), and by R. Meldola, F.R.A.S. (scenes and natives of the Nicobar Islands).

GOOD FRIDAY.

NOTICE.—THE BRITISH JOURNAL OF PHOTOGRAPHY for the week ending April 11th will published at nine o'clock a.m. on THURSDAY next, the 10th April. Advertisements intended for insertion in that issue should therefore reach the Office by TUESDAY EVENING next, the 8th April. Small Advertisements will be received up to Nine o'clock on Wednesday Morning next, the 9th April.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. STEWARD, Optician,
For the Week ending April 2, 1884.
THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

March	Barometer.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max Shade Temp.	Min. Tem.	Remarks.
27	30·18	E	41	38	—	44	39	Overcast.
28	30·16	E	41	39	—	44	38	Overcast.
29	30·06	E	43	40	—	47	40	Overcast.
31	29·53	S	49	46	—	55	44	Cloudy.
April.								
1	29·62	SW	53	49	102	61	45	Cloudy.
2	29·64	S	57	52	105	69	49	Bright & Clear.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1249. Vol. XXXI.—APRIL 11, 1884.

IMITATION OPALS.

As was stated in the previous article, the pigmented preparations there described may be used in connection with transparencies produced by the carbon, collodion, or gelatine emulsion processes. They may also be applied either before or after the production of the picture; that is, either as a substratum between the picture itself and the glass or as a covering to the picture. Obviously, the different circumstances thus developed necessitate modified modes of manipulation.

First, we will take the case of the application of the preparation in the form of a substratum. This is particularly well adapted for use with the carbon process, but it necessitates a perfection of substance which is not essential when applied over the picture—a perfection which is almost as difficult of attainment as a similar character in gelatine emulsion films. The difficulties are, in fact, identical in both cases, and consist in defects such as "pits" in the gelatine itself, dust and imperfections in the gelatine layer, as well as inequalities in the thickness of the film—all of which detract greatly, if present, from the beauty of the finished picture.

The last-named difficulties are merely mechanical, and are easily surmounted if a sufficient amount of care be devoted to the manipulations. The first, however, or "pits," is inherent in the gelatine itself; and if a tendency, however slight, to its production be present that sample of gelatine should at once be rejected. Fortunately for this purpose there need be no difficulty in securing a suitable gelatine which, so far as we are aware, is absolutely free from symptoms of pitting. This is secured in Nelson's No. 1, and, we have little doubt, also in other samples of pure English make. The softness of the brand mentioned is of less consequence for the purpose under discussion than it is in emulsion work, as an addition of chrome alum can be made to the baryta emulsion, not only without an ill effect, but with actual advantage in more respects than one. This is not necessary in the third method described, as the alum bath serves the double purpose of giving opacity as well as hardness to the film.

Glass of as even a surface as possible is chosen and well cleaned; the baryta preparation, very carefully filtered, is poured on to the depth of one-eighth of an inch, the plate having been previously accurately levelled. The thickness of the layer of gelatine will, of course, greatly depend upon the quantity of pigment contained in the emulsion and on the amount of opacity desired. If the emulsion itself be slightly tinted, then it matters not how thick and opaque it may be; but if it be intended to give a faint tint by backing with coloured paper, or if the picture itself is to be tinted by painting at the back, after the style of crystoleum, then a certain degree of translucency must be allowed. However, experience and a knowledge of the particular requirements will soon give the desired result.

The plate is allowed to set thoroughly, and is then transferred to a warm room or cupboard, free from dust, to dry, when it will be ready for use at any time. The surface should now present a perfectly smooth, matt appearance. The degree of deadness may be varied within certain limits by suitably arranging the proportions of gelatine and pigment respectively; but it is scarcely possible to obtain a glossy surface together with sufficient opacity.

When required for use the first operation is to wet the "enamel" surface, but the degree to which this operation is carried will depend upon the class of picture it is intended to superpose—in the case of a collodion picture the wetting being altogether dispensed with. The first effect of moistening the surface will be found to be an *increase* of the dullness caused by the rapid absorption of the water by the porous pigment. In a few seconds, however, the gelatine commences to swell, and gradually a more and more glossy surface supervenes.

Now if a carbon print is to be developed on the enamel surface the latter should be allowed to absorb a full quantity of water and to become quite smooth, the hardened gelatine forming a fine substratum for holding the delicate half-tones of the carbon image. If a gelatine emulsion is to be applied, then the water must be allowed to act no longer than is necessary to reverse the original deadening of the surface and cause the emulsion to flow evenly. If the wetting be omitted the emulsion will sink into the film unevenly; if it be too prolonged the sensitive film will be too long in drying. When a collodion film is to be applied the wetting must be omitted, but if, as will sometimes happen, especially with collodion emulsion, it sink in unevenly, a thin coating of india-rubber dissolved in benzole should be applied first and allowed to dry.

After fixing and washing in the usual manner the plate is dried and varnished either with thin spirit varnish or else a water varnish made by dissolving bleached lac in a boiling solution of borax. This gives great depth to the shadows without destroying the matt surface, and, moreover, forms a good protection.

In the case of a carbon print there is nothing special in the process of development; should any yellow bichromate stain be visible in the pigmented gelatine immerse in very dilute sulphuric acid. The development of either collodion or gelatine films must be as rapid as possible in order to avoid stains, and this necessitates, as a matter of course, that a full exposure be given. It is very desirable in all cases where pyro. and alkaline development is used that sulphite of soda or, better, sulphurous acid be also employed; if in spite of this precaution any stain accrue it will be necessary to remove it by dilute sulphuric or hydrochloric acid. The latter acid will also remove the yellow stain that may arise from iron development. However, these are simple matters to which the intelligent operator himself will see.

If the barium preparation is to be applied upon the top of a picture already developed—whether carbon, collodion, or gelatine—the operations are much simplified, at least so far as the obtaining perfect surface and freedom from stains are concerned. The glass selected should be as thin and colourless as possible, and in the case of gelatine negatives the films must be treated with chrome alum and dried before applying the barium emulsion; otherwise partial solution of the surface under the influence of the warm emulsion is probable. After drying, the back of the picture may be varnished if desired.

Very pretty effects are obtained with great ease by backing these pictures with suitably tinted papers, or by roughly colouring them at the reverse side of the translucent ground; but these are matters which must be left to the taste of the operator.

In addition to the hopeful effects, with very slight modification, he same barium emulsion may be used in connection with transparencies for window decoration. In fact, with the exception that a thinner coating of emulsion is required, very little modification is needful, and effects far superior to ground glass are produced.

LIME-LIGHT EXPLOSIONS AND THEIR PREVENTION.

In our issue of last week, when offering some suggestions respecting powerful lights that might prove substitutes, in some measure, for the lime light, we spoke of the perfect safety of the latter when placed under the management of competent individuals. We are personally familiar with the circumstances under which several explosions have taken place, and can most positively assert that in every instance they might have been prevented. It may seem harsh to associate with such mishaps either ignorance or carelessness, but to one or the other of these, in more or less mitigated association, they must all be relegated.

In the course of a communication by the Rev. T. F. Hardwich, in the present number—an article certain to receive the greatest attention from every reader interested in lantern proceedings—this gentleman offers various suggestions calculated to prove of great utility, and of which we recommend a careful perusal by every photographer. Mr. Hardwich, in a short letter which will be found in our usual correspondence columns, has also suggested that it might be well if some photographic society were to take this matter up, and offer a prize for the best safety tube and the best back-pressure valve. This, we suspect, would be of but little use unless some legislation were brought to bear on their employment.

We are tolerably familiar with many who are, in common *parlance*, "lantern exhibitors" or "dissolving view lecturers," but who never had an explosion during their lives, and who would, and do, pooh-pooh! the necessity or desirableness of any precautionary measures being taken. With such persons the precaution is axiomatic —"Keep your gas-bags properly weighted, and don't allow any interference with, or standing upon, your pipes, and you cannot have an explosion." This is a literal truth, but equally so is it a literal and unpleasant truth that, even with such persons, notwithstanding their knowledge of and intimate acquaintance with the conditions of safety, mishaps will and do occur.

A former editor of this Journal has placed it upon record that the requirements of a certain well-known professor of astronomy, who had had a narrow escape from an oxyhydrogen explosion, was something like the following:—"I want a burner that will give me a light of the very first order, but one by which an explosion shall not be possible by accident, by carelessness, or by design." The result of this was that our predecessor (J. Traill Taylor) invented and perfected a system of back-pressure valves, which so far fulfilled the intended purpose as not merely to have met with eulogium when introduced—at first privately, and afterwards more publicly through a communication to the South London Photographic Society in the beginning of 1868—but to have been made an article of commercial manufacture, and sold at a low price by leading scientific and commercial dealers of the period, namely, for instance, by Mr. Samuel Highley and the London Stereoscopic Company. But lantern exhibitors generally seemed to prefer saving the shilling or eighteenpence demanded for perpetual insurance money for the safety thus provided, and to run the risk. We are not at this moment aware of the precise sum at which these safety valves were sold; but we know it was a very small amount, for there was no restriction put upon the manufacture, the invention having been given to the public.

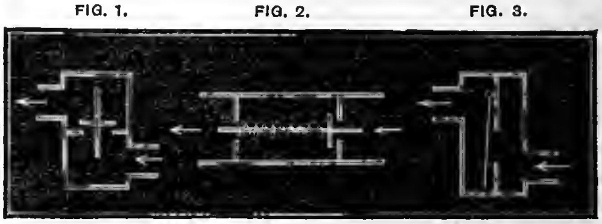
Conversing on this topic with our predecessor, he says, in effect, that the ignorance that prevails at the present time with regard to the terribly-potent mixed gases—oxygen and hydrogen—is such as ought to call for legislative interference with their free use, unless by those who can convince a competent examiner that they know at least something respecting the forces employed. "If I want to run and command a steam launch," he says, "on a stream, on which the travellers are exceedingly sparse, Government steps in and says that I must not risk my own life or those of my fellows until I shall have been examined by a competent authority as to my knowledge of steam and its effects, as developed in the yacht marine-engine, and why should not a similar test be applied to ascertain the competence of the individual who proposes to introduce a dangerous power in the midst of crowds of men, women, and children?" All this means, in plain English, that it is that gentleman's opinion that no one should be permitted to exhibit photographs or other pictures in public by the oxyhydrogen or lime light but those who, like the drivers of cabs or locomotive engines, are licensed to engage in such work. As regards this proposal we shall say nothing at present but this—that it would be certain to meet with strenuous opposition.

In the beginning of 1868 (for the particulars of which the reader is referred to THE BRITISH JOURNAL OF PHOTOGRAPHY for February 21st, 1868) Mr. Taylor brought before the notice of the South London Photographic Society the subject of explosions and the means of their prevention. We need not here recapitulate the arguments made use of on that occasion, or the conditions under which it was stated the mixed gases could with facility explode. It concerns us more at present to find the circumstances under which they could not explode. "If the weights on the bags," says the writer in question, "be not equally adjusted, the bag which is under the greatest amount of pressure has a tendency to transmit its gas to the other unless the orifice be sufficiently large to allow both gases to escape into the atmosphere. Should, however, the orifice be stopped by a particle of dirt, or by any other means, diffusion of the gases will take place with alarming rapidity." The foregoing, it must be admitted, is the positive side of our negative inquiry; but it serves to throw much light on the subject.

What is the effectual preventive of explosions caused by the back-pressure of either of the gases which, when mixed, form oxyhydrogen? Back-pressure or safety-valves—"only this and nothing more." The safety valve, which was introduced in consequence of the accident by which Professor Piazzi Smyth *might* have suffered seriously, even to the losing of his valuable life, is constructed on the principle that, concurrently with the withdrawal of the pressure caused by such an accident as the weight falling off the bag, a valve should close, and then the greater the drawback of the gases into the bag the more certainly would the valve act to prevent it.

In the following diagram an outline of three forms of this safety-valve are given. Nos. 1 and 3 are intended for insertion in the back of the lantern, flexible tubes or other fittings being "sprung" over

FIG. 1. FIG. 2. FIG. 3.



the two ends. In the first of these there is a seat upon which a very light valve rests, but which is thrown upwards upon the admission of gas, remaining up so long as there is any pressure of gas. If, by accident or otherwise, the weight were thrown off the gas bag, and the pressure of the gas thus withdrawn, the valve would immediately descend and close the passage through which the gas passed, rendering impossible the passage back of the flame beyond the safety-valve. *Fig.* 3 shows another way of effecting the same end. In it a flap is loosely hinged above an orifice in a plate which acts as a partition in the chamber. In its normal position it closes the orifice, but yields upon pressure being applied behind by the inflow of gas. *Fig.* 2 is different, and is intended to be inserted anywhere in the rubber tube between the lantern and the bag. What was effected in the previous two cases by gravity is in this one effected by a delicate spiral spring composed of a thin piece of brass wire, by which the valve is kept close as the normal position. The oxidation of these valves is prevented by giving them and their seats a thin coating of gold by the electro-metallurgic process. In some instances the flaps were faced with oiled silk, in others with thin leather and other pliant materials; but preference appears to have been usually given to metallic contact, precautions being taken to prevent particles of any foreign substance from getting access to the valves. The protection which they afford is, we are told, so perfect that when they are employed it is not possible, *under any circumstances whatever*, to cause an explosion, even when the most strenuous efforts are put forth to bring about such an occurrence.

This being the case, what is wanted, we imagine, is not so much a prize for the invention of an effective back-pressure valve as a means of inducing, or even forcing, lantern exhibitors to make use of them. There is no advantage whatever in looking for safety in the transmission of the gas through extremely fine apertures, such as those in tubes closely packed with wire or numerous folds of wire gauze, as the tenuity of the hydrogen flame is so great as to enable it to pass not only through these, but through porous wood. Indeed, it is on record that Mr. Gurney has sent the flame through a thin slab of plaster of Paris. Hence obstructive media of this class is of no use whatever, safety consisting alone in the employment of back-pressure valves.

LENSES FOR LARGE PORTRAITS.

It is pretty generally admitted that large portraits (within certain limits) taken direct possess certain qualities which, in the eyes of most photographers, are superior to pictures of similar dimensions produced by enlargement. Although, from a technical point of view, a large direct portrait—say a three-quarter- or half-length figure on an eighteen- or twenty-inch plate—if it be skilfully produced and with good appliances, may be better than an enlargement, it is, doubtless, within the experience of most professional photographers who have made this class of picture a speciality that, however perfect they may be, they frequently do not give entire satisfaction to the sitters; and, what is more, neither the sitters themselves or their friends can explain why or in what particular they are unsatisfactory. On this point we shall have something to say by way of explanation presently.

At a recent meeting of the Photographic Club the subject discussed was *The Best Lenses for Large Portraits with Gelatine Plates*. The decided opinion of all who took part in the discussion was that large and expensive lenses of the old portrait or Petzval type were no longer necessary, nor, indeed, in practice were they nearly so good as several other forms. The only advantage the old Petzval form of lens possesses over every other is its large angular aperture, upon which rapidity of action in all lenses depends, but with gelatine plates extreme rapidity is not so essential as it was with collodion. After all, the greater rapidity of large portrait lenses is more theoretical than practical. For example: if we have a lens of five inches in diameter, and we have to stop it down to three inches in order to obtain sufficient definition in the different planes of the picture, it at once becomes practically equivalent to a lens of only three inches in diameter, while the difficulty involved in its construction is immeasurably greater.

Now, having to stop down a five-inch portrait lens to three inches, particularly if it be one of short focus, is by no means an uncommon circumstance; even a two and a-half inch stop is frequently necessary to obtain a satisfactory result. Of course, stopping down to this extent necessitates a much-prolonged exposure, and the latter in the days of collodion had often to be measured by minutes rather than seconds. An exposure of from one to two, or even three, minutes was by no means uncommon with large lenses. Where, then, it may well be asked, is the utility of the large diameter, seeing that the full aperture cannot be used, and the difficulties in making large lenses are so much greater than with smaller ones? The only advantage is this: with the full opening, if the lens be a good one, small pictures can be taken with fair definition. Larger ones, too, can also be taken with a brief exposure, if we are content with definition in one plane only. This was often an advantage in collodion days, when the light happened to be indifferent and a portrait *had* to be taken. Now, with gelatine this advantage—and it is the only one such lenses possess—is not so great; therefore, lenses of smaller diameter are much to be preferred.

At the meeting to which we have referred the opinion expressed was that, for large direct portraits, lenses of the "universal" or "group" series, or those of the "rapid" type, are the ones most generally useful, and, for working qualities, are much to be preferred to the old portrait form. Single lenses were also well spoken of by some. In the selection of a lens, however, the professional photographer has to take into consideration which kind is likely to prove most advantageous under all circumstances. A single lens, if stopped down, will undoubtedly produce good portraits in the studio, and this is the cheapest form of lens to be had—no mean advantage, be it remembered. But single lenses must be employed in a good light, otherwise the exposure will be too protracted. Lenses of the "rapid" type, even when used with their full opening on a moderate-sized plate, are also very satisfactory for portraiture. But if a large plate have to be covered then diaphragms become necessary; hence in a dull light, or for portraits of children, unless very sensitive plates be used they may prove somewhat inconvenient. Certainly, in a good light and with plates of moderate sensibility they are all that can be desired.

The general impression at the Club appeared to be that, on the whole, lenses of the "universal" or "group" type were those to be selected. The only advantage, it may be mentioned, possessed by the "universal" over the "rapid" is the same as that which appertains to the portrait over every other form of lens, namely, its larger angular aperture, and, consequently, greater rapidity in working. It may thus be made available, if the light be bad, when other lenses cannot.

At the commencement of this article allusion was made to the fact that, however technically perfect, large direct portraits very frequently do not meet with approval from the sitter, and we are somewhat surprised that this point was not touched upon in the discussion. Here is, without doubt, a frequent reason: large portraits, as a rule, are taken from a point much too near the sitter. If they were taken from the same distance as is customary with *cartes* and cabinets they would, doubtless, prove as satisfactory as pictures of that size and the enlargements made from them. In taking these pictures, if they be "full lengths," the camera is usually placed from eighteen to twenty feet from the sitter, and if "three-quarter" proportionately nearer. For this distance lenses respectively of about eight and a-half and twelve inches equivalent focus are employed (the back focus, which is generally mentioned in catalogues, is considerably shorter than this); consequently, the longest diameter of the picture, in either, is considerably less than half the focal length of the lens, and the angle of view included is, of course, very narrow indeed.

It has been generally conceded that in order to obtain the most pleasing results in portraiture—both as regards perspective and artistic appearance—the longest dimension of the picture should in no case exceed one-half the focal length of the lens with which it is taken. In the *carte* and cabinet portrait this limit is not reached. But what do we find with lenses supplied for large portraits? It is a fact that, notwithstanding the greater difficulties in their construction and their necessarily lower degree of perfection as optical instruments, they are catalogued to take, and are actually employed to produce, pictures quite two-thirds—in some cases even more—the length of their focus. Thus, a lens of about twenty-eight inches equivalent focus (twenty-two inches back focus) is mentioned in the catalogues of some of our leading opticians as being suitable for pictures 20 × 16, and even larger. This is increasing the proportion to two-thirds of the focal length, and consequently a much larger angle is included, while the lens has to be approached very close indeed to the sitter; whereas to secure the best pictorial effects the picture, for such a length of focus, should not exceed fifteen by twelve inches. To take a picture twenty by sixteen, bearing in mind the rule just given, a lens of not less than forty inches equivalent focus should be used.

Although opticians have succeeded in producing portrait lenses which will cover a plate up to two-thirds, or more, of their focal length they should never be utilised to this extent if really artistic and satisfactory pictures be desired. We put forth this suggestion at the present season because the extreme sensitiveness of gelatine plates has induced many photographers to make a greater speciality of large, direct photographs than they have hitherto done

MINOR HELPS.

Seeing, as we do at times, so many faces, some strange and some familiar, their owners all anxious to know, and many willing to describe—whether faithfully or not we will not stay to discuss—the "latest thing out," we sometimes find a strong current of thought or opinion running in certain directions, enough at times to be worthy of prominence being given to it under a special heading. One topic that has become of passing interest in many quarters is the fatigue of developing operations in dry-plate work, so many operators and principals complaining of the extremely tiring labour of continually bending over the sink, watching and attending to the batches of negatives being produced as plate after plate remorselessly passes through the dishes of pyro. without break or pause.

In the olden days of wet-plate negatives the work was diversified in most cases by the operator taking up various kinds of manipulatory details—a plate to be coated, drained, and placed in the holder, then developed, intensified, and fixed, all involving a little action, if even limited in character, and in a fairly-bright light. But now it often enough happens that a good portion of the day is spent in exposing plates; then the development is all performed at one sitting, or standing, and dozens, scores, and hundreds of plates pass under the photographer's hands almost without the necessity for his once moving his position, the whole being carried on—at anyrate until recently—in a light of a most dismal character.

To meet this state of affairs, we cannot avoid thinking—and the opinions of many are with us—that the device of a portable and easily-removed seat, such as would be supplied by the adaptation of a bicycle saddle, as has been described in our Almanac, will become a common adjunct of the dark room of most photographers who care for their operators' comfort, or even their own. A bar and a strut with a bicycle saddle attached easily run under or from under the developing trough is too simple to be neglected, it might be thought. We heard rather a neat thing the other day *apropos* of this subject. The principal of a studio was discussing with his assistant (who also performed all the toning) this question of a saddle, and, asking for a suggestion as to the fixing of it, received this reply :—"A very good thing indeed, sir! Don't you think one would also do for the toning-room?

The care of the eyes, too, during the prolonged work of development is a really serious matter, and we have been glad to see it taken up from various points of view. There is no doubt that the selection of a light that shall give the greatest comfort and the greatest safety is a matter well worthy of all the time recently spent in public discussion upon it; but, whatever the light may be—daylight or artificial, canary, green, orange, or ruby—the eyes of the manipulator should be protected from the glare falling directly upon them. Some wear screens or shades, and others coloured spectacles; but the interposition of a sub-permanent screen that would hide the light from the eyes, yet allow it to fall unimpeded upon the plate, appears to us to meet the requirements of the case in a perfectly-effective manner. There need be little or no expense in connection with such an arrangement, and its adoption would at once tend to preserve the eyesight and assist in forming a proper estimate of the progress of the work—minute shades of differences in density or delicacy of image not being readily appreciable when the eye is subjected to the glare of a strong light.

The discussion on Willesden paper, held a few weeks ago, seems to be bearing fruit, and from many quarters we hear of an intention to test its qualities. So far, however, as it has been brought before our notice it is in the direction of its capabilities as a builder's material that it has appealed to the photographic mind. For such purposes it has real advantages, and we are informed by one gentleman that he contemplates making use of it for screening various portions of his glass roof during summer time at least, if not permanently. Its advantages for this purpose are obvious when it is remembered that a piece of galvanised iron or "corrugated zinc"—the material usually employed for small building alterations—weighs about ten times as much, area for area, as the Willesden paper. The latter, too, can be fairly readily cut up into pieces of any particular size required, while the corrugated sheets need a skilled workman to cut and fix them. The prices for the thickest "paper" and corrugated zinc of average thickness are almost the same, reckoning the superficial contents, while, as we have said, the weights are as one to ten.

Turning now to processes: we would call attention to Messrs. Robinson and Thompson's neat method of mounting adapted for large prints, as described in our number for March 21st. It is a variation of the method of applying the mountant to the damp print and allowing it to dry before attempting to place it on its mount; but in lieu of damping the latter—after the method described by Mr. A. Cowan some time ago—the print itself is again damped, though not sufficiently so to enable it to expand. The uninitiated might easily perform this part of the work sufficiently unskilfully to render the evil of cockling as great as ever; but to prevent this contingency occurring Messrs. Robinson and Thompson, who have had large experience in such work, have given a very succinct account of the method they have for years adopted with complete success—such success, they state, that even if the print were mounted in a book the "cockling" would be too insignificant to notice. As this is a point which we are frequently asked about we feel the greater pleasure in calling attention to this method. [*Vide* page 191.] While on this subject we cannot avoid calling attention to the greater frequency with which instances are brought before us of the distortion in portraits caused by the unequal expansion of the paper when wet. It is obvious that the method we speak of would to a great extent, if not completely, obviate its occurrence.

We would conclude the list of "minor helps" by again drawing attention to the plan we described a little while ago of immersing the developed plate, with little or no preliminary washing, into an acid solution of alum, using chrome alum in preference to the ordinary alum, on account of the smaller quantity required and the consequent increase in the rapidity with which it can be eliminated till a mere trace only remains. We have given it a fair trial, and are much pleased with the results. In the first place, we have found no perceptible disadvantage in entirely discarding the washing before aluming; and, secondly, even when plates have had a prolonged development we have found that the negative treated this way has, when fixed, little or no trace of the yellowness. Negatives finished in this manner have more wet-plate character than almost any other of which we have had experience. With the advent of warmer weather there is a possibility that a tendency to frill may be engendered. We trust not, and, meanwhile, shall be glad to learn from others their experience with this mode of treating negatives.

Mr. Cecil V. Shadbolt has quickly got his arrangements into form for aërial photography, and our readers will be interested to learn that the first ascents for the year of the "Sunbeam" are arranged to take place on Easter Monday and Tuesday, and we hope to be able to communicate at an early date full details of the success which, we trust, may attend them. Our readers will join us, we are sure, in wishing him a safe and successful journey.

Various chemicals have been recommended in our columns from time to time for drying-chambers, boxes for dry plates, paper, and soforth, and one or another has been pushed into notice as the best without any very logical cause for the preference. Owing to the researches of Herr E. Fleischer, however, a more definite value can be placed upon the various exsiccating matters employed, and an explanation given of their mode of action. His results, which we abstract, will be of considerable value to photographers. He says it is generally assumed that the air contained in a desiccator after exposure for a few hours to the desiccating substance is perfectly devoid of moisture. He made some experiments with a hygrometer, and found that sulphuric acid after a lapse of thirty-five minutes left thirty per cent. of the original moisture, after one hour eighteen per cent., and after one hundred and five minutes none at all. Calcium chloride after two hours left thirty-one per cent., after four hours twenty-five per cent., and after six hours twenty-one per cent. of moisture. These results are so very exact and conclusive that it is evident that chloride of calcium must be entirely rejected when quick and efficient exsiccation is required.

It may be remembered that Captain Abney, one of the examiners of the Council of the City and Guilds Institute, in his report last year, had to make some very depreciatory remarks upon the technical knowledge of the majority of the candidates in last year's examination. This year it is gratifying to learn that he says the results are much in advance of last, and that the past session marks a new era in the technical teaching of photography. We are not aware if it be possible for a student to gain a prize for photography who has never seen a camera, but we have heard of a prize being gained in a handicraft examination by a student who had no practical knowledge of the tools of the particular trade in question.

It is known that the late Duke of Albany was thoroughly *au fait* in photographic matters, as indeed all Her Majesty's sons are, and one of the last sad offices in connection with the interment was performed by photography, a negative being secured of the royal coffin as it rested on the bier under its crimson pall. Photography, in common with other arts and sciences, has lost a friend whose value will only be thoroughly appreciated now that he is taken from us.

Mr. G. A. Hahn has devised a sunshine recorder, differing entirely from those in use at the present time. It consists substantially of a retort exposed to the sun, and connected with a condenser and receiver placed in the shade, but in the open air. Bisulphide of carbon is placed in the retort, and a vacuum is made in the apparatus so that it may contain merely the vapour given off by the liquid. As long as the sky is overcast the liquid remains in the retort without distillation or condensation. As soon as the sun shines the bisulphide begins to boil, and the liquid collected in the receiver in a unit of time is proportional to the quantity of solar heat received in the same time.

The following method of testing the quality of glue, doubtless applicable in some respects for gelatine, is given in the *Tischler Zeitung*:—A weighed piece of glue (say one-third of an ounce) is suspended in water for twenty-four hours, the temperature of which is not above 50° Fahr. The colouring matter sinks, and the glue swells from the absorption of water. The glue is then taken out and weighed; the greater the increase of weight the better the glue.

A propos of the recent discussion on variously-coloured illumination for the dark room, in which singular differences of power in perceiving light by various experimentalists was shown, it will be interesting to make a note of a very elaborate series of experiments made by Drs. Kœnig and Dietrici, and communicated by them to the Berlin Physical Society. By means of an ingenious and elaborate arrangement these gentlemen caused minute sections of spectra to be placed in juxtaposition for relative comparison, and so to test the power of the observer's eye to detect slight differences of colour. Not to cumber the subject with too many details, we may say briefly that the results obtained enabled them to give three hundred as the number of differences of colour in the normal spectrum which the healthy eye could perceive. They observed three parts of the spectrum where the eye could appreciate differences with greater nicety. The position of the first of these maxima lay with a wave-length of 570 near the D line, a second greater maximum with a wave-length of 490 to 470 approached F, and a third smaller had a wave-length of 450 to 440. It was observed that beyond 640 and 430 these experiments could not be carried out; differences of intensity, but not of colour, could be discerned. This was particularly the case at the red end.

THE OXYHYDROGEN LIME LIGHT.

Few of your correspondents have had more experience with the lime light for lanterns than myself. For forty years I have lectured every winter and never had an accident. The accidents referred to in your article of the 4th instant were, I suppose, those in or near Bolton, and you will remember they were both caused by using ether for hydrogen. I have never seen the apparatus, but, as you know, ether is extremely volatile, the vapour often catching at a light several feet off.

But the ordinary lime light is of two kinds. The best for large pictures is that in which the two gases are mixed in a small chamber in the jet before impinging on the lime cylinder. This kind requires the use of two gas bags, and is perfectly safe provided equal pressure is kept on both bags. It sometimes happens that either people or articles of furniture cause the pressure-board of one bag to catch, whilst the other, of course, goes on. But this is manifest to the exhibitor at the moment by the light, and ought never to be allowed to continue to a dangerous extent. By increase of equal pressure this light may be made equal to pictures of twenty-five feet diameter. I have often had such in the large Town Hall of Ashton.

The second kind of lime light, and the best for pictures (say) fifteen or sixteen feet diameter, is formed by what is called a "blow-through" jet. In this jet the gases mix only at their exit from the tube, and cannot by any possibility cause an explosion. They are safer than any kind of paraffine lamp; for the heat caused by four or five wicks is intense enough, I should think, to volatilise the paraffine as dangerously as the ether above referred to. The blow-through jet requires only an oxygen bag, the hydrogen being supplied from the ordinary gas jet.

There is another very pretty little oxycalcium light (besides those in which alcohol in a spirit lamp supplies the hydrogen for the oxygen to blow through) which I invented many years ago, and used in my trinoptic lantern, described in Mr. Chadwick's interesting book on the *Magic Lantern*. It consists of a fountain argand lamp, having in the centre of the half-inch circular wick a small brass tube or jet of one-sixteenth or one-twelfth inch bore. This *feeds* the burning wick with oxygen and creates a small, white, intense light, which is again increased by the suspension of a lime ball half-an-inch in diameter by platinum wire right over the centre of the wick, which, becoming beautifully incandescent, unites with the flame and greatly intensifies it. This light is perfectly safe in any hands. The oil used is salad oil.

Now, one word as to the electric light:—My Rectory is lighted by it and I have a Gramme dynamo. But the electric light will only do for the lantern where the apparatus is fixed and permanent, as for large discs the *arc light* must be used. This is the case at the Crystal Palace. Incandescent lamps are seldom used of more than twenty-candle power. In these the *shape* of the light is bad for definition, and it is not sufficient for more than a small disc. Accumulators are as yet far from perfect, and it would require a very large number of them indeed to keep up an arc light for two hours. Depend upon it there is no light for the lantern equal to the oxyhydrogen lime light, and none more safe than the blow-through jet. St. Vincent Beechey.

SAFE LIGHT.

No. II.

There is no such thing known at present as a safe light. It is simply a question of comparative safety, and is in a very great degree dependent upon the manner in which the plates have been prepared.

I insist that any photographic plate prepared in absolute darkness has a certain amount of stability; that is, that it will bear a certain amount of exposure to actinic light, and still be able to resist the reducing action of any ordinary developer. If this were not so it would be impossible to produce a negative free from fog. The whole plate receives a slight general exposure to diffused light arising from two separate causes —reflection from the surfaces of the lens and reflections inside the camera. The first is far greater than is generally believed, but is very well known as the "ghost" or "flare" in certain cases. This is due entirely to light reflected from and between the inner surfaces of the lens, and gives the obnoxious flare spot in the form of a circular patch of considerable opacity in the centre of the negative. This flare spot is caused by the stop being at such a distance from the lens that the reflected image of the view in front of the lens only extends over a small angle. The amount of light which thus reaches the plate within this angle (through which the reflection is visible) is quite sufficient to fog the plate. The remedy is to alter the position of the stop until the reflected image is visible over as wide an angle as the plate subtends. The reflected image is always there, and consequently always acts upon the plate; yet a plate properly exposed shows no sign of fog, while one under-exposed cannot possibly be developed fully

If, therefore, it be granted that a photographic plate does, when carefully prepared, possess a certain amount of stability it is not difficult to believe that, unknowingly, this amount may have been lessened by preliminary exposure, not only during manufacture but in the various manipulations necessary before development can commence.

It must be borne in mind, too, that this preliminary exposure would have the effect of increasing the apparent sensitiveness of the plate. It will then, I think, be allowed that the greater part of the commercial plates must have had a very full share of this spurious sensitiveness, and that this must still be the case where coating and drying are not conducted in absolute darkness. It is quite impossible for all the operations to be done in the dark. For example: the plates must be examined for defects; but, as far as I can ascertain, the most reliable plates are those in which the working light is not only reduced to a minimum but the greatest attention is paid to the non-actinic character of the light, and also that the plate should only be exposed to this for as short a time as possible.

We now come to the question of what is the safest light, and to this only a qualified answer can be given. It was asserted at one time, some three or four years ago (but I cannot lay my hand upon the exact date), that when a plate had received a slight preliminary exposure to light, just sufficient to develope a stain, and that then the plate was exposed to the spectrum, while the blue end had a powerfully-actinic action the red end had a reversing effect, actually undoing the work which had before been done by light. Here, then, was the problem to solve: find a real red light, and it not only would be safe for working by, but would actually restore plates accidentally exposed. It would hardly have been a *safe* light for all that, for I expect we should have had complaints that the plates would not develope at all—that the red light destroyed the work done in the camera. Anyhow, it caused me to consider the subject and to experiment upon it; but, alas! only with the result of finding that, try whatever combinations I would, there was always some actinic light which found its way to the plate through every tone and depth of red I could procure.

The experiments themselves, however, were extremely interesting, particularly in the extraordinary differences in colours, which to the eye were very similar, and which were revealed instantly by the spectroscope. It was easy to understand how many of the deepest ruby tints were utterly unsafe, when, although the eye could not detect it, the spectroscope revealed the presence of a large proportion of blue. Now, without going deeply into the scientific question of colour, everyone knows that the blue end of the spectrum contains all, or very nearly all, the actinic rays, and that, consequently, blue photographs as rapidly almost as pure white. It is, therefore, self-evident that a "ruby" glass, which also transmits some of the blue, cannot be made safe by doubling its thickness; it remains absolutely the same. The surface must be extended to give the necessary amount of working light, when the same proportion of hurtful rays are present as would be from the less surface of a single thickness. The blue rays must be kept out, and, if possible, the yellow ones too; for why has bromide been employed in photography except for its greater sensitiveness to the yellow than iodide or chloride?

It is, therefore, utterly inadmissible that yellow of any kind can be a safe light, except under the conditions I have named, namely, that the plate is sufficiently stable to resist the action of even white light. This, too, fully explains the feat often performed of successfully developing a rapid bromide plate by ordinary diffused light. It is only a question of degree. The white is safe for a time, yellow for a very much longer time, and red for a still longer time.

It was clearly demonstrated a short time since, by Mr. B. J. Edwards, at the Photographic Club, that of two lights of as nearly equal illuminating power as could be ascertained, by the test of reading printed matter, the yellow had about four times the actinic action of the red. This fully confirms my own early experiments that the safest light is a red light, and that a light is only really red when the blue is entirely kept out of it. In practice this is easily done by the superposition of a suitable yellow. The red, which before allowed some of the blue rays to pass, is then noticed to have had a crimson tint. The addition of a yellow film alters the tone to scarlet; but while completely cutting off the blue it does not appreciably diminish the working light.

It becomes, therefore, more a question of personal appreciation than absolute safety. There are many people to whom a red light is positively painful. To such I would say—decidedly employ a yellow light, but do not for a moment believe it is, or that it can possibly be, safe. Look at it with the spectroscope and say if it can be safe; all the red, all the yellow, and all the green comes through. There is no such thing as a yellow light to be found unless it be in the spectrum, and even then it is very doubtful whether it is a simple or a compound colour. It certainly does not exist as a simple colour in any of the colours or pigments which pass by the name of "yellow;" for these, as far as I could ascertain, all contain an immense proportion of red. A most curious and interesting experiment to prove this is to take a piece of violet or purple glass and look at any yellow substance through it.

We will now speak "by the book," and I quote *Tyndall on Light:*—"This is purple because it destroys the green and the yellow, and allows the terminal colours of the spectrum to pass unimpeded. From the blending of the blue and the red this gorgeous purple is produced." What should happen, then, if we look at any object through a purple medium? Only the red or blue which happens to be present in the object looked at will be seen; any other colour will be absorbed by the purple glass. Look at the natural yellow. Take, for instance, a calceolaria and a scarlet geranium side by side; through the purple they are indistinguishable. Turn to the gravel path, to faces of your friends, or to the sunlit clouds, and everywhere that the eye sees a tinge of yellow this simple spectroscope shows a brilliant red. It must be existent there in what *we call* "yellow," or it could not be sifted out by the purple glass, which will allow none but red and blue to pass.

The weight of argument is manifestly in favour of the reddest possible light. Yellow would appear to be admissible only in the sense that its action is slow compared with white or blue light, while any shade of green as tending to cut off red and admit blue would appear to be the very worst of all. GEORGE SMITH.

NOTES ON THE LIME LIGHT.

[A communication to the Edinburgh Photographic Society.]

At the present season of the year the interest in the optical lantern begins naturally to decline; and yet, in one respect, it is a suitable time to write a paper, because the impression left by the winter's work is still fresh upon the mind. I venture, therefore, to communicate to this Society the following extracts from my note-book.

In the process known as the oxyhydrogen, or mixed gases, one-twentieth of an inch has been found to be a useful size for the orifice of the burner; but, as a biunial lantern consumes a large quantity of oxygen, I have tried this year to reduce it. I find that it may be reduced to one-twenty-fifth of an inch without much loss of light, but I still give the preference to the former size when economy is not an object. The actual size of the orifice, however, is not all which we have to consider; the distance inwardly before the bore begins to expand must also be taken into account. I lately purchased two burners, the nipples of which, when gauged with a needle, corresponded exactly in size of hole; yet one transmitted thirty per cent. more gas than the other in the same time, and gave a better light. On examination it appeared that the bore of this nipple measured one-twenty-fifth of an inch at the orifice, but, after passing inwards one-sixteenth of an inch, expanded to one-tenth of an inch; whereas the bore of the other extended three-sixteenths of an inch inwardly before it began to expand. On drilling the wide part of the latter lower down, it immediately transmitted the same amount of gas and gave the same light as the former. These nipples are sold at a low price—not more than one shilling or eighteen pence each—and hence it is a good plan, if you use a dissolving lantern, to purchase half-a-dozen or more and try them over until you find two to correspond. Platinum points are more expensive, but they are not necessary, as the brass points burn away very slowly and last a long time.

The distance of the point of the burner from the lime, measured diagonally, should be about a-quarter of an inch, when the angle of incidence is 45°. If you approach nearer, the dark cone of imperfect combustion in the centre of the flame will be apt to touch the lime, and, if so, a dark nucleus in the middle of the "spot" will be the result. The point of the nipple will also burn away faster, and will constantly be getting choked up with particles of lime; whereas, at a distance of a-quarter of an inch, it remains clean and bright. When the angle of incidence of the burning gases on the lime is less than 45°, the cylinder must be brought nearer. I have one burner, bent at an angle of seventeen degrees, which works best when it almost touches the lime. The flame then plays along the face of the cylinder, heating a large area and giving a very good light upon the screen.

I have quite discontinued working with very heavy weights on the bags, such as one and a-half or two cwts., finding the lantern more difficult to manage without an assistant, and the danger of accident greater. Abundance of light for all ordinary purposes can be got with three-quarters to one cwt. on an eight-foot bag, if the joints are gas-tight and the taps turned on full. I have never had an explosion, nor an injury from fire to any part of the apparatus, during an experience of many years; but I take certain precautions when working away from home, which it may be useful to mention:—1. Never allow any volunteers in the audience, who think they know "a little of magic lanterns," to come forward and help you. It often happens that they know less than they suppose.—2. Always strap on the weights to the pressure-boards, or tie them tightly with string; the "skeleton" boards, as they are called, are apt to roll over on one side during the lecture, and to allow one or both of the weights to fall off.—3. Place the boards at a sufficient distance from the wall so that they cannot touch it in their descent, and put a reliable person in charge of them, with strict injunctions to allow no one to come near.

I have spoken of very heavily-laden bags being difficult to manage, but a further objection is that you cannot so easily get a noiseless flame if you go beyond the three-quarters or one cwt., especially when the orifice of the burner is small.

Other causes of "roaring" or "humming" are as follow:—1. A roughness in the bore of the nipple, and usually in the narrow part of the bore near to the point. Polish the interior of the bore by rotating a needle in it with your finger and thumb.—2. The two gases present in the wrong proportions; an excess of hydrogen will make a humming noise, which on turning on a little more oxygen will disappear.—3. Atmospheric air, either in the hydrogen or in the oxygen. The effect of this is well seen in an ordinary house-gas jet, which roars on first lighting it, until all the air is burnt out; also, in Broughton's ether tank, which does the same.—4. The mixing chamber too small or altogether absent. What we call the "mixing chamber" is useful, although some have said to the contrary, and if it be suppressed you will find it hard to get a silent flame—especially so in the "ethoxo" process, since ether vapour does not mix with oxygen so easily as coal gas. When any impurity—such as common air or nitrogen—is present in the gases the flame will often roar during the whole of the lecture, unless you work with a large mixing chamber.—5. The plug of the dissolver is sometimes a cause of this defect. The two gas passages in it may not be equal, and the hydrogen may begin to pass before the oxygen. A roaring noise will then be produced at the orifice of the burner *during the dissolving*. File away a little of the oxygen groove and the noise will cease.

Whilst on this subject of "dissolving," I may allude to the snapping noise, like that of a percussion cap, which occurs with some burners of the blow-through kind, when there are two concentric tubes, and the outer tube of hydrogen projects beyond the inner tube for the oxygen. I thought at first that it might be remedied by turning on a larger by-pass hydrogen flame, or by altering the plug of the dissolver so as to give the advantage to the hydrogen. It was suggested to me, however, as more effectual, to throw a little oxygen into the by-pass flame, and this I found to answer perfectly. It acts by keeping the base of the flame at the outlet, and by not suffering it to sink back into the chamber beneath; but you must use only a small quantity, or the lime will become incandescent in the lantern which ought to be dark.

I strongly advise that all dissolvers should be made with a by-pass tap to both gases; for, even in the oxyhydrogen process, a little oxygen in the by-pass is very useful in keeping the lime of the dark lantern red hot, and thus preventing it from cracking when the blow-flame returns. The dissolving is also better, since the slightest touch of the handle makes the lime incandescent and brings in the second picture.

Manufacture of Oxygen Gas.—I have a word to say on the use of chlorate of potash for preparing the oxygen. There is a difference in the ease and rapidity with which the oxygen mixture gives off its gas. The last sample which I had was purchased from a good London house, and labelled "pure recrystallised," but it required a stronger heat than usual to decompose it. I was advised to apply to Messrs. Kurtz, of St. Helens, Lancashire, who are manufacturers, and have a good practical knowledge of the subject. They suggested that the quality of the oxide of manganese might make a difference, and sent me two samples—one containing eighty-three and the other ninety-three per cent. of real oxide. Black oxide of manganese is a mineral found native in Devonshire, and varies much in percentage of $Mn\,O_2$, moisture, and hardness. After experimenting with different samples, I am inclined to think that the kind which breaks with a conchoidal fracture and is very hard to pulverise is the most suitable; but there is probably something not yet clearly made out, because the chlorate of one crystallisation supplied to me by Messrs. Kurtz appeared to give off its gas at a lower temperature than the pure recrystallised, with the same sample of black oxide.

Broughton's Ethoxo Lime Light.—When coal gas is not available I still continue to use the ether process invented by Mr. Broughton, of Manchester. From letters received I gather that ether vapour is thought by many to be a more explosive substance than hydrogen or coal gas. Such, however, is not the case. The experiments of Sir Humphrey Davy and other chemists have shown that coal gas mixed with atmospheric air and ignited, explodes with ten times less violence than hydrogen gas, and that ether vapour will not explode with air. It will explode strongly, however, with oxygen in the right proportions, which have never been correctly determined, but are said by some to be six, and by others ten, volumes of oxygen to each volume of ether vapour. The "detonating line," if I may be allowed the expression, is very narrow, and an excess of oxygen on the one side, or of ether vapour on the other, prevents the explosion from taking place.

An opinion also exists that the ethoxo lime light is altogether more powerful than that of hydrogen or coal gas, but I have not been able to verify this in my own experience. With me there is practically very little difference between the three; but if I were asked to arrange them, it would be in the order before given, namely, hydrogen, coal gas, and ether. I should place hydrogen gas first in its power of producing incandescence of the lime when mixed with oxygen.

In Broughton's tank the ether is not vaporised by heat, but a small quantity of oxygen is passed through it. This constitutes a source of danger, because an explosive mixture might be formed if the disengagement of ether vapour were not sufficiently copious. The oxygen should be *saturated*, or nearly so, after which the mixture will burn like common gas. Mr. Broughton seems to have studied this part of his subject carefully, and I have received from him tanks with horizontal septa, in which the oxygen travels through more than a foot of ether, and others with vertical septa, where it passes over as much as six feet of ether.

Any of the above tanks will answer the purpose, but it is obvious that, through defective soldering in the manufacture, they might possibly fail, and pass the oxygen by a much shorter route than that above indicated. Or, supposing the apparatus to be right, the ether might be wrong, and in either case a simple and reliable test of efficiency promises to be useful. Such a test is found in the *colour* of the flame. When you have purchased a tank fill it with the lightest methylated ether of ·720 sp. gr., and light the flame at the jet of the lantern. If it burn yellow and luminous, like the flame of a candle, the proportion of ether will be sufficient to give safety. So much for the general directions; but now allow me to go into particulars, because this test, when properly applied, is as good as an analysis.

To study the colour of the flame effectually it is not enough to turn on the tap gently and to allow it to burn against the face of the lime. The lime would impart to it its own colour, and, therefore, must be taken out of the way. Close the O tap of the jet entirely, and put on a strong pressure from the H tap of the jet until the flame shoots out, like a blow-pipe flame, to a length of six inches. You will then notice one of three different stages indicating less and less ether, before the last or explosive stage is reached.

1. In the first stage, when the ether is plentiful, the flame is yellowish, with an outer envelope of blue most marked at the base and point, the blueness being due to oxidation by the surrounding air. This flame, when allowed gently to play upon the lime cylinder, does not heat it red hot, except at the edge of the flame, but sometimes deposits carbon upon it.

2. With a smaller quantity of ether in proportion to the oxygen the interior yellow flame dwindles away, and the outer envelope of pale blue becomes more and more pronounced, until the flame is blue throughout with an edging of violet next to the air. This flame will heat the lime to bright redness, but it will not make it glow. By turning off the tap suddenly you find that it is not explosive; for it dies away like common gas, and at last goes out without passing back into the mixing chamber beneath.

3. In the third stage the outer envelope of violet has encroached upon the blue, just as the blue before did upon the yellow, and the whole flame is of a fine violet tint, fringed with a dull red or purple. It will now heat the lime to whiteness and make it shine, but not with the full degree of incandescence. It cannot be termed very explosive, because if you turn off the tap it goes out quietly. I am not prepared to say, however, that it could not be sucked back or forced back into the mixing chamber; but, if so, my knowledge of the subject teaches me that the explosion would probably be an extremely-rapid combustion rather than an explosion properly so-called.

4. In this last stage there is not a very material difference in the colour of the flame, which is still a shade of violet; but *the cone of imperfect combustion* at its base, which you can easily see projecting from the point of the jet, is *very much smaller in size*. Instead of being three-quarters or one inch long, as it was before, it has diminished to a quarter or one-eighth of an inch, and if you find this you may be sure that there is danger. When you turn off the tap the flame will pass at once into the mixing chamber with a sharp report. You will, perhaps, say —"Will it not pass still further and blow up the ether tank in which it originated?" Let me explain that I have taken the precaution beforehand to affix to the jet a small pumice chamber supplied to me with the tank, and the flame on reaching this can go no further. I will say a few more words on this subject.

Back-pressure valves—whether made of metal or silk—however good for arresting the flow of gas, are, according to my experience, useless for stopping flame. If you fill a small india-rubber balloon with explosive ethoxo gas, and place it behind one of them, the gas will burn at the mouth of the lantern jet as long as the contraction of the india-rubber keeps up the pressure; but as soon as the balloon is nearly empty the flame will rush back through the whole length of the jet and through the valve, shattering the balloon to pieces. The pumice safety chamber, however, is more effectual, and I have filled the same balloon five times running, and fired the gas with a loud report, without any other effect than shaking the pumice and pulverising a part of it, the balloon on the far side remaining intact.

My advice, then, to persons holding crowded exhibitions is to procure two of these pumice chambers, to have them properly tested, and to place them—one upon the H nozzle, and the other upon the O nozzle of the tank at the end nearest the lantern. In addition to this a back-pressure valve may be put on the O nozzle of the tank at the end furthest from the lantern to prevent suction if a weight were to fall off the bag; the protection will then be complete. The tank itself has a reserve chamber, so that no back suction or forcing of *ether* into the bag would be possible; but it would not be wise to subject the best of safety arrangements to the strain of a suction backwards. In attaching the tubes be careful to use only the thickest and best india-rubber. Ether exerts a solvent action and softens the commoner kinds, which speedily give way and produce leakage.

The principal inconvenience attending the precautionary measures I have suggested is that they lessen the pressure of the gas, and, consequently, the intensity of the light. In the first tanks sent to me by Mr. Broughton, with horizontal septa, I could not use them on that account; but in the last tank received from him, which has vertical septa, the pressure is so strong that I can overcome these obstructions and still get all that I want, with no more than one hundredweight on the bag.

Two questions have still to be answered:—Can the ether be used over and over again by simply making it up to its original bulk with fresh ether of ·720? To test this point I took five fluid ounces of ether which I had put away in a bottle as having been too often used to be reliable, and, after filling it up to eight ounces with ether of ·720, I poured it into a tank made to hold fifteen ounces. On passing the oxygen the flame burnt yellow, but slightly inclining towards blue. In half-an-hour it burnt pale blue, and in another half-hour violet. Then, in another quarter of an hour the gurgling noise in the tank became irregular, indicating that the ether was evaporating down almost to dryness and that the last of the septa had been reached. On turning off the tap the flame went out quietly without explosion, and the tank when weighed was found to contain exactly three fluid ounces of ether. This experiment speaks for itself; but, to make assurance doubly sure, I shall still continue to reject what remains of the ether after using it a certain number of times in the tank.

But an objector may raise another difficulty. He may say that the lecture room is sometimes very cold, and this would be likely to hinder the volatilisation of the ether. To find how far depression of temperature affects the result I took two of Broughton's tanks—one with horizontal and the other with vertical septa—filled both with methylated ether of ·720, and placed them in a vessel containing ice. After leaving them for six hours in a cool cellar well wrapped up with flannel I brought them in the pan just as they were, in their flannel jackets, and connected them with the lantern. Both burnt at the jet with a blue flame, having a small kernel of yellow in its centre, and worked much in the usual way, excepting that less oxygen was required at the O tap of the jet to render the lime incandescent. This result was better than I anticipated, for I had great fears beforehand that the ether would not rise sufficiently at a temperature of 32°, and that the only effect of passing oyxgen would be to fill the tank with explosive gas.

The Oxygen Bag as a Source of Danger.—This bag has been known to take fire more than once, even in the blow-through or safety process, and the cause is supposed to be an accumulation in it of a dusty or powdery substance produced by the disintegrating action of chlorine present in the oxygen as an impurity. With the experience we have of the burning of flour mills, and ignition of coal-dust in mines, it is reasonable to suppose that this powder would burn with extreme rapidity if any flame were allowed to travel backwards into the bag. I would suggest, therefore, that a back-pressure valve should be placed on the nozzle of the bag when such a substance is known to be present. After long use, however, my own bag is quite free from powder, and the only precaution I take is to thoroughly purify the oxygen. Pass it through two washing-bottles, the long delivery tube of the second being closed at the end and then perforated with a number of small holes, like what is called a "rose burner." Fill each bottle three-quarters full of solution of common washing soda in the proportion of a-quarter of a pound to the pint of water, and the oxygen will then be nearly or quite free from smell. No water will enter the bag if four or five feet of india-rubber tubing of half-an-inch internal diameter be used to connect it with the nozzle of the second purifier.

Since my last communication to this Society I have seen a small screw regulating tap, invented by Messrs. Oakley's assistant. It seems to me likely to be useful in preventing accidents, both in the oxy-hydrogen and in the ethoxo lime light.

I have also adopted the "Excelsior" limes of Messrs C. and F. Darker, Forest Hill, London, as giving the best light of any which I have tried. They are sufficiently hard and very well centered.

After I had finished my "notes," and made them almost ready for the printer, I saw a report of the disastrous explosion at the Chadderton Town Hall, and of the evidence given by Professor Roscoe. He entirely condemns the use of the ethoxo light, but allows that he has had no practical experience of it. If he had tried it I think he would have come to a different conclusion.

The cause of the Chadderton accident was undoubtedly the forcing of a little ether backwards into the oxygen bag from absence of a reserve chamber, which ought to have been provided. The same thing, in substance, has happened more than once with the mixed gases. A weight has fallen off one of the pressure-boards and the expansion of the gas in consequence has sucked back gas from the other bag. I think the confidence of the public will not be fully restored until back-pressure valves and safety tubes are brought into more general use.

I have also within the last few days seen an account of an accident at a magic lantern entertainment, where the mishap was said to be caused by a rent in an india-rubber tube. Now it may seem at first that a rent in the tubing would not be a very serious matter—that it would simply allow a free escape of the gas to which the tube belonged. But if you consider for a moment you will see that it would also allow *a return current of the other gas*, and that the two would mix at the point where the tube was injured, instead of in the mixing chamber of the jet.

T. Frederick Hardwich.

MEASUREMENTS IN LANDSCAPE PHOTOGRAPHY.

Every lover of landscapes as depicted by the aid of photography must at times have felt how interesting it would be to have at the foot of the view, or somewhere convenient for reference, an account of the dimensions of the important objects included, as well as the distances of hills, mountains, and other natural objects that form the background of the picture. Most artists take care to have a man or some figure of a known height near the object to be specially brought out, so that the eye of the observer at first glance may form an idea of its proportions.

If by some simple apparatus the actual measurement, or a close approximation, can be readily obtained, I venture to think that a short time would be spared to each picture for the necessary observations. I propose, in the following remarks, to touch upon those instruments suitable for the purpose:—1. For showing inclinations and vertical heights.—2. Distances of objects in a direct line from the observer.—3. Horizontal angles and the distance apart, of different objects. Under the first head will be considered instruments that show altitudes by means of atmospheric pressure, by instruments showing degrees out of plumb or level, and by reflection. Of those that show by the weight of the atmosphere the aneroid barometer is the only one that need be seriously considered, as its accuracy when well constructed is such that differences of ten feet of ascent or descent can be at once seen. It is portable and not likely by fair usage to get out of order; whereas it is quite an undertaking to carry about a mercurial barometer. The aneroid will be found a capital travelling companion, both as a weather glass and altitude instrument—heights of *accessible* places being taken by simply setting the zero of the altitude scale at starting, opposite the hand, which will fall or rise as you ascend or descend from the level, and show at sight the number of feet. In hilly and mountainous scenery this is very interesting.

For inaccessible objects, or those hills that would require arduous climbing, a clinometer of some form is very useful, and generally the most available. These usually fold up so as to be portable, and have the sight separated as far as possible consistent with their construction, so that the eye may preserve a straight line when looking at the object. The lower portion of the hinged limb has a small spirit level inserted in it, so that the observer may see he holds it or places it on the camera-stand correctly, and then while doing so he raises the upper portion of the limb until the cross sight intercepts the object. An arc shows the degrees of inclination, and there is a supplementary table showing the rise in inches per yard horizontal. It follows that if the distance between the observer and the object be known it is easy to find out the height. Example:—26 degrees = rise of eighteen inches in each yard. If the distance from the base of the object be thirty yards, the height will be $1\frac{1}{2} \times 30$ = forty-five feet.

Several convenient forms of clinometers are made—some as folding rules six inches long and some are square or circular boxes, nearly all having compasses attached so as to take horizontal angles, as explained hereafter. Of the clinometers those with pivoted compasses are the best, and for a clinometer compass the one in a flat, square mahogany box approved by the professors of the School of Mines is a really practical pocket companion, as it gives degrees of inclination, general slopes, rise in inches per yard, and degrees of magnetic bearing.

Regarding a reflecting instrument; the most portable is the box sextant; but, while it is a most useful instrument for surveying, it requires too much time for the purposes of photographers; as all the calculations have to be worked out by trigonometry, and in most cases an artificial horizon (of mercury or perfectly flat glass) must be used.

A very simple method of determining the height of an inaccessible object when no instruments are at hand is the following:—Fix a staff of a known length (one of the legs of the camera extended will do) in the ground facing the object (tree, spire, tower, mountain top, &c.) to be measured, retire until the top of the staff agrees with the top of the object, measure the distance between the staff and yourself and the object and yourself, and, as you know the height of the staff, it is only necessary to multiply it by this proportion of the two to get the height of the object. Example:—Height of staff, five feet; distance from observer to staff, ten feet; and of observer to object, sixty feet.

The proportion being one in six, it is only necessary to multiply the five feet less the height of the eye from the ground (say three feet when kneeling) by six feet to get the answer. The rise being two feet in every ten feet run. The distances should be paced twice, and the mean taken to ensure the approximate accuracy. This plan is often used by military men.

To Determine direct Distances from the Observer and also Distances Apart of Different Objects or Horizontal Angles.—An instrument of a very ingenious character has been designed by Major Poste, and carried out by Mr. J. H. Steward, optician, Strand, London, to enable an observation to be made quickly and give distances, *without any calculation whatever*. The advantage of this is that not only can different angles be found, but considerable time saved when measuring the height of an object by its inclination from the observer. It is of moderate size, occupying about the same space in its sling case as a full-sized binocular glass, and, with the addition of sights, &c., suggested by the writer, it forms an admirable clinometer. All that is necessary to measure the distance of an object is to lay out a short base at right angles, and with the instrument to reflect the staff at the end of the base on the object. As soon as this is done the distance is shown by means of a cleverly-calculated arm intersecting a curved line. Any length of base can be used, and distances of 8,000 yards readily taken. The base can be measured before or after the observation, and the instrument is provided with an optical square, so that a perfect right angle may be laid out and the assistant or staff (the camera stand will do) placed at the apex of the angle.

Supposing it is desired to know the distance apart of two inaccessible or distant objects, it is only necessary to measure the distance of each object from the observer. Take a proportionate part of that distance—say one-tenth or one-twentieth—and place staffs at these points in a line with each object. If the distance between these two staves be measured, and it is multiplied by ten or twenty, as the case may be (that is, the proportion used), the distance between the two objects will be found. The widths of rivers, mountain gorges, &c., can also be ascertained by this instrument, and for those observers who care to go scientifically into surveying they can do with it all the work of the box sextant.

There is one great point with the mechanical calculator attached to the macrometer—that the divisions are units of the measurement employed; so it follows that, whatever the base is measured in, the distance will be given in that measurement. Yards, metres, chains, &c., can be employed at will. This instrument has been exhaustively tried by Her Majesty's Government and found very accurate. It has also been highly approved of by a number of engineers, surveyors, and military men. Being of strong make it is not likely to get out of order.

The photographer has at hand in his camera stand a capital rest for the instrument, and also, as explained, the means of making a staff to use when judging heights or distances. I am aware that some gentlemen do take with them on their tours a pocket barometer, and here and there a clinometer; but I hope the above may be interesting, and at a future time useful, to a number of your readers.

To get Angular Distances.—The compass attached to the clinometers or the macrometer can be used. The easiest mode of fixing the relative position of objects is to show their compass bearings, and then from that find the observer's own position on the ground. This can be done by taking bearings of two or more points and laying down the back bearings from those points. The point of intersection shows the spot of observation.

The compasses have check stops, so that the card or needle may be brought to rest and locked when the sighting vane intersects the object. The number of degrees shown by the compass for one object is subtracted from that of the other when the angle is registered.

G. R. Baker.

NOTES ON THE LIME LIGHT.—ON THE REV. T. F. HARDWICH'S PAPER.

[A communication to the Edinburgh Photographic Society.]

Being favoured with a sight of the above paper, I gladly add a few remarks which occur to me. As regards the light from jets, those I have most used have been only 1 mm. (one twenty-fifth) in bore, and I get with these ample light for a disc sixteen feet in diameter. But in discussing these matters I feel the want of a standard to go by—slides differ so, and some are satisfied with so much less brilliance than others. The personal element we cannot check; but I beg to suggest that it would be a good thing if some society would prepare and issue a "standard slide," of which copies could be had printed to one uniform density and transparency. We shall never get the most perfect jets till we have some such standard, to be cast upon a sheet of a given diameter. I think the best plan for the internal bore is to use a "broach," such as watchmakers employ, which is *very slightly* tapered—almost imperceptibly. Then, if a slightly-tapered steel wire be scored longitudinally with coarse emery paper, the bore can be beautifully polished at any time by turning it round. At one-eighth inch from orifice the taper should be widened. Much, however, depends upon the *outside* of the nipple, which should be nearly a knife-edge, and as thin as possible. The nipple I send, made from the point of a Wilson stylus pen, is not finished inside, but outside represents my idea of what a nipple should be, and, it will be seen, casts much less shadow than most nipples would do.

The only point I rather question is as to distance from the lime. Mr. Hardwich, I think, reckons his "angles" with the surface itself. So reckoned, I prefer about 35°, which keeps the nipple from *casting a shadow* when of proper shape. But with most nipples, on trial, I find more light the nearer the orifice, and the practical point seems determined by the distance needed to avoid clogging up. With larger orifices the distance does get greater. I begin with one cwt., and as pressure gets down put on half-a cwt. more to finish; but I certainly find more pressure, up to the capacity of the orifice, gives more light within at least certain limits. You do not, however, get light in proportion to extra gas. The best jet I know is one brought out by Mr. Place, of Birmingham—I believe in answer to my own pressing in part. It has the great merits of cheapness, and raising the lime the proper distance at each revolution. It was this latter I so much urged upon him some time ago.

I, too, find "excelsior" limes the best, and especially in accuracy of form. But of late, urged thereto by Dr. Maddox, so well known for his interest in photomicrography, I have turned my attention once more to oxide of zirconium. Within a short period lately, while absorbed in the adjustment of lenses for the lantern-microscope, which I have been working at for some time past with encouraging results (the proboscis of a blow-fly can be well shown on a screen from six to twelve feet long), I have cracked three condensers through omitting to turn the lime. I find the oxide can now be procured considerably cheaper than formerly, and I have just purchased an ounce to endeavour to make into pencils. Dr. Draper's experiments, to which Dr. Maddox kindly referred me, seem to show that the two great points are—first, exposing the oxide to intense heat for some hours before working up, during which heating it shrinks considerably; and, in the second place, to avoid all agglutinating material, but to make up with a little water only by the aid of great pressure. A pencil so made, which needs only be about one-quarter of an inch diameter by half-an-inch long (heated by the jet at one end) would probably be too fragile for ordinary lecturer's use; but, if it can be obtained, would be very valuable for scientific work, even if not really "indestructible." I should be very glad to hear from any one disposed to attempt its manufacture.

Like Mr. Hardwich, I think the "skeleton" boards very unsteady. I never use them, preferring plain boards, with a hinged double leg at one end, and a hinged stay or stretcher which ties to it. The support is the full width and cannot slip; and when the gas is half gone the stretcher unties and the boards go down on the floor. A patent has lately been taken out for a support which runs on castors and needs no adjustment whatever, the feet being in a rigid line with the top board, projecting in front; but of course this needs more floor space.

It is impossible to say too much in favour of the double washing of oxygen with soda. Not the least advantage is that you do just as well with common chlorate at 7½d. to 9d. per lb. I only now use about one-fifth of manganese, and find the gas comes off much faster, so that I often get the bag filled in twelve or fifteen minutes; indeed, the difficulty is to avoid a "rush" of gas. A little experience guards against this; and as for safety the india-rubber Woolf tops I use for wash-bottles are each a safety-valve against mere pressure.

In regard to the ether light: one main point in my opinion—and here I differ very seriously and strongly from Mr. Broughton's printed directions—is to turn on the hydrogen tap from the tank *first* so as to *vent all pressure* from the ether vapour. It is that which is the great source of danger; and this can be absolutely prevented. But while, on the one hand, I share Mr. Hardwich's profound regret that Professor Roscoe should have condemned indiscriminately and wholesale a process he admittedly knew nothing of (and, if I am not mistaken, even the mixed gases have exploded in Owens College, as a gas bottle, said to be so "safe," has done at the Royal Institution, and repeatedly in America), on the other hand I do not think anyone can use the ether light safely who has not *clearly before his mind its two special dangers*, and their reasons and their method of prevention. They are—first, the risk of want of saturation; and, second, that of "back-pressure." I do not think a few brief directions, and the statement that all is safe if these are followed, gives that *impression* to an operator, and I would urge more detailed instructions very strongly. Mr. Diggle, at Chadderton, evidently had not the faintest real conception of the very serious danger when he found ether in the supply-tube. I believe it was in the bag as well. He thought that when he had "poured it out" and the jet lit, all was right. The fact was, as I believe, that at first the oxygen far outweighed the vapour as regards *oxygen*-supply (and it was the bag which exploded). But by degrees the oxygen in the bag got exhausted, while the ether in the bag (I cannot understand the bag catching fire unless ether was in it) *still evaporated at the same rate*, until at last it was bound to reach the exact explosive point. That is my reading of it after the evidence.

All this attaches great importance to the new pumice safety-chambers. If they stand exhaustive testing they will be a great boon and comfort to many. Hemming's packing has failed, so has Gurney's water safety-chamber, and gauze is a sheer delusion; while anything that pretends to be "safe," and is not, is obviously more harm than good, since reliance is placed upon it which there is nothing to justify, and other care which might prevent accident is neglected. But a *bonâ-fide* safety arrangement is another thing; and I hope Mr. Broughton's pumice-chambers may ere long receive sanction which cannot be disputed. LEWIS WRIGHT.

LECTURES AT THE ROYAL INSTITUTION.

PHOTOGRAPHIC ACTION.

THE last lecture of the series was given on Saturday last, the 5th instant, before the same audience which have attended the other lectures. A commencement was made by referring to the different modifications of the molecular kinds of bromide, and the conversion of the green form into the orange form by mechanical pressure. The colours of the two kinds were very well seen, as they were exposed side by side in the lantern, which, by-the-bye, has been ably presided over during the course by Mr. C. Ray Woods. Various photographs taken with the invisible rays were shown on the screen, and then the lecturer passed on to consider the rays which were potent in causing the reversal of the photographic image. He showed that an image of the carbon points thrown through red glass on to a sensitive plate which had been exposed to light, and then treated with bromide of potash, caused a destruction of the action, and further emphasised the fact that not only red rays but blue rays were equally efficient by showing that the entire spectrum apparently undid the preliminary exposure The image was developed on the screen and turned out successfully.

A short account was given of the history of photography in natural colours, commencing with Seebeck's notice of the colouration of chloride of silver in 1810. The labours of Poitevin, Niepce St. Victor, Simpson, and St. Florent were briefly alluded to, and the experiments made by the lecturer were also described. According to Captain Abney the colours are due to two or three kinds of molecules, which are oxidised molecules of silver sub-chloride. The impression of colour was much more rapidly taken by the sub-bromide or violet-chloride in the presence of all kinds of oxidising material—such as bichromate of potash, peroxide of hydrogen—whilst in the presence of those substances which could take up iodine, bromine, or chlorine, the production of colour was impossible. The lecturer exhibited spectra in natural colours on paper, on gelatino-chloride, and on daguerreotype plates. In the second the colours were readily seen by transparence, showing that they did not result from interference.

The spectra on the daguerreotype plates were fairly brilliant in the blue violet and green violet, and the red was clearly marked. The lecturer stated that a mixture of the red and blue molecules would give a green molecule, and that these were probably similar in composition but different in mass, thus giving rise to difference in colour. The existence of orange, blue, and green forms of molecules in bromide of silver were adduced as exemplifications of the possible existence of more than one form of oxidised molecule.

The audience examined the examples of colours with marked interest. The possibility of photography in colours in the future was discussed, and the advent of such a possible process insisted upon if earnest workers in the field would but put their "shoulder to the wheel." The effect of dyes on films was then experimentally demonstrated, and in a photograph of a coloured plate it was shown that the use of cyanine blue made the yellow nearly as actinic as the blue. The principle that the work done on a sensitive plate corresponded with the absorption of the particular rays was further insisted upon experimentally, and three slides of spectra were shown, exhibiting the fact that some sensitive salts could themselves act as sensitisers to others. With this our readers are familiar, so we will not enter into the arguments the lecturer adduced at this part of the subject.

The clock at this point struck four, and it should have marked the termination of the lecture, but it was evident from the shoal of diagrams which were hung that Captain Abney had by no means exhausted the subject-matter of his lecture. He kept his audience a few minutes, however, in showing them one problem which required solution, and which, as it is novel, we give for the benefit of our readers. That the lecturer had a partial solution of it we believe, but time did not permit him to enter into it. A disc of cardboard, on which were pasted black strips as given in the diagram, was made to rotate very rapidly on a whirling stand, and to the eye, where the indentation in the star at A and B took place, a thin, dark circular line was visible instead of a lighter one, which would naturally be expected. To the eye the effect might be due an optical illusion or to some physical phenomenon connected with the eye; but a photograph showed that the white ring would be photographed when the rotating disc was set in motion, and that, therefore, it was not subjective.

On another disc, with the star showing white spurs on a black background, the lines at A and B were whiter than the adjacent spaces instead of darker, as would be expected, and these also showed in the photographs. This concluded the lecture, and brought the series to a termination.

PHOTOMICROGRAPHY FOR BEGINNERS.

[A communication to the North Staffordshire Photographic Association.]

AS some of our members are ardent microscopists as well as amateur photographers, perhaps a few remarks upon using the camera and microscope together may prove useful, and should anyone profit thereby, even though only in a slight degree, it will give me great pleasure to have done what has lain in my power to assist him, and if possible to transfer to other persons my own ardour in this interesting branch of our art, the practice of which, unfortunately, my rather weak eyesight will not allow me to pursue.

In the first place, all that is necessary for the production of photographs from microscopic slides is a good microscope, a camera of quarter- or half-plate size, and a good lamp giving a steady flame. I have in my practice used a microscope by Matthews—an old-fashioned one with plenty of metal at its base, giving it a firm stand, and one which is capable of being placed in a horizontal position. The camera, an ordinary bellows-body one, is joined to the microscope by removing the eyepiece of the latter and the lens of the former, and placing the camera, with microscope attached, so that when the lamp (this is one flame) is placed behind the condenser the rays of light will pass straight through the whole affair, and fall exactly in the middle of the ground glass. You can fill up the interstice between the microscope and camera-front with anything suitable, such as a silk handkerchief wrapped round the brass tube; or it would, of course, be a better plan to make a camera front specially fit the microscope tube.

Having seen that the lamp, light, condenser, object-glass, tube, and centre of ground glass are all in one plane, you may commence operations with any suitable slides. In the first beginning, use a one-inch or half-inch power and practise with it until sufficient experience is obtained to warrant your proceeding to a higher power. When practicable, it is as well, or better, to use a low power and get a sharp negative; this, of course, may be afterwards enlarged by the lantern to any reasonable size. This enlargement is made upon argentic enamel paper from the accompanying negative of *Saccharina lepiscua*. I do not know how many diameters it is enlarged, but you will see that one of the animalculæ is now the size of the whole of the microscopic slide, glass and all. You will also see that this "enamel" paper is very suitable for such a class of work as this, on account of its freedom from apparent granularity.

The slides with which I have worked have been almost all injected and stained histological specimens. They are about the worst subjects one could choose as a beginner, on account of their brown and red colour. The specimen photographs which I hand round will show that the most successful are from slides which have had no staining operations performed on them, such as crystals, &c., &c.

The slides should be prepared expressly for photographic purposes. If sections, the thinner they are cut the better; in fact, they cannot be cut too thin. Be content with a half-inch objective first, fasten the slide in its place, and, having adjusted everything as above directed, cover your head and the camera as usual with a cloth, and focus first with the coarse, and afterwards with the fine, adjustment. It is as well to remove altogether from the camera the piece of ground glass, and replace it by a piece of plane glass which has been coated with a solution of white wax in benzole and allowed to dry. This will give a much finer and more suitable surface for the purpose than ground glass. When focussed as sharp as possible the dark slide and slate may be inserted and the exposure commenced. This will, of course, vary with the nature of the subject, and can only be judged by practical experience; but by using a stand and light, such as an ordinary argand petroleum lamp, after a few trials the necessary exposure may soon be judged. By the way, in focussing, and using a half-inch objective (never mind the same not being corrected for colour) with artificial light, and getting as sharp an image as possible on the screen, it will come out sharp on development. As to development: I prefer Audra's ferrous oxalate, for with it perfect control can be obtained, and should a plate be slightly under-exposed it may remain any length of time in the solution without fog, as in forcing with pyrogallic acid.

Again: should intensification be necessary do not use the mercuric iodide and hyposulphite intensifier. Some of these were treated with it, and they are almost useless now; whereas, had they been left alone, they would have been nice, thin negatives, from which transparencies could have been obtained. As regards the kind of plates most suitable for use with the microscope: do not use a quick plate—such a plate as is suitable for landscape work. One containing a fair proportion of iodide to bromide will give the best results, and be the most serviceable for use with artificial light. The exposure will vary from ten minutes to two hours, so there is plenty of time to meditate and smoke a pipe during the operation; and, as the development is done but slowly, one plate may be exposed while another is developed. For any other information I will refer you to the excellent articles which have lately appeared in the technical journals. W. B. ALLISON.

RECENT PATENTS.

PATENTS APPLIED FOR.

No. 5,817.—"Photographic Studio Backgrounds." JAMES SYRUS TULLEY, 235, Ball's Pond-road, London.—*Dated April 2, 1884.*

No. 5,911.—"Photographic Cameras." W. MIDDLEMISS.—*Dated April 4, 1884.*

ARTIFICIAL IVORY.

IN the following specification of a patent, by JARVIS BONESTEEL EDSEN, of Adams, Mass., U.S.A., we have a means whereby tablets of artificial ivory suitable, *inter alia*, for photographic miniatures may be prepared.

THIS invention relates to the manufacture of artificial ivory from xylonite or a cellulose compound.

The object of the said invention is the production of an article which closely resembles, and is adapted for use as, a substitute for ivory.

The said invention consists essentially in forming a composition chiefly of such substances as xylonite, or those elements which are formed chiefly of pyroxyline.

According to the present invention I form the xylonite or its equivalent substance of different densities, and in some cases of slight differences in colour, and cut the same into sheets, by any of the well-known processes for such manufacture, and then combine them in the said sheet form by rolling or pressing them together under great pressure, so as to compact the several sheets into one entire mass, but in such a manner as to preserve the peculiar characteristics of the structure of each sheet, and at the same time make such a compact body that, when cut into thin sheets, the various sections in the said sheets will show the different characteristics or grain of the original sheets of which the mass was composed, and thereby imitate the various growths or laminated character of the ivory.

It is evident that this composition and combination may be made of various materials and in various manners without departing from the nature of this invention.

Having thus fully described the said invention and the manner of performing the same, I wish it understood that I claim—

First. The method of forming artificial ivory or a substitute for ivory, by forming the material for the several growths or layers of xylonite or similar substance of different densities or different characteristics of composition; cutting the same into sheets, and then compressing the several sheets of all the elements into one entire mass; and making into sections the several layers as by the process of cutting, for producing the sheets to imitate ivory as hereinbefore set forth.

Second. An artificial ivory or substitute for ivory formed of xylonite or similar compound, the basis of which is pyroxyline, so as to resemble ivory, substantially as described.

PRODUCING PRINTS OR TRANSFERS OF PHOTOGRAPHIC PICTURES.

THE invention of Mr. Eugenio de Zuccato, of Charterhouse-street, London, in the direction indicated by the above title, has been of such a comprehensive nature as to have induced him to embody it in three separate specifications. It will be seen that they all relate to the utilisation of the Woodbury relief as a means of producing surfaces capable of giving prints in fatty inks. As these specifications follow each other in immediate succession in the patent records we shall adopt the same order.

No. I.

MY invention relates to an improved method or process of producing prints or transfers of photographic pictures, and is carried into practice in the following manner, that is to say, I take what is known as a "Woodburytype relief" of the picture which it is desired to print or transfer, and I lay this relief upon a sheet of paper or analogous material, placed on a slab or plate (such as those hereinafter described) having a smooth surface which is inked with printers' ink so as to form a grain, stipple, or series of closely-assembled lines or dots; I then press the said relief, the paper, and the slab or plate together by suitable mechanical means, whereupon the printers' ink will more or less completely "set off" and be impressed on the paper or analogous material, and thus form a grained, stippled, or lined picture or ink-photo. print corresponding to the said "Woodburytype relief." This grained, stippled, or lined image or picture may then be transferred to metal or lithographic stone by any method known to printers; or the grained, stippled, or lined image or picture may be photographed and a transfer made therefrom by any method known to photolithographers and photozincographers.

The term "Woodburytype relief" is well understood by photographic printers; but to prevent any misapprehension I desire to state that I mean a gelatine film in which the varying tints of a photograph are represented by varying thicknesses of gelatine, or a substitute for the said "Woodburytype relief," such as a cast or mould.

The materials which, for the purposes of my invention, I regard as analogous to paper, are such thin, flexible, or yielding materials as will readily take an impression in printers' ink. Among these may be mentioned tracing-cloth, ribbed or grained transfer paper, tin or other foil, gold-beaters' skin, silk fabric, or other suitable tissue.

To explain what I mean by "a slab or plate having a smooth surface which is inked with printers' ink so as to form a grain, stipple, or series of closely-assembled lines or dots," I quote the following as examples, viz.:—

(1) A lithographers' stone upon which a stipple or lined ground of any kind is imprinted.

(2) A zinc plate upon which a stipple or lined ground of any kind is imprinted.

(3) A slab of any kind upon which a tint or stipple in printers' ink has been inscribed or transferred.

(4) A slab or sheet of paper, either enamelled or plain, upon which a tint or stipple in printers' ink has been impressed, inscribed, or transferred.

By the term "printers' ink" I mean any ordinary printing ink in which a pigment is incorporated with an oily vehicle, or similar fatty inks such as are especially made and sold for the purpose of transferring. When I re-photograph the ink-photo. print I sometimes use an ink of which the vehicle is glycerine, mucilage, or a similar substance.

Soft wax, fat, varnish, soap, or a mixture of these materials may, in some cases, be used in place of ink when the image is to be transferred to stone or metal.

Having thus fully described my said invention, and the manner of performing the same, I wish it understood that I claim—

The production of a picture or transfer by pressing paper or analogous material between a "Woodburytype relief" and a slab or plate lined, grained, or stippled with ink, substantially as described.

No. II.

MY invention relates to an improved method or process of producing prints or transfers of photographic pictures, and is carried into practice in the following manner; that is to say, I saturate or ink a piece of fine network or other textile fabric either with printers' ink or with a transfer ink such as is used by lithographers, care being taken that none of the meshes or ribs of the fabric are blocked up with ink, but that each rib or thread is well saturated. This inked fabric is placed in contact with a sheet of paper; and either upon the said paper or upon the inked material I place a "Woodburytype relief," and the whole is then subjected to pressure by suitable mechanical means.

I can so vary the working of my invention as to ink the "Woodburytype relief" itself; but in this case the paper or analogous material must always be placed between the relief and the fabric. The pressure causes the ink to "set off" from the inked material on to the paper, upon which is thus formed a picture in a kind of stipple corresponding to the "Woodburytype relief." This stippled picture is then either transferred to metal or stone by any method known to printers, or it may be photographed, and a second transfer in fatty ink made, by methods known to photolithographers and photozincographers.

I can, if desired, so practice my invention as to obtain the grained or stippled image directly upon a plate of zinc or other metal, or upon a lithographic stone. For this purpose I first lay the inked fabric upon the plate or stone; I then place the "Woodburytype relief" upon the said inked fabric and apply pressure by suitable mechanical means as above described.

Fine wire gauze may, in some cases, be used in place of the textile fabric, and I may mention silk gauze, ribbed silk, ribbed or grained transfer paper, and bookbinders' cloth as examples of the fabrics I use, such fabrics as are thin and yielding or flexible being best adapted to the purposes of my invention.

The term "Woodburytype relief" is well understood by photographic printers; but to prevent any misapprehension I desire to state that I mean a gelatine film in which the varying tints of a photograph are represented by varying thicknesses of gelatine; or a substitute for the said "Woodburytype relief," such as a cast or mould.

Those materials which, for the purpose of my invention, I regard as analogous to paper are such thin, flexible, and yielding materials as will readily take an impression in printers' ink. Among these may be mentioned tracing-cloth, tin or other foil, gold-beaters' skin, a collodion pellicle, silk fabric, or other suitable tissue.

By printers' ink I mean any ordinary printing ink in which a pigment is incorporated with an oily vehicle; or similar fatty inks such as are especially made and sold for the purposes of transferring. When I re-photograph the ink-photo. print, I sometimes use an ink of which the vehicle is glycerine, mucilage, or similar substance.

Soft wax, fat, varnish, soap, or a mixture of these materials may, in some cases, replace ink, when the image is to be transferred to stone or metal.

Having thus fully described my said invention, and the manner of performing the same, I wish it understood that I claim—

First. The production of a picture or transfer by pressing an inked textile fabric or the like against paper or other suitable material by means of a "Woodburytype relief," substantially as described.

Second. The production of a print or transfer on paper or analogous material, which is pressed between a textile fabric or the like and an inked "Woodburytype relief," substantially as described.

No. III.

MY invention relates to an improved method or process of producing prints or transfers of photographic pictures, and is carried into practice in the following manner; that is to say, I take what is known as a "Woodburytype relief" of the picture desired to be printed or transferred, and I lay this relief upon a sheet of paper or analogous material, and on the other side of this paper or other material I place a roughened, grained, stippled, or lined plate which has been inked on its roughened side with printers' ink. The roughened side of the plate must be next the paper or analogous material. I then press the said relief, the paper, and the inky roughened plate together by suitable mechanical means, whereupon the printers' ink will "set off" or be impressed on the paper or analogous material, and thus form a grained, stippled, or lined picture or ink-photo. print corresponding to the "Woodburytype relief." This grained, stippled, or lined image or picture may be transferred to metal or lithographic stone by any method known to printers; or the grained, stippled, or lined image or picture may be photographed and a transfer made therefrom by any methods well known to photolithographers and photozincographers.

The term "Woodburytype relief" is well understood by photographic printers; but to prevent any misapprehension I desire to state that I mean a gelatine film in which the varying tints of a photograph are represented by varying thicknesses of gelatine, or a substitute for the said "Woodburytype relief," such as a mould or cast.

Those materials which, for the purposes of my invention, I regard as analogous to paper are such thin, flexible, or yielding materials as will readily take an impression in printers' ink. Among these may be mentioned tracing-cloth, tin, or other foil, gold-beaters' skin, silk fabric, or other suitable tissue.

By a grained, stippled, or lined plate I mean a plate of any moderately-hard material of which at least one surface is roughened, grained, or lined. As examples I may, on the one hand, mention a metal plate or block of wood which has been grooved or stippled, a cast of this plate or block in ebonite, dry gelatine, or celluloid; and, on the other hand, a sheet of emery cloth, sand-paper, or bookbinders' cloth.

By printers' ink I mean any ordinary printing ink in which a pigment is incorporated with an oily vehicle; or similar fatty inks such as are especially made and sold for the purposes of transferring. When I re-photograph the ink-photo. print I sometimes use an ink of which the vehicle is glycerine, mucilage, or a similar substance.

Soft wax, fat, varnish, soap, or a mixture of these materials may, in some cases, replace ink when the image is to be transferred to stone or metal.

Having thus fully described my said invention and the manner of performing the same I wish it understood that I claim—

The production of a picture or transfer by pressing paper or other suitable material against an inked roughened plate, or the like, by means of a "Woodburytype relief," substantially as described.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
April 15........	Bolton Club....................	The Studio, Chancery-lane.
" 16........	Photographic Club	Anderton's Hotel, Fleet-street.
" 17........	London and Provincial	Masons' Hall, Basinghall-street.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

The usual monthly meeting of this Society was held on Tuesday last, the 8th inst.,—Mr. James Glaisher, F.R.S., President, occupying the chair.

As had been previously announced the meeting was devoted to the exhibition, by the Society's lime-light lantern, of slides prepared by various methods for comparison of the results thereby attained.

Mr. T. Sebastian Davis, who had acted as Chairman of the Committee appointed to arrange the business of the evening, prefaced the exhibition by observing that photography had come into very general use for the production of slides for the lantern, and that for many subjects—but especially for architectural ones—photographs were much to be preferred to even careful hand-drawings: because details were represented that could not—in such a small compass as lantern slides—be drawn in by the artist, and in some subjects the details really gave the character to the whole. The various photographic processes that had been employed for the purpose—wet collodion, collodio-albumen, dry collodion, Woodbury process, gelatino-bromide, and gelatino-chloride—were referred to by Mr. Davies, who went on to say that he had many years ago struggled with the difficulties attending dry collodion for this purpose, the chief of which was that the plates, when prepared, would not keep. The introduction of gelatino-bromide had removed this difficulty, and the plates prepared by this process appeared to keep indefinitely, and, at the same time, gave much greater rapidity than before was obtainable; but, having perfected the negative process, we come now to the production of positives. Transparencies of a very high character—perhaps even the highest of all—had been obtained upon wet collodion. The difficulty with gelatino-bromide has been that the high lights were apt to be more or less veiled. Sometimes perfectly clear prints could be obtained, but not with certainty. The search for this perfect clearness had culminated in a process which is a very slow one—the gelatino-chloride: but this slowness is no disadvantage for the particular purpose now under consideration.

A series of slides made by wet collodion in the camera, the work of Mr. P. M. Fincham, from a variety of subjects, including views of Ilfracombe, Brixham, Tynmouth, Plymouth, and Clovelly were first shown.

Mr. F. Howard's slides, of somewhat similar character, were next projected upon the screen.

Mr. Meldola's slides, also upon wet collodion, were then exhibited. They excited much interest, as being records of the expedition sent to the Nicobar Islands in 1875 to photograph the eclipse of the sun.

Mr. C. Ray Woods then showed a series of slides, made upon wet collodion and toned by the ferrid-cyanide and uranium intensifying process, and by modifications with iron and copper suggested by this process. Some of those toned with copper, also with uranium and a trace of iron, were very rich. The iron alone gave a blue tone, which, however suitable for some special subjects, would not be likely to find general acceptance; whilst, when uranium was the only metal employed, the tone was warmer than—except as a particular fancy—would be desired.

Mr. W. England showed some slides made in 1860 upon wet collodion, upon coffee plates, and upon tannin plates. Of these the wet collodion were rather the finest. Some collodion slides, by Mr. England, of statuary subjects, were also shown. In these there was a black background surrounding the figure, with curtains at the top and sides. Coloured sheets of gelatine were used to give a glow to these curtains.

Several slides by the Woodbury process, sent by the Sciopticon Company, were next exhibited. Amongst these were some beautiful slides from microscopic objects, foraminiferous shells, and diatomaceæ.

A series of slides of Swiss scenery, by Professor F. W. Donkin, were then exhibited.

Mr. Moncrieff next showed a number of slides produced upon commercial gelatino-bromide plates, and developed with sulpho-pyrogallic.

Mr. J. B. B. Wellington exhibited a series of transparencies produced upon gelatino-bromide plates developed with Mr. J. B. Edwards's ferrous oxalate formula for chloride plates, with and without the addition of bromide of potassium as a restrainer. One of these, without the restraining bromide, was of a clear, pure black tone; whilst with the bromide the slides varied in colour, according to its quantity, through brown up to a claret colour. Three plates of a mill at Corfe Castle, developed in the different ways mentioned, showed the beautiful variety of tones obtainable.

Slides of Dr. Huggins's negatives of star spectra, and of the eclipse of the sun of 1871, were next exhibited.

Mr. B. J. Edwards showed slides printed upon albumen, and toned with gold and hypo. Some of these were very rich and fine; but Mr. Edwards said that equally good results could be obtained upon gelatino-chloride with much less trouble, and that was the process he should recommend.

The Chairman—in proposing votes of thanks to the exhibitors, to the committee, and to Mr. J. Cadett for the management of the lantern, which were carried by acclamation—said that, after all, wet collodion held its own very well, and, at all events, need not hide its head before the most recent productions of the art.

Mr. Robert Tindall was elected a member of the Society.

It was announced that at the next ordinary meeting, on the 13th of May, Mr. J. Spiller would read a paper *On Fading*, and Mr. W. E. Debenham one, accompanied by demonstrations, *On Illumination of the Dark Room.*

The meeting was then adjourned.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

The ordinary monthly meeting of this Society was held at the house of the Society of Arts, John-street, Adelphi, on Thursday last, the 3rd instant,—the Rev. F. F. Statham, M.A., F.G.S., President, occupying the chair.

The minutes of the previous meeting having been read and confirmed, Mr. A. T. Tagliaferro, of Malta, was proposed, and duly elected a member of the Society.

The Chairman then made the presentation of the silver medal given by the Society in connection with its monthly competitions for the best picture of the year. On this occasion the medal fell to the lot of Mr. F. A. Bridge for his excellent picture, *A River View*—a scene on the Thames. In making the presentation the Chairman took occasion to remark that many very artistic pictures were to be obtained in and about London if they were, as had been done by Mr. Bridge, carefully selected and then artistically treated. He quoted instances where most unpromising-looking subjects had been really artistically rendered, yet perfectly true to nature, in some of the illustrated periodicals, simply by judiciously selecting the point of view.

It was announced that at the next meeting Mr. Norman Macbeth had kindly consented to read a paper on an artistic subject, and members were requested to introduce a friend at that meeting, as the paper, from Mr. Macbeth's well-known ability, would doubtless prove a very interesting and valuable one, as that gentleman had devoted so much attention to the art aspects of photography.

Messrs. C. and F. Darker then gave an exhibition of objects in their polariscope lantern. Before commencing the exhibition,

Mr. C. Darker concisely explained to the meeting the principles of the polarisation of light and the use of the Nicol prism, illustrating his remarks by projecting sections of the tourmaline, Iceland spar, selenite, &c., upon the screen. Space will not permit of our reproducing Mr. Darker's remarks, but those who desire information on the subject of polarised light are referred to a leading article on page 145 of our issue for the 4th ult. A chameleon, several flowers and various designs, formed of selenite, were then thrown upon the screen, and the analyser being rotated caused the colours produced to change, and a most pleasing effect was produced, exciting considerable astonishment in those not familiar with the phenomena of polarised light.

Passing from what may be termed the more popular portion of the subject, Messrs. Darker exhibited specimens of rock crystal, showing a "cross crystallisation" which at times causes considerable inconvenience to opticians in the construction of "pebble" lenses. These defects, though not visible by ordinary light, were rendered very manifest when it was polarised. Various crystals—such as salicine, benzoic acid, santonine, our old friend (or enemy?) hyposulphite of soda, citrate of soda, tartaric acid, &c.—were next shown. A very interesting feature of this portion of the exhibition was the formation of crystals of boracic acid. A slide, upon which was a concentrated solution of boracic acid, was introduced into the lantern, and the salt allowed to crystallise. The display under the polarised light was very interesting. Next the effect of pressure on glass was demonstrated. A plate of glass was secured in a frame in such a manner that pressure could be applied to one edge at will by means of a screw. Until the pressure was applied the glass was perfectly transparent and free from colour; but immediately the pressure was applied brilliant colours were produced, which gradually disappeared as the pressure was removed, clearly demonstrating the effect pressure had in altering the molecular condition of glass. The effect of heat in altering the molecular state of glass was also shown. Different rock sections were next exhibited; and, finally, several photographs of various crystalline substances, produced by Mr. George Smith, were projected upon the screen. These pictures showed the advantage which would often accrue if certain objects were photographed in both kinds of light. Several of the slides exhibited, it may be mentioned, were kindly lent for the occasion by our contributor Mr. Lewis Wright.

The CHAIRMAN, in proposing a vote of thanks to Messrs. Darker for their interesting and instructive demonstration, remarked that photographers were inclined to look to the practical rather than the theoretical phases of the subject, and suggested that polarised light might be made available for detecting impurities or adulterations in the materials they employed. In doing so he directed particular attention to the effect produced by pressure and heat upon glass as demonstrated by the polariscope, and also pointed out that the working qualities of photographic lenses might be materially influenced by their being secured too tightly in their cells, so that greater pressure was exerted upon one portion of the glass than another. He (the Chairman) said that, however much might be read upon the subject, nothing could convey an idea of the effects of polarised light like a demonstration such as they had just witnessed.

The vote was carried by acclamation.

Mr. F. YORK exhibited and explained a camera he just had constructed, the principal feature of which was that, although it was oblong in shape, pictures either vertical or horizontal could be taken at will without removing it from the stand. This is accomplished in a very simple manner. The back portion of the camera which carries the slide can be easily detached from the base-board and replaced either horizontally or vertically. To enable this to be done the bellows, instead of being attached as usual direct to the front of the camera, is fixed to a disc of metal fitted to the front in such a manner that it can be rotated a quarter of a revolution. The simplicity and utility of the contrivance excited considerable admiration. He (Mr. York) mentioned that although this form of camera was, he believed, a novelty in this country, it had been in use for a considerable time in France.

A subject, taken from the question box, "Does the burnishing of prints produce any chemical change in them?" was then discussed.

Mr. HARRISON said that, as prints subjected to heat became of a warmer tone, some chemical change might possibly be produced by hot burnishing.

Mr. E. DUNMORE remarked that if any hyposulphite of soda, from imperfect washing, remained in the print it would be decomposed if exposed to a strong heat, as in burnishing.

The discussion—in which Messrs. Ayres, Ashman, Foxlee, and others took part—then became of a desultory character, and no very definite conclusion was arrived at.

The meeting was then adjourned.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AT the meeting of this Society, held on the 3rd instant, the chair was occupied by Mr. W. Coles.

Mr. J. B. B. WELLINGTON said that he had tried the formula for emulsion given by Mr. Henderson at the preceding meeting. He had attempted to reduce the quantity of water, but found that that gave a coarse precipitate which would not properly emulsify. He succeeded best when adding two or three grains of gelatine after the acetate was formed and before adding the bromide. The silver then emulsified properly, and he produced a transparency printed on a plate made from this batch, but he had not time yet to form a decided opinion as to the rapidity of the emulsion.

Mr. A. L. HENDERSON said that he could, by the method described, get an emulsion without any cooking that would give 25 on the sensitometer. He thought it important that the acetate of ammonia should be neutral. It was not so good either if the ammonia were in excess.

Mr. WELLINGTON thought that he had some excess of acid.

Mr. HENDERSON remarked that in excess of acid some silver was wasted, and the emulsion might be thin.

Mr. A. HADDON said that liquid ammonia was preferable to the carbonate for making a neutral acetate, as the carbonic acid given off from carbonate of ammonia masked the indication of the test paper, and, observing that the undeveloped plate shown by Mr. Wellington was of a rich orange red, inquired whether with that colour the emulsion was rapid.

Mr. HENDERSON replied that, considering the colour, emulsions prepared in this manner were wonderfully rapid. A little acetic acid might be added before coating; this made the blacks very clear.

Mr. W. E. DEBENHAM said that colour was no certain guide to the rapidity of emulsions. In some cases the colour of an emulsion had been referred to as evidence of its speed. Some orange or even red plates were quicker than some blue ones.

Mr. A. COWAN had just been asked to try the speed of certain plates; one of these was red and was slightly quicker than the other—a blue one.

The CHAIRMAN thought that colour was a guide in any particular process, but not when comparing the plates made by one method with those produced by another plan.

Mr. HADDON inquired whether Mr. Cowan found the orange or the grey emulsion gave the more density.

In the particular plates to which reference had been made Mr. COWAN had found a little more density with the grey.

Mr. HENDERSON thought that acetate of silver washed and added to bromised collodion should make a good emulsion.

An exposure shutter lent by Mr. Turnbull, of Edinburgh, was handed round amongst the members.

Mr. WELLINGTON then gave the following formula for an emulsion:—

Nitrate of silver	50 grains.
Citric acid	50 ,,
Water	4 ounces.

To this sufficient liquid ammonia (about one and a-half drachm) to redissolve the precipitated silver was added, and the solution was then to be stirred into the following:—

Bromide of potassium	45 grains.
Iodide ,,	1 grain.
Carbonate of ammonia	30 grains.
Gelatine	10 ,,
Water	4 ounces.

Mix all cold. The colour at first was ruby, but after twelve hours it became blue, and two hundred grains of gelatine previously soaked was added, and, after melting together and setting, washed in the usual way. He had tried a similar mixture, but with the application of heat at 150°—instead of the addition of ammonia to obtain rapidity—it became blue and very thin.

Mr. HENDERSON related some experiments with artificial illumination for the dark room. He had used the light reflected from a phosphorescent tablet without any transmitting medium. He thought that the tablet at first absorbed the actinic rays and so prevented them from acting upon the sensitive plate, but that the tablet soon became saturated, then gave off actinic rays, and acted like an ordinary reflector. It was necessary, therefore, to change the tablet frequently. To avoid this he had adopted another plan. He had used two phosphorescent tablets as transmitting screens. The first one, he considered, absorbed the photographic rays, and let those only pass through the second which it was safe to use.

Mr. DEBENHAM thought that in the first case mentioned the phosphorescent reflector was, at starting, in the same condition as an ordinary reflector, but afterwards gave out rays of photographic power, and was worse than the ordinary reflector. As to using phosphorescent paint to transmit light through: it was not probable that it would give any safer light than another medium of similar colour and opacity.

Mr. COWAN said that he had added ammonia to finished emulsion, as had been recommended. He had put in five minims to the ounce. At first there seemed to be no difference in the plates coated with it, but after keeping a few days the ammonia plates gave in parts no image at all.

The second Thursday this month falling upon the eve of Good Friday, Mr. Debenham's lecturette, *On Lenses*, will be given on the 17th instant, instead of the 10th, as previously announced.

MANCHESTER PHOTOGRAPHIC SOCIETY.

THE usual monthly meeting of this Society was held at the Manchester Technical Schools, on March 13th,—the President, Mr. John Pollitt, in the chair.

The minutes of the previous meeting were read and confirmed. The ballot was then taken, and the following gentlemen were admitted members:—Messrs. W. Jenkinson, J. T. Lees, Levi Lambert, H. Pope, and Charles Coote.

Mr. Jos. GREATOREX read an interesting and somewhat amusing paper, the subject being *A Summer Holiday*, consisting of notes of a recent tour in Switzerland. [See page 218.]

Mr. S. D. MCKELLEN gave a practical demonstration of the printing on argentic-bromide paper as manufactured by Messrs. Goodall and Steven, and also made an enlargement on the same paper, about 12 × 10, from a 3 × 4 negative. The method of enlarging adopted by Mr. McKellen was to illuminate the negative by the aid of a sciopticon lantern, and he stated that he had found a sheet of ground glass interposed between the negative and condenser a great improvement.

The HONORARY SECRETARY said if the condenser was large enough to cover the negative the ground glass was unnecessary.

Several prints and enlargements were exhibited by the demonstrator, and admired for their pure whites and general brilliancy.

Votes of thanks were passed to Mr. Greatorex and Mr. McKellen.

The CHAIRMAN then referred to the interesting paper read at the previous meeting by Mr. Rishton, and said that but for the lateness of the hour he should have invited a discussion on swing-backs and swing-fronts, as he knew there were several members who had studied the subject and had decided to communicate their views. He would, therefore, have great pleasure in bringing the matter forward at the next meeting.

The HONORARY SECRETARY said he should give them a communication and probably a demonstration in making enlargements from small negatives at an early date.

An interesting and enjoyable evening terminated at a late hour.

NORTH STAFFORDSHIRE PHOTOGRAPHIC ASSOCIATION.

THE ordinary monthly meeting was held on Wednesday evening, the 2nd instant, at the Mechanics' Institute, Hanley,—Mr. R. S. Burgess occupying the chair.

Mr. W. F. Fishburn was elected a member of the Society.

The HON. SECRETARY exhibited a half-plate tourist apparatus by Mr. C. E. Elliott, of London. The elegant appearance and finish of the camera were much admired, the excellence of the dark slides being also remarked upon.

A paper upon and demonstration of the process of *Photomicrography for Beginners* [see page 234] having been given by Mr. W. B. Allison, a vote of thanks was unanimously passed to that gentleman; and, after some interesting conversation upon the subject of photomicrography, and Mr. Allison had passed round some transparencies upon collodio-bromide, the meeting terminated.

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION.

THE annual meeting of this Society was held in Lamb's Hotel, on Thursday, the 3rd instant, at which there was a good attendance,—Mr. W. D. Valentine, Vice-President, in the chair.

The CHAIRMAN read a letter from Mr. J. C. Cox expressing his regret at not being able to be present, and thanking the members for their kindness in re-electing him President. He (the Chairman) said the Society was fortunate in possessing in their President a gentleman who was an enthusiastic photographer, an acknowledged artist, and of good social position. Mr. Cox had spared neither time nor money in promoting the welfare of the Society ever since its establishment, his latest gift to the Society being a fully-equipped developing room, which was already being largely taken advantage of.

The following new members were admitted:—Messrs. W. W. Moncrieff, D. R. Mitchell, John Jones, and D. R. Malcolm.

The election of office-bearers was then proceeded with, and the following is the list for 1884-85:—*President:* Mr. J. C. Cox.—*Vice-Presidents:* Messrs. W. D. Valentine and D. Ireland.—*Council:* Messrs. G. D. Macdougald, J. Geddes (Arbroath), H. G. Fraser, A. C. Lamb, Alfred Guthrie, and G. F. Rodger.—*Hon. Treasurer:* Mr. John Robertson.—*Hon. Secretary:* Mr. D. Ireland, Jun.—*Auditors:* Messrs. John Mess and John R. Wilson.

A special vote of thanks was awarded to the Hon. Secretary and Hon. Treasurer for the efficient manner in which they had fulfilled their duties in the past session.

Mr. G. D. Macdougald then read an able paper on *Development*, and gave the particulars of a new developer which yielded negatives of a peculiarly rich, non-actinic colour, another advantage being that all the ingredients were dry, only requiring the addition of water to form the developer.

Some discussion took place as to whether the negative was better to be of a blue or of a non-actinic colour. The opinion of the meeting was that the latter was preferable.

Dr. J. K. Tulloch said that a gelatine negative rarely printed quite satisfactorily without after-treatment, and that he was in the habit of applying bichloride of mercury, followed by ammonia, to nearly all his negatives. This treatment seemed to bring up the detail in the shadows, while the high lights, being already opaque, were not affected by it.

The Chairman was greatly averse to the use of mercury, as he found that negatives thus treated faded in the course of a year or two. On his motion a vote of thanks was awarded to Mr. Macdougald. He (the Chairman) also showed a negative in which the sunlight on the pillars and wall of the interior of a cathedral was perfectly clear glass, the reversal being caused by over-exposure.

A vote of thanks to the Chairman closed the proceedings.

Results of competition for February:—*Portrait Taken in Room:* J. Sturrock, 200 marks; Dr. Tulloch, 150. For March competition, *Still Life*, there was only one entry, Mr. D. Ireland, Jun., 200 marks.

Correspondence.

April Meeting of the Photographic Society of France.—Retouching Pencils.—Gelatino-Bromide Films.—A Demonstration by M. Audra for the 25th instant.—Mr. Henderson Invited by the Photographic Society of France.—On Exposing Films.—A New Dark Slide.—M. Mauduit's Electric Movement for Instantaneous Shutters.—A New Seeker.—Ceramic Photography.

The April meeting of the Photographic Society of France was held on Friday last, the 2nd instant,—M. Davanne in the chair.

M. Gilbert, a French manufacturer of blacklead pencils, presented a series of pencils for retouching photographic negatives. Several members spoke highly in their praise. Patriotic feelings were then aroused, as we have been tributary for years to a Prussian house for this very useful article. A discussion took place upon the best means of rendering the hard, and sometimes very brilliant, surface of the gelatine negative sufficiently soft to retouch upon. Emery powder and many other "dodges" were proposed. The most interesting to notice was to pour spirits of turpentine over the surface of the negative. Another method was to plunge the negative for an instant into a five-per-cent. solution of acetic acid.

M. Bornstein presented some gelatino-bromide films, which he requested to be experimented upon. No specimens were shown.

M. Audra offered to give a private *soirée* on the 25th inst., at which he would publicly demonstrate his method of making emulsions. The Society accepted with pleasure and due acknowledgment this innovation, and offered their place of meeting to M. Audra for his demonstration.

This idea does great credit to M. Audra, and is a novelty. In England these public demonstrations are common, but here they are unknown.

I had the honour of informing the Society that Mr. A. L. Henderson had succeeded in making a gelatino-bromide of silver emulsion by precipitating the silver from aqueous solutions, and then adding the necessary quantity of gelatine. Moreover, Mr. Henderson had invented a new coating apparatus so simple in its construction that the clean glass is put into one end, a tramway seizes it, carries it under the coating machine, and then stacks the plates ready for the drying cupboard. Mr. Henderson proposed to visit Paris in order to exhibit practically the results of these new ideas to the Photographic Society of France.

The Society passed a vote of thanks to Mr. Henderson, and begged me to inform him that they would be most happy to welcome him among them.

MM. Bayard and Trevaux presented a means of fixing films in the camera. As their system is identical with that of M. Leon Vidal I will not repeat it, as I gave a full description in a former letter. Diachylon is employed to hold the film upon an opaque surface of zinc or ebonite. This manner of holding the film has been found to be far superior to that of placing it under a glass plate during exposure. The light impinges directly upon it instead of first going through a sheet of glass. The refraction of the glass, not to speak of absorption, is sufficient to prevent its employment.

M. Mackenstein presented a very novel double dark slide. The shutter is made with very narrow bands of wood glued upon a piece of linen, and is very flexible. Although the slide is double, only one shutter is required for the two. The frame, when in its place upon the camera, can easily be opened by pulling up the flexible shutter. In so doing the sensitised glass plate is uncovered. When the exposure is terminated the flexible shutter is put into its place, the dark slide is turned, the other end of the flexible shutter is pulled out, and the second plate is exposed. Having only one shutter for the two sides of the dark slide, the latter can be made very thin and having a minimum of weight.

M. Mauduit presented another instantaneous ratchet or catch for rapid shutters. Instead of a pneumatic ball and tube he employs an electric current, which, he says, has the advantage of not imparting motion to the camera.

M. l'Abbe Fernique presented a little instrument which he had invented in order to see the exact position of a moving object in taking instantaneous pictures. It consists of a kind of lens which is fixed upon the top of the camera. The operator can see the image he wishes to reproduce reflected upon the instrument. He can then choose the proper moment to take the picture.

Ceramic photography is getting into fashion. Since Mr. Henderson's public demonstration of his excellent process hundreds have been experimenting in order to obtain the *ne plus ultra* of photographic productions—that is to say, the brilliant and permanent enamel. The dusting-on process and the substitution process of our indefatigable friend Mr. Henderson have been brought before the readers of The British Journal of Photography; each has its respective merits and its inherent faults. A gentleman of St. Petersburg has found a method of obtaining photographs on chinaware or enamels by employing the carbon process. Instead of the ordinary colour employed he macerates with gum, honey, and metallic oxides. This emulsion is spread upon paper, sensitised by a bichromate of potash solution, and treated in every way like an ordinary carbon print. The image is then transferred to glass, enamel, or chinaware to be burnt in. The great superiority of this process over all others consists in the advantage it gives the operator in getting the depth of colour he desires, and also in the simplicity of the manipulations. Ere long we may expect to obtain permanent burnt-in proofs as easily and as cheaply as the well-known *carte de visite*.

E. Stebbing, *Prof.*

25, *Rue des Apennins, Paris, April* 7, 1884.

CANARY MEDIUM.

To the Editors.

Gentlemen,—With your permission I should like to say a few words upon the last paragraph of Mr. G. Smith's contribution in your issue of the 28th ult., and to shew why it is that canary medium has been used in the north of England.

At a meeting of the West Riding of Yorkshire Photographic Society it had been arranged to spend an evening in the development, &c., of gelatine plates, and a member had promised to provide a suitable lantern, which proved to be of the kind usually considered essential—that is, a deep ruby glass, a candle being the source of light. With that arrangement any object more than about a foot from the lantern was in darkness, and developers, &c., had to be found by touch rather than sight.

Mr. Bridges, of Bradford, also brought a lantern, and after the necessary communication had been made to the gas bracket it was lighted. It was now possible to see the features of each other, even when some sixteen or twenty feet away from the light, the whole room being filled with what looked almost to be white light after the experience of the ruby. I believe there was not a single member present who had not grave doubts as to the possibility of such a light having any practical value. I can truly say that I was a sceptic.

I had two negatives with me which experience had proved to be veritable twins. After dividing a gelatine plate in two, exposing the halves to the ruby and canary lights respectively, and developing together close to the glasses of the two lanterns for ten minutes, in the same solution, we succeeded in getting a faint transparency on each. Opinions differed as to which was the more exposed; the impression was so very slight that a comparison of details was impossible. With such a result no member could believe that either lamp arrested all the actinic rays.

One broad fact was made evident—that whereas you were compelled to be close to the ruby light, and had to make a prolonged inspection to find out the progress of development, with the canary you might be much further away, and a momentary glance would reveal progress.

The opponents of canary have usually made one great mistake in comparing chemical illumination, and not noticing visual illumination, as an illustration. I might instance an experiment made, I believe, by Mr. Cussons, of Southport, who put in a frame a ruby glass and a piece of canary medium side by side, put a plate behind, exposed, and developed, Two substances might be tested in such a way and yield identical results; yet in one case the ratio of actinism to visibility might be as five to one hundred, and, in the other case, as five to ten. If two rooms were lighted through such media until objects were equally visible to the eye, there would be ten times as much fogging power in one room as in the other.

And here I have a word of fault to find with the Editors. A letter I sent pointing out the relation of these items of chemical and visual power was "boiled down" into an intimation in "Answers to Correspondents," stating a fact without a particle of evidence to support it. What is the practical good in using canary medium? I venture to say that if you go the round of those studios where it is used you will not find that abnormal shortening of the focus of the eyes which is said to be found where ruby-lighted dark rooms are employed.

I have used ruby and had great pain in my eyes, which left me shortly after I put away the ruby and substituted canary, and I beg to thank Mr. Bridges for the share he had in preserving my eyesight.

It is too late to judge canary solely upon theoretical grounds. Two or three years' practical experience affords data which ought to play a part in estimating its value.

"Northerners must have been working slower plates." As northerners and southerners were alike in an experimental stage, and had not settled down to the exclusive use of the plates of some favourite maker, it is evident that the plates developed under a canary light were, in many cases, of southern production, and, in fact, identical in character with those used by the people who rejected canary medium.

If agreeable to the Editors, and thought likely to be of interest, I could send a description of my dark-room window, which allows a considerable amount of modification of lighting under ready control.

I notice an inquiry has been made about soda instead of ammonia in alkaline development. If ammonia produce chronic bronchitis, and the substitution of soda or potash could be effected without introducing some other drawback, the value of such a change would be health and life to the operator.—I am, yours, &c., JOHN GARRATT.

Dewsbury, April 2, 1884.

P.S.—Since writing the above I have been trying potash as a substitute for ammonia, and send you two plates. No. 1 was developed with carbonate of potash twenty grains, water one ounce, and bromide of potassium half-a-grain. No. 2 with carbonate of potash twenty grains, soda sulphite twenty grains, bromide of potassium half-a-grain—in each case with an equal amount of pyro. solution six grains to the ounce. The soda sulphite is added to potash carbonate, no neutralisation with citric acid, and the effect is most marked in improving quality. A portrait I have since taken is singularly rich in delicate tones.—J. G.

ACCIDENTS AT RECENT LANTERN EXHIBITIONS.—A SUGGESTION.

To the EDITORS.

GENTLEMEN,—I should be very glad to hear that some photographic society had taken this matter up and offered a prize for the best safety tube and the best back-pressure valve. Although I have but little time at my disposal, I would willingly assist in testing these tubes and making the award. T. FREDERICK HARDWICH.

Shotton Vicarage, Castle Eden, April 7, 1884.

A QUESTION OF PRIORITY.

To the EDITORS.

GENTLEMEN,—In my paper, referred to by Mr. Collier, I find I have been scarcely explicit enough. The action of a solarised bichromated film imprinting its image on another bichromated film was brought out as a process by M. Marion, of Paris, under the name of "Mariotype," a full account of which is to be found in the *Journal of the Photographic Society* for May, 1873.

Captain Abney's researches on the continuing action of light on bichromated films had been made prior to this, and Mariotype was more or less a practical outcome of these researches.—I am, yours, &c.,

Cross Park, Partick, N.B., April 4, 1884. WILLIAM LANG, JUN.

[The original paper by M. Marion, of Paris, together with leading and other articles on the subjects therein brought forward by that gentleman (since deceased) will be found in the issues of May 16th and 23rd of THE BRITISH JOURNAL OF PHOTOGRAPHY for 1873.—EDS.]

UNIVERSAL ATTRACTION AND ITS RELATION TO THE CHEMICAL ELEMENTS.

To the EDITORS.

GENTLEMEN,—Since your remarks, last week, upon my recent publication, contain certain statements which require alteration to agree with facts, I request you will rectify same in your next issue, though I quite believe they may have originated in want of clearness of expression on my part rather than in want of acquaintance with recent discoveries or want of accuracy on yours.

I am made to speak of Nature choosing *figures* when speaking of the chemical atoms and their numerical equivalents. What I said was that "it is a libel upon Nature to say she made such *condensed masses*," as the chemical atoms are made to appear to fit the Newtonian philosophy. I am represented as confessing want of success in search of *definitions* of "mass" and "weight." What I sought unsuccessfully were *values* for these in the Newtonian equations consistent with the facts of chemistry. My "terrestrial spectrum" illustration is open to grave misconception, separated as it is from its contiguous paragraphs.

Leaving now the facts, and coming to questions of opinion, I seek in no way to question yours or others, but I tender you my thanks for the courtesy and tolerance which has prompted you to notice in a journal devoted to the light science a subject destined to throw considerable light into a dark corner of the basement premises which underlie all science. Your courage in noticing, even as you have done, a subject which involves an inconvenient dilemma that some have not been slow to appreciate in a manner less scientific than significant entitles you to the thanks of every lover of fair and free inquiry.—I am, yours, &c., W. B. SHARP.

Edinburgh, April 5, 1884.

GLOY.

To the EDITORS.

GENTLEMEN,—In a recent number of THE BRITISH JOURNAL OF PHOTOGRAPHY there is a damaging paragraph about gloy, as it is not only not made from dextrine, but in any one of our products there is not a particle of dextrine. Moreover, we are told that our gloy No. 2 mounts photographs better and cheaper than any other adhesive. Samples have been frequently submitted to us; and, in fact, our attention has been called to your remarks by a photographer who constantly uses it.

You must have made experiments with some quality of gloy not intended for the purpose, and we will thank you to insert this letter in your next issue, and call attention to the subject.—We are, yours, &c.,

St. Mary's-chambers, St. Mary Axe, April 4, 1884. GLOY MANUFACTURING CO.,

[The above communication reached us too late for insertion in our last issue. We can find no reference whatever to dextrine in connection with "gloy" in any of our recent numbers, and think it rather unnecessary on the part of the Gloy Company to exercise so much energy in repudiating a harmless ingredient which they have *not* been charged with using, while they calmly ignore the more dangerous substances which our short paragraph mentioned as appertaining to the preparation of their adhesive. If the Company can with equal frankness—and we may add truth—assure photographers that not only dextrine, but also caustic alkalis and strong mineral acids, find no place in any one of their products—that, in fact, our paragraph is incorrect—we shall be glad, and photographers may then be able to use gloy with comfort.—EDS.]

Notes and Queries.

"As regards the 'ownership of negatives,' discussed in the last number of your Journal, an analogous case occurs to me. You go to an engraver and order visiting cards, he prepares a copperplate (or negative), which becomes your property on payment.—G. H."——Nay! Not so! The engraver advertises "your name-plate engraved *and* fifty cards for half-a-crown;" whereas the photographer does not stipulate to give up the negative.

"GENTLEMEN,—You are quite right in your reply to 'A. H. B.' in last Journal. Protosulphate of iron is utterly untrustworthy as a developer for dry plates—at anyrate for those formed of collodio-bromide. Let me here take advantage of the *Notes and Queries* to ask whether any one has made systematic experiments with ferrous oxalate in connection with dry collodion, and if it possess that enhanced rapidity once hinted at by Mr. W. Brooks.—S. S. A. B."

F. DUGON, replying to the remarks of J. Berryman, which appeared in our *Notes and Queries* last week, and in which he stated that he had been ungenerously misled by others, says:—"I have witnessed a free demonstration of an enamel process, and have succeeded fairly well in my very first attempt. The innuendoes thrown out by your correspondent seem to be somewhat unjustifiable, and I write this in the interests of those gentlemen who have written on the subject."

J. W. G. says:—"Will you answer me the following questions? 1. How to form an idea of the focus of a lens minus a camera.—2. The best all-round colour for an outdoor background.—3. The best lubricant for prints previous to burnishing, and how to use it."——In reply: 1. Hold the lens close to a white wall at the back of a room, and move it slowly out until an inverted image of those objects outside which are situated at a distance is seen to be as sharp as possible; then measure the distance between the optical centre of the lens and the wall, and the result will be a tolerably near approximation to the equivalent focus.—2. This is purely a matter of taste. Some prefer drab, others lighter, and others still darker tints.—3. Like the previous question there is no "best" in this matter, as there are many opinions. Try a two-grain solution of wax in ether. For the manner of using a burnisher see any manual of instructions.

"IN reply to the query of Geo. Thompson respecting a hygrometer in which the indications of moisture are made by the rising and falling of a column of mercury, I beg to say that if he will fit a glass tube (the bore of which is large enough to allow a pin to drop through it) to a bulb composed of animal membrane and filled with mercury, the bulb will contract and expand according to the state of the atmosphere as regards moisture. The bladder of a rat has been recommended in some old treatises on Natural Philosophy as the best membraneous substance for a bulb. I once constructed a hygrometer of this class, and although the mercury rose and fell I regarded it rather as a toy than a proper philosophical instrument, and never put myself to the trouble of graduating the scale. I do not see how it is possible that any real accuracy can be obtained by its indications, as there is the thermometric change in the volume of the mercury to note as well as the rise that takes place by the construction of the bulb.—AULD REEKIE."

"I AM building a studio in which I require to get light from the south side. I propose to make the roof clear glass and the side ground glass. The roof, I presume, will be safe from interference by my adjoining neighbour on account of its not overlooking his premises? Will not the upright light at the side be equally beyond his power to prevent, as the window, being non-transparent, will not overlook him either? I do not know if this point has ever arisen in a court of law.—BROMO."——So far as we remember this is a point in lighting that has not previously been raised, and we shall be glad to see it discussed.

W. C. C. says:—"Would you kindly inform me what is the best method by which I can get a 'tooth' to the gelatine film for retouching upon? I have tried several ways, but have not succeeded in getting it to my satisfaction. I have used various media, but, instead of producing a 'tooth' to the surface, they have been of such a greasy character that the pencil will not bite. I have been using Wolff's three and four H leads, and have tried both with varnish and without. Would you inform me how I can tone the ready-sensitised paper quicker? I have only lately taken to use it, and find it takes a surprising time to tone. I have tried ammonia to neutralise the acid in the paper, but without any mere success."——Instead of replying to these queries we submit them to our correspondents, as being suggestive.

"I SHOULD be much obliged if you could tell me in your next number how to prevent halation caused by a window directly facing the camera in photographing an interior.—L. W. J."——In reply: The best way to prevent halation under the circumstances described is to apply to the back of the plate a mixture of any colouring matter of the nature of Venetian red or Spanish brown, with water, glycerine, and gum arabic. The proportions of these should be such as to form a solid coating capable of being removed by rubbing with a wet sponge. By this coating the light which would be reflected from the back of the plate on to the sensitive surface is absorbed. An application of wet, red blotting-paper to the back would answer the same purpose; but it is imperative that it be wet, and in optical contact with the glass during the exposure.

"ON page 92 of the ALMANAC for 1884, among jottings (No. 13 in order from beginning), occurs the following:—'Shreds of gutta-percha dissolved in benzole,' &c., &c. Would you kindly answer me a query in your next issue as to how to dissolve these shreds? I have had some soaking in benzole for three weeks, and they are not touched in the slightest degree by the solution.—H. ASH."——In reply: It is probable that the refractory gutta-percha will succumb to the influences of a tolerably warm sand-bath. The jotting in question is one of a number of useful selections made from this Journal by the Rev. Locke Macdona, B.A., from whom we shall be glad to receive an answer in this matter. We have frequently dissolved gutta-percha in rather common naphtha, and we do not see how it resists the more potent solvent powers of benzole. We need scarcely say that, when heat has to be applied to such inflammable materials, caution must be observed.

Exchange Column.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPHS REGISTERED.—

Edwin Debenham, 79, Princes-street, Edinburgh.—*Four Photographs of the Clergy of St. Mary's Cathedral, Edinburgh.*

William Duncan, Clifton Vale-terrace, Clifton Junction, near Manchester.—*Photograph of Brackley Old Unitarian Chapel.*

Squire Knott, Yorkshire-street, Oldham.—*Photograph of Mr. Ben. Brierley.*

Joseph Barwise, 22, Station-road, Workington. — *Photograph of St. Michael's Church.*

☞ Several "Exchanges" are unavoidably left over till next week.

H. HAWKINS.—After the remedies you have tried we should advise you to procure a fresh sample of paper.

CHROME ALUM.—It is not advisable to use the bath after it has become discoloured. The solution is not costly.

F. A. M.—The effect is very curious. Probably it is caused by particles of dust settling on the films whilst they are drying.

EDWIN GRANT.—From two to three guineas and travelling expenses will be a fair charge; that is, if your work be of first-rate quality.

VIOTTI KROMMER.—The water becoming "milky" will do no harm, nor prevent the pictures from toning. All waters, as a rule, except distilled or rain water, produce turbidity with silver nitrate.

A. G. (Printer).—Without making an analysis it would be impossible to express an opinion. Bristol board would, no doubt, be perfectly safe if of good quality. Yes, copying a copyright picture at all is an infringement of the law.

WARWICK.—We fear you will have to be content with warm tones with the sample of paper you are using. From the examples forwarded it is clear that purple tones cannot be produced with it, and the attempt to obtain them would only end in mealiness.

J. P. B. (SPOT.)—If cyanide of potassium will not remove the spots we fear nothing else will be effectual. In future we should advise you to protect the film with varnish, and also bestow more care upon the removal of the last traces of the hyposulphite of soda.

PUZZLED PRINTER.—The marks across the prints are caused by the "cotton cord" upon which you have hung them to dry. Probably it contains some traces of chlorine with which the fibre was bleached. We had a similar experience ourselves some few years back.

A. G. GRIGSTONE.—The defects are more imaginary than real. Try the instrument, and you will doubtless find in practice that its working qualities are very little, if at all, impaired. However, be that as it may, then, there is no remedy but to have new glasses.

S. J. G.—The chalkiness in the carbon prints is due to the tissue being in a too-soluble condition. The remedy is to keep the tissue longer between sensitising and printing. Another remedy is to sensitise on a stronger bath. We are assuming that you are not employing the water too hot in the development.

THOS. BILLINTON.—We are unable to say if there be a good opening for a photographer in the town mentioned. This we do know, however, there are some excellent photographers there, and unless you can surpass them we think you stand a somewhat poor chance of success in commencing a new business. The town is by no means a large one, and, as we have said, already possesses several good photographers.

J. T. HOULSTON.—The design for studio marked "No. 3" is certainly to be preferred to either of the others. If you have space it will be advisable to build it five or six feet longer than the plan shows, as this will enable you to take groups with greater convenience, and from your note we imagine this is a consideration with you. With regard to the side light: it will be better to stop off rather less at the background end—say four feet, instead of six.

A COUNTRY ARTIST.—The sand-blast process is largely employed in producing the grained surface on opal glass. It possesses some advantage, inasmuch as it is less liable to scratches. These are frequently very prevalent in hand ground glass. The objection to sand-blasting is that if there are any minute air-bells in the glass near the surface they become broken and form small holes. Opal glass with the sand-blast grain is less costly than that in which the grain is produced by hand grinding.

*** Owing to our going to press a day earlier than usual this week several communications which arrived late must stand over till our next issue.

PHOTOGRAPHIC CLUB.—At the forthcoming meeting of this Club, at Anderton's Hotel, Fleet-street, on Wednesday next, the 16th inst., the subject for discussion will be—*On Packing and Repacking Dry Plates when on a Tour.* For Monday next, the 14th instant (bank holiday) an outdoor meeting has been decided upon; but, owing to the earlier publication of this Journal, the locality selected on the 9th instant will have been chosen too late for insertion. Members and friends desirous of joining may ascertain particulars by application to the Honorary Secretary.

A FRAUDULENT PHOTOGRAPHER.— At the Leicestershire Quarter Sessions, on Tuesday last, the 8th inst., George Daniels, a photographer, of Nottingham, was indicted for having, on the 15th of August and 25th of December last respectively, obtained money under false pretences from Fanny Upton and Thomas Davies. In addition to this charge (particulars of which appeared in our issue of February 15th, page 111), the prisoner was further indicted with having stolen a lens, worth £5, the property of Professor Colton, of Ratcliffe College, on the 24th of November last. The evidence for the prosecution in the latter case was to the effect that on the day in question the prisoner called at Ratcliffe College and requested Professor Colton to allow him to take a photograph of several of the pupils. Professor Colton, who practises photography himself, placed his dark room at the disposal of the accused. The prisoner, after some three hours' interval, left the room, which was then locked up by its owner. When Professor Colton again visited his dark room, in March last, he found that one of the lenses in the triplet lens attached to his photographic apparatus was missing, and another glass put in its place. The lens, which was produced in court and identified by the owner, was valued at £5. Mr. Toller for the defence argued that, owing to the great resemblance between the lenses, it was quite probable that the accused, when leaving the dark room, appropriated the wrong lens in mistake. The jury found the prisoner guilty on both counts, and he was sentenced to six months' imprisonment with hard labour.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1250. Vol. XXXI.—APRIL 18, 1884.

ADAPTING THE CAMERA TO LANTERN PURPOSES.

The rapidly-increasing popularity of the optical lantern leads necessarily to a growing demand for fresh slides, and, as the large army of amateur photographers attach a greater value to the pictures of their own production than to those of others, we may anticipate a considerable activity on their part during the approaching season in this particular branch of negative production.

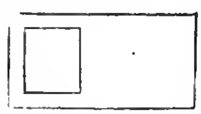
The negatives suitable for the purpose may be divided into two principal classes—those which require subsequent reduction, and those which, being taken on quarter-plates, are suitable for contact printing. But objections may be, and are, raised against both these classes. In the first place, the lantern picture is, as a rule, when not circular, square, or nearly so, while the sizes of none of the plates in general use approach very closely to that shape. Plates of such sizes as 5 × 4, 10 × 8, or, better still, 12 × 10 are near enough to the regular shape to answer most purposes; but, even with these, it is frequently found that some portion of the subject must be left out of the "slide" and thus spoil the composition.

The tendency in focussing and arranging the composition of a landscape is to make the best of the material before one on the size of plate represented by the focussing glass, and in the case especially of a large plate it would be obviously unwise to make the original negative subservient to the requirements of the small lantern picture. Hence, on looking over a collection of such negatives, it is often surprising how few of them lend themselves readily for reduction to the dimensions and shape of the lantern slide without in some degree spoiling the composition.

If, however, we turn to the far more popular sizes—such as $7\frac{1}{2} \times 5$, $7\frac{1}{4} \times 4\frac{1}{2}$, or half-plate—we find these difficulties to be even greater in consequence of the wider disproportion between the length and height of the picture. The obvious reply to these objections will be that it is easy to provide a special camera of quarter-plate size, and to take negatives directly suitable for contact-printing, and including just so much of the subject as may be desired for the purpose of the lantern picture. But a great many outdoor workers will object equally to going out with "only a quarter-plate camera," and to carrying two instruments. This forms the objection in the second case, and though it is true the quarter-plates may be used for the production of enlargements the objection is, we have reason to know, a valid one.

We propose, therefore, to describe here a slight adaptation we have had made in one of our own cameras which renders it available both for lantern and ordinary purposes at will, and which involves no expense beyond a few pence, and practically no increase of *impedimenta*. The camera in question is of the popular size, $7\frac{1}{2} \times 5$, but the arrangement is equally adapted to other similar sizes.

The first necessity is to cut, in the inner framework of the camera to which the bellows are attached and immediately in front of the focussing glass, a sunk rebate of the same size as, and corresponding with, the position of the plate when in the dark slide. The depth of the rebate need not be greater than one-sixteenth of an inch, or just sufficient to take a sheet of zinc or stout cardboard. The latter forms a mask by which one-half of the plate is covered during the exposure of the other half, and two pictures can be produced on the one plate. This purpose is effected by cutting an aperture of the desired size and shape in the centre of one-half of the zinc plate, thus:—



This plan is better than employing the central partition usually supplied with cameras of the sizes we have named, since it takes less time to place the mask in position or remove it. It allows lenses of any focus up to the full length of the camera to be used, whereas the central division being intended for stereo. purposes is rarely longer than 6 inches; and last, but not least, if the aperture be of the dimensions of 3×3, the operator sees at the time of focussing exactly the amount of subject he will have on his slide, and runs no risk of spoiling the composition by crowding in too much.

Except with a lens of very short focus there is no absolute necessity to shift it from the centre of the camera front. If it be capable of covering the whole of the plate when in that position it will, of course, cover the half; but where it is possible, by lengthening the slot in the horizontal sliding front, to bring the lens opposite the centre of the half-plate, or nearly so, it is obvious the best portion of the lens will be utilised.

After taking one picture the mask is merely reversed, the front, if movable, pushed to the opposite end of the slot, and the next picture taken. Or if a whole plate be required the mask is removed altogether.

With regard to the advisability of developing two different exposures on the same plate, we may say that we prefer to cut the plates previous to development, and thus develope each exposure separately.

ON PHOTOGRAPHING SILVER PLATE, &c.

It is no unusual circumstance for photographers to be called upon to photograph silver or gold plate, jewellery, and other *objets de luxe* of a similar character. Indeed, many gold and silversmiths, now-a-days, after they have completed a communion, dinner, or tea service of exceptional design, make it a rule to have it photographed prior to delivering it to the customer. Jewellers, too, often take advantage of photography to portray their handicraft, when it happens to be of an unique or special design. It is likewise becoming very customary, when a testimonial is presented, to have it photographed, and for a copy to be supplied to each subscriber. Wedding-presents also are frequently required to be photographed; indeed, photographs of the entire collection, in a group, of the wedding-presents received by the happy couple are now becoming very general.

When the pictures are required by the manufacturer for trade purposes the photographing is generally deputed to those who make this class of work a speciality; but when for private purposes the work usually falls to the lot of the portrait artist, who, possibly, has had but little or no experience in this particular direction, and may not even have the best appliances at hand for the purpose. As a consequence, he often fails to secure a picture that proves quite satisfactory, the fault generally being that the high lights of the picture, or the frosted portions, are a chalky, white mass, completely devoid of detail, and the burnished parts black patches, showing nothing but the reflected sash-bars of the studio. To photographers so situated a few practical hints may be an advantage.

Presuming a commission has been received to photograph a service of plate or plated goods, the best result will always be secured if the picture can be taken before the articles are finally polished or burnished. It is at this stage, it may be mentioned, that manufacturers usually have the photographs taken. It sometimes happens, however, even in the unpolished state, that the metal is too brilliant to photograph well, but an oily rag rubbed over its surface will at once enable the difficulty to be overcome. However, it is not with the photographing of the unfinished articles that we at present intend to deal, as these are, by the way, usually entrusted to the hands of experts in this kind of work. It is of the finished goods we propose to treat, as it is these which are the more likely to come into the hands of the portrait artist, and it is he who is most in need of assistance.

The chief difficulty in photographing plate arises from the white or frosted portions impressing the sensitive film before the burnished parts, which in silver, under certain conditions, are practically black. Consequently, when the developer is applied, the bright portions flash out and acquire intensity before the detail in the darker ones can be brought out. But if the burnished portions be dulled, much of the difficulty of obtaining a harmonious picture at once vanishes.

There are several "dodges" resorted to by photographers for this purpose. The best practically, and the one most generally adopted by experts, is dabbing the burnished or excessively-bright parts lightly, but evenly, over with a piece of common glaziers' putty. This produces a dead surface which photographs remarkably well, and enables the most delicate design to be clearly depicted. After the photograph has been secured the putty is easily removed by brushing it over with clean, dry whiting. Instead of using common whiting—which often contains gritty particles liable to scratch the metal—precipitated chalk may be substituted; indeed, it is a good plan to make the putty itself of precipitated chalk to avoid risk of scratches. A little of the chalk mixed with almost any kind of oil will answer the purpose.

Another plan, which is frequently adopted, is to dull the surface with moisture by causing a dew to form upon it in the following manner:—After the light has been arranged, the image focussed, and the plate ready for exposure, a piece of ice is placed inside each vessel. The metal, being a good conductor of heat, soon becomes very cold, and the moisture always present in the atmosphere quickly condenses upon it in the form of dew, and so dulls the surface. Immediately the surface is dulled the exposure must be made, as the condensation continues, and eventually the moisture forms into drops and runs down in "tears." As soon as the exposure has been made the ice should be removed, and the vessel dried. In summer, if the weather be exceptionally dry and this method adopted, it may be necessary to sprinkle the floor of the studio with water, or to spread out some wet cloths in the vicinity of the articles to be photographed, in order to supply the necessary moisture. It is obvious that the ice plan can only be applied to vessels, and not to such things as salvers, candelabra, epergnes, and similar articles.

If either of the "dodges" we have described be resorted to the photographing of plate becomes very much simplified. However, it may be well to mention that gelatine plates are preferable to collodion for the purpose, as with them greater harmony will be secured with far less difficulty. A very full exposure in all cases must be given, and the intensity kept back as much as possible in the development until all the detail in the darker portions are fully out.

In photographing groups of wedding-presents—which may consist of the hundred-and-one heterogeneous things of which such gifts are frequently composed—considerable thought and judgment are required to ensure perfect success. Some of the articles may consist of plate, which require very little exposure; while others are of the darkest and most non-actinic character, and, consequently, necessitate a prolonged exposure in order to obtain anything approaching a satisfactory picture. However, by judiciously arranging the articles themselves much of the difficulty can be overcome. For example: the darkest objects should be so placed that they shall receive the strongest, and the brighter ones the most feeble, light. In many cases one article may be so arranged as to cast a shadow over some smaller one, which would otherwise come out too bright. Much may frequently be done by simply altering the angle at which an object is placed, so that if it be of glass or metal it may reflect the light in a different direction. Matters may sometimes be improved if the light be shaded from some of the articles during part of the exposure by holding a large sheet of cardboard between them and the principal light. A sheet of thin muslin stretched some feet above the group will prevent the reflection of the sash-bars of the studio in the polished articles, which is always so objectionable in a photograph.

Before concluding it may be well to refer to the optical phase of the subject. Throughout this article we have assumed that it is a portrait artist who has to take the picture. Now many artists, who usually confine their practice to portraiture, possess only portrait lenses, and these are about the very worst form of instrument that can possibly be employed for the purpose to which we here draw attention. However, a very suitable lens for the work, if not the best, may be extemporised by removing the back lens of a portrait combination from its mount and screwing the front lens in its place—so that the convex side be next the ground glass of the camera—and then inserting a stop (in the usual slot) with an aperture of one-twenty-fifth or one-thirtieth of the focal length of the lens. The size of plate such a lens will cover sharply to the edges with fairly even illumination will be about two-thirds of its focus.

We advise the use of so small a stop, not because it is necessary to secure good definition, but because it will be found in practice that when very light and very dark objects have to be photographed in juxtaposition, a better result—particularly with collodion plates—will be secured with a small stop and a long exposure than with a large aperture and short exposure, as the violent contrasts will be found more equalised in the picture.

PORTABLE CAMERA ADJUSTMENTS.

There are three separate systems by means of which the expansion and adjustability of the camera bodies are effected, namely, simple sliding, rack and pinion, and screw. Each of these has its peculiar advantage, the first being pre-eminently the best as regards simplicity and rapidity of motion or extension.

To extend the camera from its minimum to its maximum capabilities of expansion is by means of the sliding system of adjustment only the work of a second; whereas by the agency of a screw, even one possessing a quick action, some degree of loss of time and rather irksome manipulation must be experienced. Better in this respect is the rack and pinion, which, if an error be not made on the side of having the teeth too fine, answers every purpose in the most admirable manner, except that of (what may be designated) instantaneous expansion.

It is known to those who have had opportunities of studying the construction of certain portable cameras of American manufacture that in some, and these not the least pretentious, the simple sliding adjustment is adopted, the pinching-screw assuming the form of a small projecting lever, and the screw itself being concealed beneath the body. This pinching-screw has a triple or, at anyrate, a very quick thread, so that about a quarter of a turn suffices either to pinch it effectually or to effect its complete liberation.

The objection which is urged against the sliding system is the difficulty of being able to have recourse to extremely-fine focussing. Its cheapness, and the rapidity of transit of the body along the baseboard, are undoubted; but delicacy in focussing is difficult of attainment, the analogy in this case holding good between the coarse and fine adjustment of a microscope bearing a high power, or of an astronomical telescope.

In certain portrait cameras of the same nationality a compromise has been made between the sliding and the screw modes of adjustment; or, perhaps, it may be more correct to say that advantage has been taken of both united in one—a species of *duo in uno*. In this composite system the sliding is effected as in the old French cameras of a former era, in which a piece of brass projects behind, and through which passes the pinching bolt and nut. But in the American portrait camera of the class to which reference is now being made, the brass travelling piece is not directly attached to the camera body, but only connected with it through the intervention of a quick-acting screw, having in its head a deep groove in which works the end of the brass travelling plate, bent at a right angle. The action is such that, when the coarse adjustment has been made and the focus approximately obtained, the pinching-screw is fastened and the fine adjustment then effected by rotating the head of the screw, which, unable to move backwards or forwards itself, owing to the groove of which we have spoken, causes the body of the camera to move on the base-board.

We have been shown an improvement effected upon this system as applied to the portable camera, no matter whether the camera be of English or American design. In this case, as in that described, the travelling brass piece, to which is affixed the clamping-screw, is not attached to the camera body, but supports a strong pinion, which is geared into a short brass rack, one end of which is fixed to the travelling body of the camera. When the pinching-screw is liberated the action of the body of the camera upon the base-board is that of the ordinary, primitive kind, and admits of the instantaneous sliding action of which we have already spoken, and by means of which an approximately good focus may be quickly made. A touch on the side of the pinching-screw immediately renders the whole rigid and incapable of further adjustment so far as the brass runner is concerned; after which the milled head of the pinion, standing in contiguity to that of the pinching-screw, affords the means of effecting the fine adjustment of the focus by the agency of the rack and pinion.

By the means described the special advantages of both systems of adjustment—that of the simple slide and of the rack and pinion—are secured in a manner at once neat, cheap, and effective.

SHELLAC AND ITS SOLUTION.

Considerable prominence has lately been given in various technical journals to the process discovered by Herr Andes, fully described in these pages a short time ago, for purifying and decolorising the ordinary shellac of commerce. Shellac and copal are two of the most largely-used gums employed in the arts, and if the former, as imported, could only equal copal in colour, or, rather, its absence, the already widespread employment it enjoys would be still further developed. There are, of course, means of decolorising it; but all leave something to be desired, while, at the same time, a number of the published methods are utterly futile. Some of them and methods of dissolving the lac it is our purpose to discuss.

To facilitate the work of those of our readers who care to experiment for themselves, it may be serviceable to describe some of the properties of shellac as already discovered by previous investigations. Our readers are, doubtless, aware of the source from which it is procured. The lac insect deposits its eggs in the twigs and small branches of the Bihar tree, and accompanies them with a peculiar matter which entirely encrusts the twigs—a matter which some observers have stated is neither more nor less than the body of the female insect herself, who, after performing her maternal functions, leaves her bodily frame as food for the future brood, who are thus cannibals from their youth. Be this as it may, the encrusted twigs are collected by natives, and are then known as "stick lac." The encrustations taken off are termed "seed lac," which when melted and squeezed through cloth bags spread on the broad surface of a prepared piece of plantain tree, and then, chipped or flaked off, is known as "shellac"—the form best known to photographers. Many varnish formulæ involve the use of seed lac; but, as will be perceived from our brief description, it cannot possess any advantage over shellac, while it is certainly darker in colour and contains more impurities.

The lac in the "shell" form contains two resins soluble in alcohol, and a wax, but not a third, insoluble resin (laccin) found in seed lac, and, according to Watts, in his *Dictionary*, is soluble in "hydrochloric acid, acetic acid, potash, soda, and borax, but not in ammonia." It is somewhat singular that the latter statement should be made, for a now well-known method of dissolving shellac for certain photographic purposes is entirely based on its solubility in that menstruum or the carbonate, either of which may be made use of, the only secret being that heat is to be employed to aid the dissolution. The method of dissolving in borax has been long known, and indeed we believe it is the one practised by the hatter in producing those wonderful structures with which the average Briton covers his head.

The presence of the borax, however, militates against its employment in photography, and to obtain an aqueous solution of the resin nothing, perhaps, is better than to place it in a water bath at boiling point, cover it with boiling water, and then add ammonia gradually, with constant stirring till all is dissolved, taking care to employ as little as possible, or the colour will be too deep. It is not generally known that the addition of a few drops of ammonia to a spirituous solution of shellac will render it completely miscible with water in all proportions without precipitation. This property is very useful in removing the varnish from a negative by alcohol, as it prevents any deposit from precipitation when the alcohol is removed by washing.

In dissolving shellac in alcohol the great difficulty is to clarify the solution, and the drawback is the great waste of solvent which is imprisoned by the flocculent insoluble matter always found in alcoholic solutions of lac. The addition of chalk and magnesia is often recommended to reduce the cloudiness of the solution, which, however, it is stated, soon returns after the use of these materials, although it be well filtered. It is further said that with stick or seed lac the effect is not so prominent.

This milkiness or flocculent deposit is evidently the effect of the undissolved constituent of the lac, the wax we have described forming one of its component parts. Many methods have been devised for getting rid of it, but that of Herr Andes, which we have spoken of, is based on the insolubility of the wax in carbonated alkalies, though lac itself is quickly dissolved. This being the case, Herr Andes sets the lac to dissolve in a hot solution of carbonate of soda, and then, after the whole has cooled, he removes the cake of wax which has formed in the surface of the cold solution. The soda, being neutralised carefully by sulphuric acid, throws down the lac again in a purified form. It is, however, said to be lowered in quality and made brittle in texture; in other words, to have lost its essential character of hardness and toughness.

In our opinion all processes which tend to the entire removal of the "wax" are a mistake; for we believe it is to the mixture of all its constituent ingredients, and not any particular one, that shellac owes its great value, and that if any one of them be removed the whole mass suffers. We, of course, leave out of consideration the colouring matter, whose presence *per se* we do not suppose to confer any advantage.

Where it is desired to obtain a clear alcoholic solution of lac it may be made by adding to the alcohol one-fourth of its bulk of petroleum spirit, frequently shaking for an hour or two till dissolved. Two layers of liquid will form after a time, and they can be readily separated from one another by means of a syphon or a separating funnel. The upper layer of liquid is the petroleum spirit with the wax dissolved, while the lower is the resinous constituent dissolved in alcohol. A similar effect is obtained by first shaking the shellac up with warm petroleum spirit before dissolving in spirit. The shellac has to be coarsely powdered for the purpose, and a troublesome task it is to perform. Those who wish to try it can, however, buy powdered shellac, which is largely used for pyrotechnical purposes.

The great staple lac for photographic use is undoubtedly "white-lac," originally devised in the days when sealing-wax was an article of great demand, the process of decolorisation leaving it in a form adapted for using with the most delicate colours. For this purpose it is, or was, made on a very large scale. Gmelin gives the following as a method for producing a perfectly white shellac soluble entirely in alcohol:—"Twenty-five parts of shellac are dissolved in six hundred parts of water containing ten parts of soda, and the solution is mixed with dilute hypochlorite of soda, and then with hydrochloric acid as long as the precipitate redissolves. It is then exposed to the sun for a day or two, mixed with sulphite of soda, and precipitated by hydrochloric acid." We do not doubt that anyone giving this method a trial will feel as fully satisfied with the result in appearance and working qualities as is possible with a white lac.

Our own experience, however, with white shellac of commerce is that in the process of bleaching it has lost much of its valuable quality; for a varnish made entirely with it is far less tough or hard. It may comparatively be easily scratched with the finger nail, while orange shellac dissolved in spirit never can be. We may say that we have tried to reduce the colour of a sample by means of charcoal and exposure to sunlight, as recommended in some works; but we have been entirely foiled, scarce a trace of colour having been destroyed after a continuation of the most vigorous daily shakings. We may observe, too, that old experiments of our own in dissolving shellac in ammonia and then endeavouring to decolorise by means of chemicals other than chlorine, followed by precipitation of the resin, never gave us any satisfactory results. When we have required a lac varnish we have used a solution of both white and orange lac mixed, obtaining results which it would be most difficult to surpass in usefulness, and with so little extra colour from the orange lac that no inconvenience was caused.

We may conclude by pointing out to those of our readers who are not aware of it an important property of white lac:—Although shellac retains its power of solubility in alcohol for an indefinite period, white lac, on the contrary, will gradually lose its solubility until in time it will become as insoluble as stone. The best way to preserve its qualities is to keep it covered with water, which will greatly prolong its keeping powers without in any way injuring its properties.

A correspondent from Wanganui, New Zealand, Mr. W. J. Harding, gives us in a private letter the following method of reducing over-dense negatives. He says:—"I find by practice that a gelatine unvarnished negative, when dry, may be reduced to any extent, either all over or in any part, by rubbing it with a piece of rag wetted with methylated spirits. The rag becomes black as if with indian-ink. I now reduce the over-intense iron roofs of buildings in that way, and am very pleased with the result."

The same gentleman says, in connection with our friend Mr. Andrew Pringle's last series of articles:—"I very much liked *Round the World*, by Andrew Pringle; but we have no trouble to get the Maories to sit for portraits in these parts. The trouble is to keep them out of the studio, and I don't find them *too* honest." Accompanying Mr. Harding's letter are some two or three dozen portraits of Maories, male and female. From a careful examination of these we judge that the New Zealand "lines of beauty" differ somewhat from ours.

What funny people some of our new-world contemporaries are to be sure! In a leading article in one (which is now in the twenty-first year of its existence), entitled *Our Influence*, it waxes quite jubilant that what has been designated the "fifth quarter" of the world "has quite a list by herself, twenty-six subscribers being supplied there every month." After proclaiming the fact that a new subscriber has been received through Sampson Low and Co., of London, it heralds the fact of its California agent increasing the number of its patrons to fourteen! Those acquainted with the *trade* in this country will conclude that some brethren are thankful, and properly so, for very small mercies.

From the same journal we perceive that punning of a certain class is now beginning to pervade the photographic literature of Pennsylvania. For example:—"What a fearful punster is brother Allen, of Detroit. He is Orville (awful). Is a key required?"——We venture to say that a key *is* required.

The friends of Mr. George H. Croughton, formerly of Lowestoft, will be interested in learning that he has become a regular contributor to our Philadelphia contemporary. Mr. Croughton is now a resident in the American city of "Brotherly Love."

From the contemporary just referred to we learn that "most of the photographers on the Ohio River, from Pittsburg to Cairo, were submerged more or less by the flood." We have not heard of any of them having been drowned, but we sympathise with them none the less, whether the submergence were in whole or in part, or whether it was the photographers themselves, "their ox, or their ass, or anything belonging to them," that was "submerged."

Who was it that, in the course of a paper read before the South London Photographic Society, last year, on photography in America, spoke in such eulogistic terms of the glorious and bright weather of the New World in contrast with that of "Perfidious Albion?" And how must he feel when he reads the following from the leader page of a local journal which ought to know?—"Business, since the first of January, has not been the best. In most localities bad weather has been the rule, and sunlight the exception. Throughout the Ohio Valley unprecedented rains have prevailed, and some photographers have not, on the first of March, been able to get off some of their Christmas work." In what respects, therefore, are meteorological conditions more favourable for the operations of the photographer in America than in England?

At the last meeting of the Association of Operative Photographers of New York the following curious statement was made by "A Member":—"The English, he found, had gone back to oxalate; he himself had gone back to pyro." This will, indeed, be news to the majority of "the English" for more reasons than one. First, the statement implies that the oxalate developer was the first used on this side, and that photographers had seceded from that to pyro.; whereas, as a fact, alkaline pyro. was in general use at least fifteen years before oxalate was heard of. Secondly, the statement would lead one to suppose that ferrous oxalate was, or had been, at some time the favourite form of developer amongst English photographers—a conclusion so singularly contrary to fact that we wonder at anyone who even occasionally sees an English journal venturing to make such an assertion.

The fact is that pyro. has always been the favourite developer with the majority, and we expect always will be. Further than this: many of those who at one time used oxalate exclusively, on account of its simplicity and the character of negative it gives, have since learning the value of pyro. adopted that method in preference. Indeed, from the report of the meeting alluded to, we find that that is becoming the case even in American plates, where oxalate had become firmly established. As the quality of American plates improves with experience in manufacture so will the use of pyro. increase; for, as Dr. Liesegang said at the Photographic Club, in explanation of the greater popularity of ferrous oxalate on the continent, the English plates are the only ones that will stand pyro. development without green and other fog.

After a series of experiments with glass of various colours for dark-room illumination, Mr. G. G. Rockwood, the well-known photographer, of New York, has decided in favour of a combination of orange, green, and ground glass, as giving in the highest degree safety, comfort, and quantity of illumination.

Our old friend, Mr. P. Mawdsley, has been discoursing before the Rochester (N. Y.) Photographic Association on the subject of stops in landscape photography. His view is that by using too small a stop atmospheric effect is destroyed; hence he advises the employment of as large an aperture as may be compatible with definition.

Mr. Edgeworth, of the Chicago Amateur Photographers' Club, has some novel notions on the subject of development. We learn from *The Eye* that "by using the developer with dry pyro. you would not get negatives with stains;" and that "in the developer of the two sodas there was no ammonia used." But the most surprising result of his experience is that "the finest accelerator, in his opinion, was water—*of course it developed alone.*". The italics are ours.

The explanation of the "dry pyro." developer and the "developer of the two sodas" is found in another paragraph of the same report, where Mr. Edgeworth gives his formula. He says:—For the pyro. solution take as follows: salicylic acid six grains, to one ounce of pyro. The accelerator was composed of carbonate and sulphate of soda. He found it work well; it gave no stains." But he omits to say

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INK-PHOTO. SPRAGUE & Co LONDON.

whether the salicylic acid is to be dissolved in the pyro. or the pyro. in the salicylic acid; nor does he explain why "the finest accelerator, in his opinion"—water—is entirely dispensed with.

A book of some interest has been published by Messrs. J. Wilson and Son, University Press, Cambridge, Mass., entitled *Researches on Astronomical Spectrum Photographs of the late Professor Henry Draper, M.D.* It consists of extracts from the *Proceedings* of the American Academy of Sciences, and contains cullings from the original notebooks and an introduction by Professor C. A. Young, with measurements and discussions of the plates by Professor E. C. Pickering. Although quite recently spectrum photography has made great advances, an account of the work done by Professor Draper in connection with this subject, with which his name is inseparably connected, will be of great value.

We have already dwelt upon the probable future usefulness of Willesden paper in connection with photographic work—mainly, perhaps, building work; but with regard to indoor requirements we cannot help thinking it remarkable that greater attention has not been given to the advantages of "built-up wood"—the peculiar sheets made by glueing together pieces of so-called "veneers." The material is, perhaps, most familiar in the form of chair seats—semi-elastic wooden slabs perforated with a number of small holes; but it is produced in many forms, and of plain and ornamental woods. It is made by well glueing sheet upon sheet of wood together, the grain of one being crosswise to the next; and when each sheet is nearly saturated the whole is submitted to hydraulic pressure which welds it almost into a homogeneous sheet without cleavage and without possibility of splitting. The inside can be of inferior, the outside of ornamental, wood; and, as it is economical, strong in every direction, and impossible to be cracked, it possesses advantages of strength and permanence which should make it very valuable for many photographic purposes. As an example of the wide range to which its usefulness can extend, we may instance canvas for artists and binders' boards for book covers, for which it has been found an efficient substitute.

Professor Bryce's bill "to secure access to the mountains and moorlands of Scotland" ought to secure a hearty meed of praise from the whole body of tourist photographers in the north, as great restrictions have been placed on the access to some of the most beautiful haunts of the lover of nature—"trespassers beware!" staring him in the face in all directions. The bill embodies every possible precaution against the abuse of the access craved. We join in the wish expressed by a scientific contemporary that all interested societies "should use every legitimate means to obtain for it parliamentry sanction."

Quilla bark is a very singular natural product—an infusion forming a mixture possessing many qualities analogous to those of a solution of soap, among them that of forming a permanent lather. Saponine is an active principle obtained from this substance, and appears to possess properties that may render it serviceable in photographic operations. Stütz could not prepare it in a pure form, but Schiaparelli states that he has been able to produce a perfectly-pure sample free from all inorganic substances. He states that it has the property of preventing the separation of substances insoluble in water, and that a solution of "soap bark may be looked upon as a semi-emulsifying medium." We have no data available to know its exact *modus operandi;* but though there are many agents—such as gelatine, sugar, and other substances—which also possess the power of interfering with the precipitation of insoluble matter, saponine may have a place in photographic operations.

According to a technical journal, "Mr. St. George has devised a method of recording telephonic communications by means of photography. This is done through the action of a circular collodion-covered plate, which revolves by clockwork. A pencil of light vibrates through a small slit, and leaves a dark line on the plate. The record of these vibrations is afterwards fixed in the ordinary manner."

The following is given as an excellent formula for making an etching ink for writing upon glass:—Equal parts of sulphate of barium and fluoride of ammonium are mixed in a lead vessel, and sufficient hydrofluoric acid is added to form a thickish liquid with which glass can be written upon with a steel pen. This etching ink should be allowed to remain for about half-an-hour before being washed off.

As iodine still finds a place on the shelves of the photographer's laboratory, it may be well to note the best method of encountering it if by any chance some should be swallowed by mistake. The usual effect of a poisonous dose of this chemical is the production of so much irritation of the stomach as to cause sufficient vomiting to eject the greater part of its contents. A German technical journal, commenting on a recent case of poisoning by iodine, puts forward starch paste as the best antidote under the circumstances; but it would certainly appear that "hypo.," which was actually used in the case in question, is much more likely to be useful, as the chemical change it would bring about would result in the production of a comparatively inert compound.

The second volume of the *Calendar of Documents Relating to Scotland* in H.M. Public Record Office is in the press, and will shortly be published. One of its distinguishing features, which the *Athenæum* justly characterises as of great value, will be the autotypes of a considerable number of homage seals. Photography is considerably cheaper than engraving, and is infinitely superior to it for the purpose, seals and coins being reproduced by photography with, of course, unerring fidelity, and, at the same time, with such verisimilitude of representation that the eye can often be deceived, a casual inspection giving the effect of true relief.

When shall we be able to have lumps of solid oxygen? The other day Professor Landolt exhibited to the Physical Society of Berlin a cylinder of solid carbonic acid which had been made upwards of an hour before he produced it. He allowed liquid carbonic acid to enter a cloth bag in which, through the quick evaporation, it took the form of a loose snow, which was then hammered into a mass in a cylindrical cylinder.

By-the-bye, liquid sulphurous acid, always a favourite material with experimentalists for producing intense cold, appears now to be in great demand—at least so we judge from the fact that it is advertised as a regular article of commerce, to be bought at so much per pound.

Works of art—the term including photographs—imported into America are subjected to a very heavy duty, on the principle, we suppose, that being luxuries, they should be taxed at a high rate. Formerly the rate was ten per cent. *ad valorem;* the Tariff Act of last year raised it to thirty, and the late Tariff Commission recommended its being raised to forty per cent.! There is, however, another side to the question, that of the educational and refining influence of pictures and sculptures, and some American statesmen hold that their value on that account should secure their introduction duty free; fortunately the question is not complicated with ideas of "protection," for the American artists themselves ardently support duty-free importation of pictures. The feeling of the country will be put to the test, for Representative Perry, of New York, has now introduced a bill which, if passed, would admit, without any duty being paid, all works of art, ancient or modern, the term to be construed as including all "paintings, drawings, and photographs, as well as statues of marble or other stone." The breadth of mind which such a measure proves must be gratifying to all true lovers of art, and it is to be sincerely hoped that the bill may pass in its entirety.

MR. PAYNE JENNINGS.

The subject of our illustration this week has been well known for his artistic landscape work for many years past—not only in this country, but also on the continent and in America. His first success was scored in Ireland, his Killarney series of pictures, published about fourteen or fifteen years ago, attracting universal attention by their freshness and novelty of style, as well as their technical and artistic merits. Other portions of Ireland, the Lake District, and Great Britain generally, have since occupied Mr. Jennings's attention, and he has figured frequently as a medallist at different exhibitions as well as in the capacity of judge, for which post his technical knowledge and artistic taste eminently fit him. Few figures are better known at the London meetings than Mr. Jennings's, as he is at present, or as been, on the executive of the

Photographic Society of Great Britain, the South London Photographic Society, and the Photographic Club, of which last he was one of the original committee.

THE FOCAL LENGTH OF LENSES FOR LARGE PORTRAITS.

I READ with great pleasure the article in your last issue on *Lenses for Large Portraits.* I am particularly glad to see that photographers in general are beginning to understand a little more than they formerly did the functions of the principal instruments of their work, and that they are coming to appreciate the fact that, if they work with a lens stopped down to give a certain angular aperture, the smaller in diameter the lens itself is the better. Only a couple of years since I remember at a photographic meeting there was brought up a subject very similar to that which was treated at the recent meeting of the Photographic Club, and that the general opinion of members was that, used with the same angular aperture as a lens of the "rapid" landscape type, the portrait lens had some peculiar virtue of its own which was variously, but somewhat indefinitely, described as "penetration," "intensity of action," "roundness of image," and soforth.

Now, as a matter of fact, if these phrases have any meaning at all, they describe properties which the portrait lens possesses in a less degree than any other. Thus, "penetration" is a word which may describe a property of a lens in giving the least possible amount of diffused light in the camera, thus allowing deeper shadows to be rendered with strong detail than would otherwise be possible. This property is possessed in the highest degree by such lenses as have the fewest reflecting surfaces. Thus, the single lens exhibits it in the highest degree possible in any lens, as it has but two reflecting surfaces. The lenses of the double combination type with both combinations cemented, which includes all English landscape lenses of the "rapid" type, come next; whilst at the foot of the list comes the portrait lens with its six reflecting surfaces.

May I venture to say that I believe the "universal" or group lens is the best for large portraits only up to a comparatively-moderate size, and that for very large sizes the "rapid" lens is by far the best. From what I gather of the practice of the best portrait photographers it is seldom that in the case of plates measuring sixteen to twenty inches in length an aperture of more than about $\frac{f}{10}$ or $\frac{f}{12}$ is used, whilst I understand that $\frac{f}{16}$ or even $\frac{f}{20}$ is not uncommon. Now, all these apertures can easily be got in the case of a lens of the rapid rectilinear or rapid symmetrical type.

The special point on which I wish to say a few words is one which has, I think, been overlooked by the Editors in the article I referred to at the beginning of this communication, and which is, indeed, one very often overlooked by photographers generally. I refer to the increase of focal length which takes place in a lens when it is brought at all near the subject to be photographed.

In giving the focal length of lenses manufacturers always state the length of focus when a distant subject is photographed. Now, as we well know, in the case of portraiture the object is never distant. The increase of focus beyond that for a distant object which takes place when we focus for a portrait is a small fraction of the focal length in the case of short-focus lenses, but it is by no means inconsiderable in the case of a long-focus lens.

As you justly remark—"It has been generally conceded that to obtain the most pleasing results in portraiture . . . the longest dimension of the picture should in no case exceed one-half the focal length of the lens with which it is taken." This is very true, but the rule applies not to the focal length of the lens when a distant object is focussed, but when the portrait to be taken is itself focussed. This gives us, in the case of very long-focus lenses, such an increase of focal length that in using them on the plates which they are advertised to cover we do not fall very far short of what is demanded by the above rule.

The formula for calculating the increase of focal length of a lens, when a near object is focussed, is very simple. Let f be the focal length of the lens for distant objects. Let n be the number of times smaller that the ground glass image is than the object itself; then for that particular image the focal length will be $\frac{n+1}{n} \times f$.

We may put the manner of using this formula in words in the following manner:—Discover how many times smaller the image on the ground glass is than the figure being photographed. Divide the focal length (for a distant object) by the figure thus obtained. Add to the focal length for a distant object the figure got by this division, and we shall have the focal length for the near object. This requires illustrating, and I shall take the case of the lens which the Editors mention in the article referred to. This is a lens of twenty-eight inches equivalent focus, which is to be used for covering a plate 20 × 16 inches.

Suppose that the standing figure of a very tall man is being treated. This will give the smallest benefit in the way of increase of focal length that we ever get in the case of portraiture, and yet this increase will be by no means inconsiderable. Probably about fifteen inches of the plate will be occupied by the figure. Supposing the man to stand six feet three inches, the image will be exactly five times smaller than the object. We, therefore, divide the focal length (twenty-eight inches) by five. This gives, as near as possible, five and a-half inches. This, added to the focal length, makes thirty-three and a-half inches—certainly still a good deal short of the forty inches required; but then it must be borne in mind that a standing figure, being nearly in one flame, there is not likely to be much noticeable straining of perspective.

Worked out according to the formula that I have just stated, this comes out as follows:—$\frac{5+1}{5} \times 28$ or $\frac{6}{5} \times 28$, which, worked out, gives precisely 33·6 inches.

In the case of a sitting figure, in which the perspective is most liable to be strained on account of the fact that parts of the subject are much nearer the camera than others, we have a much greater advantage. A very tall figure measures, when sitting in an ordinary chair, four feet four inches in height. This will again occupy about fifteen inches of a 20×16 inch plate. Fifteen inches is within a small fraction three and a-half times less than four feet four inches. Taking the formula again, we have—$\frac{3\frac{1}{2}+1}{3\frac{1}{2}} \times 28$. This, worked out, gives thirty-six inches. We are now very nearly approaching the required focal length, which ought to be twice the length of the picture. It should be borne in mind that from a 20 × 16 inch plate we shall probably not get a picture more than nineteen inches long; therefore all the focal length that we require is double that, or thirty-eight inches. In taking head-and-shoulder portraits, which will come out on a 20×16 inch plate at least half size, we find our focal length increased to forty-two inches, or considerably more than the greatest which can be desired.

Taking all this into consideration, I think it will be granted that, so far at anyrate as perspective is concerned, the opticians are excusable in advertising their longer-focus lenses as capable of covering a plate proportionately longer than their smaller ones do. Possibly they carry this affair a little too far.

Surely, however, there is no excuse for an optician who in his lists mentions the back focus of the lenses advertised without making any mention of the equivalent focus. A knowledge of the back focus of a lens conveys absolutely *no* definite information to a purchaser. Surely this is a matter in which our opticians might with advantage recast their price lists.

There is another point in which I think they might make an improvement. Why is it, I wonder, that our leading opticians still describe the properties and capabilities of their lenses in the same terms which were applied to them when they were to be used for wet plates only, but which in many cases do not correctly describe their capabilities when used on dry plates? Surely it is not with the view if imposing on ignorant customers by persuading them to purchase the expensive portrait lens, when a cheaper lens would much better suit their purposes.

W. K. BURTON.

A RAPID EMULSION FORMULA.

I SEND you a formula which I find excellent and very rapid. It is very simple, and an emulsion can be prepared in a few minutes:—

Stock Solution No. 1.

In ten ounces of distilled water dissolve—

Bromide of ammonium	560 grains.
" potassium	960 "
Iodide "	80 "
Chloride of ammonium	200 "

Solution No. 2.

Absolute alcohol	10 ounces
Liquor ammonia (strong)	$3\frac{1}{4}$ "

Solution No. 3.

Distilled water	10 ounces
Nitrate of silver	750 grains.

In one ounce of No. 1 dissolve ten grains of gelatine by gentle heat; then add three ounces of No. 2 and three ounces of No. 3, shaking whilst adding the solutions. Then add five drachms of dry gelatine and dissolve by gentle heat. After complete solution pour it into fifteen ounces of warm methylated alcohol, cool, and place the cake of emulsion in a mixture of—

Glycerine	5 ounces,
Absolute alcohol	5 „
Thymol	5 grains,

which will keep it indefinitely. AJAX.

THE LIME LIGHT.

"IN the multitude of counsellors there is safety." So says the scripture adage; and as I have, in conjunction with Mr. Robert M. C. James, of Watford, and Mr. Steward's lime-light jet maker, conducted a number of experiments with a view to obtaining improved results in lighting, I will, with your permission, offer a few remarks on the same.

The lantern employed was a Bridgman triple, with lenses as nearly as possible alike for focus, colour of glass, &c. The gas was in gas-holders and in bags. A photometric slide was put in each stage of the lantern, and consisted of a disc of brass fitted into a mahogany block of the ordinary size, but very carefully made and centered. A section of one-third of the circles (three and a-half inches) was cut out of each in such a way that one-third of the disc was illuminated by each lantern, and so an entire circle made up, each plate being marked distinctly, so that a reference to degrees of illumination could be quickly made.

In the first experiment No. I. jet had a nipple with a comparatively large orifice, and the nozzle bent considerably, so as to concentrate on a spot. No. II. had the same-sized nipple, but the nozzle was straighter, so as to give an elongated incandescent area of light. No. III. was a small nipple, and was supplied from a twelve-feet oxygen and a fifteen-feet hydrogen gas-holder without any other pressure than the weight of the dome. Nos. I. and II. were supplied from gas bags in a double board with fifty-six pounds pressure.

The result, as shown on the screen, was that No. III. was superior to No. II., and both were much in advance of No. I. in brilliancy. The conclusion we came to at this trial, and that which I think we fairly demonstrated, was that the light should not be a spot, and the orifice of the nipple should not be large when using a small pressure. With the hydrogen tap full on in each instance I noticed that, with the light at the best point attainable, the oxygen tap No. I. was only one-third on, in No. II. was half on, and in No. III was two-thirds on. To see what relation there would be in the light by increasing the pressure on the bags and leaving the gas-holder as it was, all the jets being precisely as before, two additional fifty-six pounds weight were added, making one and a-half hundredweight, with the result that No. II. was increased so much that it was cent. per cent. better than No. III. (the previous best), and No. I (the worst previously) was slightly better than No. III. Conclusion come to:—The larger-sized orifice was available for a high pressure with satisfactory results, thus proving the aperture or orifice of the nipple must be regulated by the pressure. The maximum light to be obtained without noise could only be ascertained by actual experiment.

A number of other trials were made with a view of overcoming hissing and waving of light, the nipples being successively larger, and tried on short nozzles, long nozzles of ordinary form, long swan-neck nozzles, and so on; but it was found that, no matter how carefully they were broached and made, the moment the orifice passed a certain aperture with a certain pressure the hissing commenced.

The subject of *safety-valves* and chambers also engaged our serious attention then, and very considerably since the Chadderton explosion, and the form that commended itself most to us was Highley's water interceptors. Those, however, we made in accordance with his description and drawings, we found, were not practical, for two reasons—first, serious diminution of pressure; second, waving of the light. After a number of experiments and modification of old forms of valves and entirely new valves had been tried, we reduced to a working minimum the loss of pressure; but up to this time have failed to get over the fluctuations in the light after the gas has passed through the interceptor (and consequently through the water) to the jet. I may mention that some two dozen different forms of vessels have been constructed of tall, short, and broad make, and fitted with everything that ourselves and the gas engineers we have consulted could suggest, and we have not yet found the right thing for *practical* work, although our approach to it at times has been so near that we thought the goal had been reached. Although checked, we do not consider ourselves quite *hors de combat*, and shall go at the enemy, "hidden danger," as soon as some fertile imagination can start another convoy of ammunition in the shape of ideas. It will be very encouraging to the lanternist and everyone using explosive gases if an *absolute* safety-valve can be devised; and I hope that Mr. Broughton or some of your correspondents will be able to demonstrate that no explosion is possible when using pumice chambers, and that they do not practically affect the light.

I notice, in your issue of April 11, that the Rev. T. F. Hardwich has tried these pumice chambers, and his test for safety seems a very fair one. I shall be glad if he can kindly tell us what percentage of pressure is lost by passing through them, and if he has tried them with the most explosive form of mixed oxygen and hydrogen he can make. I can endorse his opinion that oiled silk valves are no use to stop *ignited* gas returning; and, from what the Editors and other experts say, even such material as plaster of Paris and wood will not stop it. I am trying some new metallic and non-inflammable valves of a simple kind that have occurred to me, and if the results are at all of value I will communicate the same to your excellent Journal.

Unequal Pressure.—Our experience of unequal pressure is this—that there is no danger while both are forward, even if that on one bag or holder be three times as great as that on the other, the taps of jets sufficiently regulating the supply correctly. If anything be wrong it will be indicated by the light, and it is wisest to at once turn off the gases and make a general inspection.

Gas Dissolvers.—I find that among a great number of lanternists the gas dissolvers are very little understood, and unless the principle on which they work be mastered I can readily understand the hitches occurring that we hear and read of. I would strongly advise a periodical inspection of the dissolvers, as the grooves of plugs may be partially stopped by the lubricant, or the chlorine deposited by the oxygen. Screws that secure the plug should not alter by the working of the plug, as I have known them to do, and so cause the plug to become loose and the gas pass round it.

Jets.—As most jets take to pieces, great care must be taken to see that all the joints are sound. In the interchangeable and other forms of jets where the nozzle removes, a little grease to the ground fittings is occasionally required; and if there are any washers they must be sound to secure a gas-tight fitting. The popping-out of light after or during dissolving is sometimes attributable to a leakage in the jet. To test if a jet or chamber, such as a retort, purifier, &c., is gas-tight, stop up by turning off the taps or plugging with the finger, a cork, &c., all outlets except one, and then try and create a vacuum by sucking. If on the outlet touching the lip, it hold fast, it will be sound enough for all practical purposes. Another cause of occasional popping-out of the light is having too large an aperture in the nipple of the jet. If everything else be right with the jet and dissolvers, and the light go out with a report, the most likely thing is that the gases are not properly combining, and so they explode when the oxygen gets sufficiently in excess in the jet or pipes. G. R. BAKER.

TRACING ON GLASS FOR THE LANTERN.

SOME four or five years ago, possibly more, I gave, in one of the almanacs, a process for tracing designs on glass for the lantern, which, if it had only been followed up, would, I am sure, have been much in use at the present day, and such things as ground glass *à la* transparent slate, and other like systems would be put entirely in the shade. It was simply a varnish composed of dammar in benzole or chloroform, to which a few drops of india-rubber solution had been added. After an hour's drying, it was ready for use. With a fine lithographic pen dipped in indian-ink the finest drawing can be executed. I have myself written my name in full, "Walter Bentley Woodbury," in the diameter of a fourpenny piece; and by means of a small piece of damped card attached temporarily, have by the aid of drawing instruments, made some fifty circles in the space of a couple of inches. The advantages are that the glass is perfectly transparent, and even under a high power the lines show no sign of raggedness.

I should be glad if some of your readers, interested in this work, would give it a trial and report on it—*pro bono publico.*

W. B. WOODBURY.

THE LATE MR. F. A. WENDEROTH.

IT is over twenty years since articles of a brief yet practical nature began to be contributed to this Journal by Mr. F. A. Wenderoth, of Philadelphia, who was at that time, unless we are misinformed, a member of the photographic firm of Wenderoth, Taylor, and Brown. It is with much regret that we have to record the death of this gentleman—an event which took place on the 15th ult. A native of Germany, Mr. Wenderoth emigrated to America when he was thirty-five years of age, residing at first, and for several years, in California. He afterwards, in or about 1857, settled in Philadelphia.

Although he was an able practical photographer, his predilections lay most strongly in its artistic development. We possess examples of his more purely pictorial photographic work, which are perfect masterpieces of posing and artistic conception as regards grouping of figures. He was specially successful in a system of printing on opal glass originated by himself, and for instructions in which he refused the offer of large sums, afraid lest it might fall into the hands of those who would lower and cheapen a class of work for which he entertained so high a regard. The stripping and transferring of collodion films, ghosts in the solar camera, flare in lenses, the angle of view, the enamelling of photographs, the production and painting of opalotypes—these are among the numerous subjects upon which he wrote. In later years he devoted himself almost entirely to art rather than to technical photography.

So far as we can learn, Mr. Wenderoth was slightly over sixty years of age when he died. His latest contribution to our Old World literature was an article by him in our ALMANAC for 1880. He leaves a widow and grown up family.

PHOTOMICROGRAPHY.

[A communication to the Glasgow and West of Scotland Amateur Photographic Association.]

THOSE who use the microscope for the study of natural history are fully alive to the value of photography as a means of registering their observations, but the great majority are deterred from attempting its use by the idea that it is difficult as regards manipulation, and costly as regards apparatus. The various text-books of microscopy are greatly to blame for this, and certainly their descriptions of heliostats, electric lamps, and special microscopes are alarming. I hope, however, to show you that, in these days of dry plates, much may be done with very simple apparatus and little trouble.

There are microscopists whose interest lies rather in raising the microscope to the highest pitch of optical perfection than in its use for the purpose of study; and, doubtless, with the enormous magnifying powers now at their command, manipulation does become difficult and apparatus costly when they call in the aid of photography to test the latest optical triumph. The other and larger class, who in pursuit of knowledge use the microscope only as a tool necessary for their work, would welcome photomicrographs for their indisputable truth and manifest advantages over *camera-lucida* drawings. For such work as they require you see here all that is necessary—a good, firm, microscope, a "Lancaster" quarter-plate camera, with dark slides (the lens of course is removed), and a source of light, which in this instance is a magic lantern, although a paraffine lamp will do as well. The condenser between the lantern and object is the "bull's-eye" provided with every microscope. The body of the microscope should be short, if possible. Mine, as you see, has a short body with sliding-tube for lengthening. As this tube contains a diaphragm which would lessen the field if used full length, I keep it pushed in, and make up the length by means of this wider tube on the camera front. A pasteboard tube well blackened would do for this purpose. It is advisable that there should not be a rigid connection betwixt the microscope and the camera, as putting the dark slide in place might disturb the focus. The eyepiece, as a rule, is removed, though very minute objects may require its use, but then the loss of light is enormous.

Microscopic lenses, or "objectives," are in all good microscopes achromatic combinations, and may be divided into two classes—wide angle and ordinary. The first have greater resolving power—that is, the power of showing minute details of structure which might escape the narrower-angle objectives; but, on the other hand, these latter have more penetrating power or "depth of focus," and when the object is of appreciable thickness will show with comparative sharpness parts lying in different planes. This is the more fortunate, since the ordinary lenses are much less costly than those of wide angle, and are the class generally supplied with so called "college" or "medical" microscopes.

Here is the lens I find most useful. It is called a "one-inch objective," and is so called because it has the magnifying power of a single lens of one-inch focal length. To increase its penetration I have reduced its aperture by one-half with a paper diaphragm, and have still plenty of light. Here is one of a-quarter-inch focus much more powerful. Here is another, to which I would direct your special attention. It is now of one and a-half inch power, but by turning this collar I can decrease its power by degrees to four and a-half inches. This means that a comparatively-large object may be viewed as a whole and magnified a few diameters, and then, the power being increased, it may be examined in detail. There is a scale on the revolving collar for registering the power employed. In photography this lens is remarkably useful, as the object can be enlarged just sufficiently to cover the focussing-screen. It is, however, only available for comparatively-large objects.

I should like to ask any of our members who are well up in optics if there be any reason why we should not have a variable lens like this for landscape work. It would be peculiarly useful to us in the West of Scotland, where at one time we are doing a "bit" in a glen with most of the picture within a few yards of the camera, and next minute have to deal with hills ten miles away. Under these circumstances a lens of variable focal length would be very desirable.

The greatest difficulty in photomicrography is to judge exposure. It varies with every objective and with every object. The thickness, and particularly the colour, of the preparation must be considered. Parts of insects are, as a rule, of a reddish-brown tint, very non-actinic, and require long exposures; while botanical preparations are generally colourless or green, and require much less time. As a rule, with an object which is new to me I give an exposure which I know must be full, and develope with hydrokinone, using a minimum of sodium carbonate to begin with. The image comes up very slowly and is perfectly under control. When I know the right exposure I give it, and use Edwards's developer, which seems to give a very fine grain to the negative. Too much density should be avoided, as it is often desirable to make lantern transparencies or gelatino-bromide prints from micro-negatives, and for such work a rather thin negative with lots of detail is best.

It is generally stated in works on microscopy that the chemical and visual foci of objectives do not coincide, and that, after focussing, the objective should be moved closer to the object to an extent only to be found by experiment. This is doubtless true in theory, but so far as any of my lenses are concerned I have found that a sharply-focussed image gives a sharp negative. It will, however, be found that when using a low power the objective may be moved through a very minute fraction of an inch on each side of the point of absolute sharpness without apparent detriment to the image. In such a case it is advisable that it should be moved to the nearest point to the object consistent with sharpness; it will then be in focus for the blue rays.

My subject may not be of much interest to most of you, but after seeing the operation of making a photomicrograph you may be able to convince some doubting friend that it is not so very difficult after all. It is interesting to note, by the way, that probably the first gelatino-bromide plates were used for this work, since Dr. Maddox, to whom I believe we owe the process, is an eminent microscopist and uses photography largely in his researches.

The apparatus I have shown you is simple and inexpensive enough, but good work may be done with a home-made camera. My first attempts were made with a curious-looking affair made from some old boxes and a bit of black velvet, and were quite successful. I found, however, that some objects required direct sunlight to do them justice, and then a well-made camera and dark slide are assuredly necessary. To give you an idea of the exposures necessary I shall now take some negatives. WM. GOODWIN.

A BALLOON TRIP.

IN our issue of last week we announced that Mr. Cecil V. Shadbolt intended to make two ascents in the "Sunbeam," on Monday and Tuesday last. These aërial trips were to take place from Birmingham. The first actually took place on Easter Monday. At the last moment we have received the details of the start and ascent, which are so graphically described in Mr. Shadbolt's communication that we give the particulars in that gentleman's own words:—

I will tell you in very few words how I got on—or, perhaps, you will think, did *not* get on—on Monday last down at Birmingham. The fact is, I have had such a taste of the "shady side" of ballooning that I should be sorry to have a similar experience again if it could be avoided; but, at the same time, of course we must just take all these things as they come, if we want to do any good—the rough as well as the smooth.

The wind was so high at the start that the balloon could not be got under control, and, after being dragged about by an immense crowd of people who were assisting us in the hope of getting something like a decent start, we were obliged to let go everything and get dragged along the ground through the immense throng of people who were present, and who made way pretty quickly before us. Bag after bag of ballast was thrown bodily out, and at length we rose beautifully without injuring anybody, which seemed rather astonishing under the circumstances. Mr. Dale was at one time thrown clean out of the car, but fortunately regained it in safety before we soared aloft. The journey itself I need not describe, save that we reached an altitude of just upon 5,500 feet, and lost sight of the earth for a considerable time.

In cloudland all was, of course, calm and peaceful, and we seemed to be hanging quite still in a scene of arctic beauty, although, in reality, we were scudding along before the wind at a speed of something between thirty and forty miles an hour. When we dipped below the clouds again we were close upon Worcester, where we landed, I am happy to say, in safety, although the concussion and subsequent knocking about was terrible, the car turning clean over and dragging on the ground in a horrible manner. Everything seemed in the most dreadful confusion. My fellow-passengers seemed right over my head, and a heavy bag of ballast fell on me from somewhere. The bottom of the car must have been up in the air at the time, and for the next moment everything seemed to be in black darkness, but only for a moment. No bones were broken, and my worthy little captain behaved admirably all through. We pulled up within about fifty to one hundred yards of the river, into which we must have gone had the grapnel not taken a firm and splendid hold in the turf.

As to photographic work, it was impossible; and the camera-holder, which had been fixed to the car by a carpenter in the most businesslike manner, was torn off "like nothing" some time before we got away even. You will not be surprised when I tell you that after this, the following day appearing equally unfavourable, I decided to "go up"—not by the "Sunbeam," but by the 11.30 train for London; and here I am, safe and sound on the whole, though rather shaken and stiff about the arms and shoulders, awaiting more favourable weather for the next ascent.

NOTES ON DEVELOPERS.

[A communication to the Leeds Photographic Society.]

I HAVE had under experiment for some time the two following questions:—"The relation between exposure and developer" and the "colour of the deposit" in negatives and transparencies. This paper may be taken as containing a few notes on certain developers which I have used in the course of my experiments, and a brief indication of the line my investigation is taking. I reserve for a future paper a more complete account of the investigation itself.

The question as to the cause of the different colours obtainable with bromide gelatine plates by the use of different developers is one which is found, on close examination, to be by no means an easy one. It resolves itself at once into two lines for observation—the colour due to simple staining as in the yellow, over-developed pyro-ammonia negative, and the green pyro. ammonia carbonate of potash negative, or the colours produced by combination of citrates, chlorides, and iodides with ferrous oxalate developers, where staining does not appear to be an important factor, if it plays a part at all.

As nearly all the formulæ described in the paper have been published, it is not necessary to repeat them. The following, however, may be included:—Take citric acid twenty grains, sulphurous acid, B. P. solution, half-drachm, water five ounces. When the citric acid has been dissolved add a quarter-ounce of pyrogallol. Use one drachm to one ounce of water for a quarter-plate. This solution will keep indefinitely. The one drachm contains as much citric and sulphurous acid as will nearly neutralise one minim of ammonia. For the ammonia solution take water five ounces, bromide of potassium forty-five or fifty grains, ammonia, ·880, half-ounce. Use one drachm to the drachm of pyro. solution, preferably adding it in separate half-drachms as the development progresses. The colour of the negative is nearly that of ferrous oxalate, and the shadows are perfectly clear.

As bearing upon hydrokinone developers, I may state that I have recently taken a very quick exposure with Reynolds and Branson's shutter, on a Nelson's ten-times plate, at half-past four on a March afternoon, the subject being a street of red brick houses and children playing. I developed with one grain of hydrokinone to one ounce of water and half-an-ounce of saturated solution of carbonate of soda. The picture came up with plenty of density and very fair detail in five minutes.

As regards the colour of the deposit: I can only say that I have so far secured a very wide series of colours with bromide plates, and that I am now carefully examining them as fast as the limited time at my disposal will allow. I have hopes that prolonged, careful, microscopical examination will throw further light upon the subject.

H. POCKLINGTON.

POITEVIN'S PHOTO-RELIEFS.

[A communication to the Glasgow Photographic Association.]

IN my former communication to the Society I made a passing reference to what the French chemist, Poitevin, had done in the way of forming relief pictures; but I was unable to bring before you any examples to illustrate his method of procedure. Since our last meeting I have made several experiments, following out, with some slight modifications, the lines laid down by Poitevin in his *Traité des Impressions Photographiques*. A copy of this work is lying on the table. It is the second edition brought out last year by M. Leon Vidal, who is, as you are aware, a no mean authority in photographic matters. Each chapter is followed by an appendix, written by M. Vidal, which adds greatly to the value of the book, and enables the reader to form a more correct estimate of the truly original nature of Poitevin's researches.

It is not only interesting, but instructive, to go over the ground traversed by the pioneers of photography; and, among the many processes that have become historical, *helioplastie*, the name given to his process by Poitevin, or sun-modelling, as it may be rendered in English, is by no means one of the least suggestive. It is simplicity itself. There are not many processes where all the development required consists in immersing the plate in cold water. When we consider that it was about the year 1848, almost forty years ago, that Poitevin conducted his experiments, the wonder is that long ere this there has not been some practical application of the work he then did. For your inspection I have here an intaglio in moist gelatine produced from a negative, and its accompanying plaster cast. Here is an electrotype, got from one of these plaster productions, which will give an infinite number of prints with gelatine ink in a Woodbury press. I have drawn one or two, just to illustrate the principle, before coming to the meeting, and they can be examined, although somewhat rough in appearance. This is due, not to any imperfection in the process, but to my not having prepared the plaster cast in a sufficiently careful manner for the delicate operation of electrotyping.

To show the difference in the nature of the reliefs obtained, when employing a positive, and when a positive picture and a negative one: here is a gelatine relief picture which has been exposed behind a positive, and with it the plaster reproduction. It seems to me some of you professional men might revive, with advantage to yourselves, these sun-modelled pictures; they would be something new, I think, to the present generation. The face as seen in profile would undoubtedly be the best pose; further, having got your plaster-mould, casts could be taken in white wax. There is no end to the many modifications that one could work out in these matters. To show how perfectly the minutest detail is preserved in these plaster pictures, here is a small landscape subject. It occurred to me that it would be interesting to try the effect of producing a plaster relief from a photograph of some statue. I accordingly got a print which you see here; it represents the goddess Hebe. Having waxed it and put it into a frame in front of a prepared film, on developing the mould presented the appearance it has here, and the plaster cast from it reproduces very fairly in bas-relief the original character of the statue. It wants, of course, the rounded character of the original figure; but perhaps, by shading the outer portions of the figure, a rounded character could be conferred on the mould, and subsequently, of course, on the plaster cast. I have not had, however, the necessary time to do anything in this direction.

I may mention that the films used in these experiments were prepared from Nelson's gelatine, one ounce to eight ounces of water, a certain amount of sugar and glycerine having been dissolved in the water. Poitevin seems to have worked with gelatine pure and simple, but you will readily understand that plates prepared thus dry badly. I dried the plates at a temperature of 90° F. or thereabouts—not exceeding it, however—in a drying-box after England's pattern. A concentrated solution of bichromate of potash was added to the warm gelatine just before coating, sufficient to give a slightly-yellowish colour to the solution. Contrary to what might be expected, a very thick film is of no advantage. In coating, I first got a level place on the table, put the plate down, and surrounded it with strips of thick plate glass, cuttings of shop window glass, arranged to form temporary slides. When set the glass was withdrawn, and the plates removed to the drying-cupboard. Filled up to the level of these thick glass sides there is always a uniform quantity of gelatine left on the plate.

WILLIAM LANG, Jun.

LANDSCAPE PHOTOGRAPHY FOR AMATEURS.

[Condensed from a paper read before the Newcastle and Northern Counties' Photographic Association.]

AT the annual lantern meeting of this Society Mr. J. P. Gibson, of Hexham, read a lengthy paper, which, unfortunately, our space does not permit us to give in full. After alluding to the capabilities of photography in various directions, and its power of expressing art feeling, he proceeded to enforce the claims of landscape photography as a health-giving and useful recreation, adding the following general directions for the use of amateurs about to take up the art for the first time:—

An expensive outfit is not by any means requisite for landscape photography. It is, I think, most convenient for an amateur to commence with a quarter-plate camera—that is, one taking photographs on plates $4\frac{1}{4}$ by $3\frac{1}{4}$ inches—as it is much less costly to work, and much more portable than those of larger size. For lady amateurs this size is specially suitable. From the negatives taken in such a camera *carte de visite* views and magic lantern slides can be got by direct printing, and by the aid of an enlarging lantern bromo-gelatine paper prints can be made, up to about 16 by 12 inches, with very good results. A portable camera of this kind, with three or four double dark slides for the prepared plates, can easily be carried in the pocket of a shooting-coat or in a very small satchel. A light stand may be got which can be used as an alpenstock in hill climbing. Such an apparatus can be had complete from about £3 to £12.

After having thoroughly mastered the technical details of dry-plate work the amateur may proceed to attempt photographs of a larger size. When the camera is required to be carried for long distances by the photographer himself without assistance a camera taking plates $7\frac{1}{2} \times 5$ inches is very convenient, as a whole-plate camera—that is, one taking views up to $8\frac{1}{2} \times 6\frac{1}{2}$ inches—is very apt to feel heavy at the close of a long day's tramp over rough country roads.

By the use of a simple adapting-back quarter-plate views can be taken in the larger camera, and with six large and six quarter-plate dark slides filled with plates the amateur is fully equipped for a long summer day's work. I prefer double dark slides to any arrangement for changing the plates during the day's work, the latter wasting time in the most valuable part of the day, and also causing a considerable risk of injury to the plates. In selecting an apparatus let the beginner carefully avoid one having many loose pieces; and before starting to work let him make out a written list of the materials required for his day's work, and carefully check it off before starting to see that he has forgotten nothing. It is a little depressing to find when miles away from home that that trifle, the lens, has been left behind. A valued friend of my own, who is one of the most enthusiastic and successful amateurs in the North of England, may be taken as a type of the forgetful photographer. He might be exactly described by a slight paraphrase of the description of the baker in Lewis Carrol's wonderfully-humourous poem, *The Hunting of the Shark.*

> "There was one who was famed for the number of things
> He forgot when he entered the ship,
> His camera, tripod, drop-shutter with springs,
> And the plates he had bought for the trip.
>
> "He had forty-two boxes all carefully packed,
> With his name painted clearly on each,
> But having forgotten to mention the fact,
> They were all left behind on the beach."

His forgetfulness (which gives him no end of trouble) is, however, equalled, or perhaps surpassed, by the wonderful mechanical ingenuity which he displays in getting out of the difficulties his lapses of memory cause, and he manages to produce charming negatives which very often tempt me to feel envious.

Coming to actual outdoor work: let me recommend beginners to try at first simple effects of lighting, such as can be obtained with the sun on one side of and slightly behind the camera, as brilliant and satisfactory looking negatives are most easily got by this method of lighting. With the sun straight behind the camera a direct front light is thrown upon the landscape, which is usually the very worst form of lighting possible to work with, the resultant pictures being flat, tame, and spotty. Occasionally with subjects which possess great contrasts of light and shade in themselves even a front light may be utilised.

In photographing a wooded landscape, the sun almost immediately in front of the camera and just kept from shining on the lens by a sky-shade, gives, perhaps, the greatest chance of obtaining artistic effect to the photographer who has thorough mastery over manipulative detail, as nature seen right under the sun reveals many beauties otherwise hidden. Under the sun the the shadows are broad and massive, and the heavy summer foliage seems surrounded by a halo of light caused by the reflections from the upper leaves, which glisten and sparkle in the glad sunshine like numberless jewels. In attempting to obtain effects of this kind every possible precaution must be taken to prevent the evil known to photographers as "halation." Fine effects may be often got on days when there is no direct sunshine. A weak, diffused light suits best heavy masses of foliage and deep wooded glens, such as those in which most of our Northumbrian "linns" are situated. While the attention of the photographer is directed to the landscape, atmospheric effects should not be neglected; and an opportunity of taking a fine sky should never be lost, as he who does not make his skies a material part of his picture neglects to avail himself of one of his greatest aids. In the works of all the great landscape painters the skies seem to sympathise with and form part of their subject. The practice, so common with photographers not long ago, of treating the sky as a white sheet thrown behind their landscape is now fast becoming obsolete, and in almost all exhibition pictures, and in many procurable in the shops of photograph dealers, we find natural skies, either produced in the negative by the use of a sky-shade during exposure, or by the more troublesome but more effective way of printing-in a sky from a separate negative taken specially for that purpose.

Having surmounted technical difficulties the amateur will find it to his advantage in every way to turn his attention to some special and definite purpose. To attain excellence in a special line is better than to be content with mediocrity in many, and it is by steady, earnest effort in one direction that the best results are most easily accomplished.

Let me conclude with a word of warning to the beginner. Do not attempt too much at first. It is necessary to creep before walking. I have known a man who could not develope a dry plate properly, and who certainly did not know a good one from a bad one, commence to make his own gelatine plates, giving as his reason that he wished everything connected with the photograph to be his own handiwork. Carrying out his principle he might have started a glass manufactory and a paper mill. To such a man there comes in photography a quick and stern Nemesis. Frequently it comes, after a tour with the camera amid beautiful and enchanting scenery, when in the silence and lurid red light of his developing-chamber he attempts to bring out the images of beauty latent on his plates. One after another is plunged into the developing solution; but instead of the expected pictures there results only fog! fog!—hopeless and universal fog! In his despair he feels photography is a sham and civilisation a failure; and in the extremity of his anguish perhaps he is tempted to utter the big, big D. We may all take warning by the fate of the ambitious youth of heathen mythology, Phæton, who essayed to drive the horses of the sun; and we must remember that the horses of the sun god, whom we photographers so ardently worship, will not be driven, but must be gently led.

RECENT PATENTS.

PATENTS APPLIED FOR.

No. 6,242.—"Obtaining Photographic Images on Porcelain and Enamelled or Glazed Surfaces." J. Wetter; communicated by J. A. Burell. —*Dated April* 10, 1884.

No. 6,323.—"Frames for Holding Photographs and Other Pictures." H. H. Hund; communicated by A. Brüning.—*Dated April* 12, 1884.

NOTICE TO PROCEED.

No. 5,681.—"Improvements in and Relating to Colour-Printing, also Partly Applicable for Producing Coloured Photographs and for Similar Purposes." W. R. Lake; communication from A. Bisson, Paris.—*Dated December* 8, 1883.

PATENT SEALED, April 9, 1884.

No. 712. — "Improved Apparatus for Washing Photographs." F. Hazeldine.—*Dated January* 4, 1884.

Notice.—In the official journal of the Patent Office of the 11th instant, we find a notice of application for the amendment of the specification of George Duncan Macdougald, of Dundee, No. 416, dated January 2, 1884. This specification was published on page 155 of The British Journal of Photography. The proposed amendment will not greatly interest our readers, and, therefore, we refrain from giving the details.

IMPROVEMENTS IN ASTRAGALS OR GLAZING BARS FOR HOLDING AND SECURING GLASS FOR ROOF-LIGHTS AND WINDOWS.

Although this is not a photographic patent, it is believed that it will possess interest to every photographer who has a glass-roofed studio, seeing that it embraces a new method of attaching the glass to the astragals. The invention is by John Fraser, of Wellgate Works, Arbroath, Scotland, and the specification is as follows:—

My said invention has for its object the constructing of astragals or glazing bars in an improved and extremely simple and economical manner. And my invention consists in a new and improved mode of combining strips of thin lead with wooden astragals or bars, the lead strips being used in a manner which is now well known and commonly practised for holding and closing the glass by being folded down on the glass when placed in position. In carrying out my invention a saw cut or deep groove is formed along the top of the astragal or bar, and a pair of lead strips or one doubled strip is inserted in the groove, with the outer edges of the lead projecting sufficiently for being folded down upon the glass. The lead is secured in the groove by transverse nails, sprigs, or pins. A single lead strip may be used in some cases.

And in order that my said invention, and the manner of performing the same, may be properly understood I hereunto append a sheet of explanatory drawings to be hereinafter referred to and representing examples of my improved astragals or glazing bars.

Fig. 1 is a transverse section of a simple modification of the improved astragal, which consists of a bar, 5, of wood having formed along the middle of its top a deep narrow groove for the reception of a pair of strips, 6, of thin sheet lead. After being inserted the lead strips, 6, are fixed by

FIG. 1.

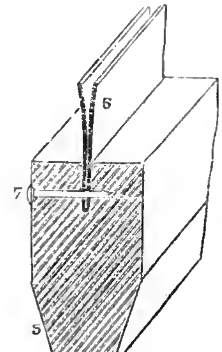
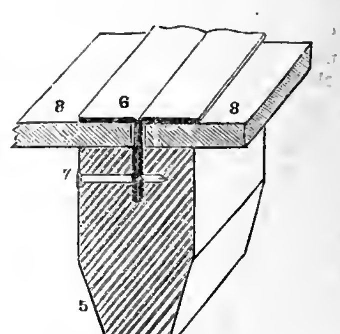


FIG. 2.



nails, 7, driven in transversely at suitable intervals along the bar. In *fig.* 1 the lead strips, 6, are shown as they are before the glass is placed in position. *Fig.* 2 is a section of the same form of astragal as that shown in *fig.* 1, but with the glass, 8, in position and the lead strips, 6, turned down upon it.

The wooden astragal or bar, 5, may be made of various forms or sections, and, if desired, it may have grooves or gutters, 9, formed along its sides as shown in *fig.* 3, for leading off moisture or water; or such grooves or gutters, 9, may be formed so as to be covered by the glass as shown in *fig.* 4, or as shown in *fig.* 5. *Fig.* 5 also shows a mode of using a single lead strip for securing the adjacent edges of two pieces of glass. This single lead strip is cut from its top edge down to the level of the top of the glass at intervals, and the parts between the cuts are bended down upon the glass alternately to opposite sides.

Instead of reproducing all the figures given as illustrations of the specifications, we confine ourselves to *figs.* 1 and 2, as from them may be deduced all the others. The special claim is—

The fixing of lead strips to astragals or glazing bars by inserting them in grooves formed in the tops of the bars and by driving nails, or the like transversely into the bars and through the lead strips substantially as and for the purposes hereinbefore described.

PHOTOGRAPHIC COPYRIGHT IN THE UNITED STATES.

In this case the Supreme Court of the United States, acting as a Court of Appeal, had before them a copyright case. As it involves the portrait of an Englishman more or less well known, Oscar Wilde, it is believed that every reader interested in the law of copyright in other countries will feel specially interested in this case. The story, as told by Mr. Justice Miller, when delivering the opinion of the court, is substantially as follows:—

The suit (he says) was commenced by an action at law, in which Sarony (photographer, New York) was plaintiff and the Lithographic Company was defendant, the plaintiff charging the defendant with violating his copyright in regard to a photograph, the title of which is "Oscar Wilde, No. 18." A jury being waived, the court made a finding of facts on which a judgment in favour of the plaintiff was rendered for the sum of \$600 for the plates and 85,000 copies sold and exposed to sale, and \$10 for copies found in his possession, as penalties under section 4,965 of the Revised Statutes.

Among the finding of facts made by the court the following presents the principal question raised by the assignment of errors in the case:—

"That the plaintiff, about the month of January, 1882, under an agreement with Oscar Wilde, became and was the author, inventor, designer, and proprietor of the photograph in suit, the title of which is 'Oscar Wilde, No. 18,' being the number used to designate this particular photograph and of the negative thereof; that the same is a useful, new, harmonious, characteristic, and graceful picture, and that said plaintiff made the same at his place of business in said City of New York, and within the United States, entirely from his own original mental conception, to which he gave visible form by posing the said Oscar Wilde in front of the camera, selecting and arranging the costume, draperies, and other various accessories, in said photograph, arranging the subject so as to present graceful outlines, arranging and disposing the light and shade, suggesting and evoking the desired expression, and from such disposition, arrangement, or representation, made entirely by the plaintiff, he produced the picture in suit, Exhibit A, April 14, 1882, and that the terms 'author,' 'inventor,' and 'designer,' as used in the art of photography and in the complaint, mean the person who so produced the photograph."

Other findings leave no doubt that plaintiff had taken all the steps required by the Act of Congress to obtain copyright of this photograph, and section 4952 names photographs among other things for which the author, inventor, or designer may obtain copyright, which is to secure him the sole privilege of reprinting, publishing, copying, and vending the same. That defendant is liable under that section and section 4965 there can be no question, if those sections are valid as they relate to photography.

Accordingly, the two assignments of error in this court by plaintiff in error are:—

1. That the court below decided that Congress had and has the constitutional right to protect photographs and negatives thereof by copyright.

The second assignment related to the sufficiency of the words "Copyright, 1882, by N. Sarony," in the photographs, as a notice of the copyright of Napoleon Sarony under the Act of Congress on that subject.

With regard to this latter question it is enough to say that the object of the statute is to give notice of the copyright to the public, by placing upon each copy, in some visible shape, the name of the author, the existence of the claim of exclusive right, and the date at which this right was obtained.

This notice is sufficiently given by the words "Copyright, 1882, by N. Sarony," found on each copy of the photograph.

The constitutional question is not free from difficulty.

The eighth section of the first article of the Constitution is the great repository of the powers of Congress, and by the eighth clause of that section Congress is authorised:—

"To promote the progress of science and useful arts, by securing, for limited times, to authors and inventors the exclusive right to their respective writings and discoveries."

The argument here is—that a photograph is not a writing nor the production of an author. Under the acts of Congress designed to give effect to this section the persons who are to be benefited are divided into two classes—authors and inventors. The monopoly which is granted to the former is called a copyright; that given to the latter letters patent, or, in the familiar language of the present day, *patent right*.

We have, then, copyright and patent right, and it is the first of these under which plaintiff asserts a claim for relief.

It is insisted in argument that a photograph, being a reproduction on paper of the exact features of some natural object or of some person, is not a writing of which the producer is the author.

Section 4952 of the Revised Statutes places photographs in the same class of things which may be copyrighted with "books, maps, charts, dramatic or musical compositions, engravings, cuts, prints, paintings, drawings, statues, statuary, and models or designs intended to be perfected as works of the fine arts." "According to the practice of legislation in England and America (says Judge Bouvier, 2 *Law Dictionary*, 363), the copyright is confined to the exclusive right secured to the author or proprietor of a writing or drawing which may be multiplied by the arts of printing in any of its branches."

The first Congress of the United States, sitting immediately after the formation of the Constitution, enacted that the "author or authors of any map, chart, book or books, being a citizen or resident of the United States, shall have the sole right and liberty of printing, reprinting, publishing and vending the same for the period of fourteen years from the recording of the title thereof in the clerk's office, as afterwards directed."

This statute not only makes maps and charts subjects of copyright, but mentions them before books in the order of designation. The second section of an act to amend this Act, approved April 29, 1802, enacts that from the first day of January thereafter, he who shall invent and design, engrave, etch, or work, or from his own works shall cause to be designed and engraved, etched, or worked, any historical or other print or prints shall have the same exclusive right for the term of fourteen years from recording the title thereof as prescribed by law.

By the first section of the Act of February 3, 1831, entitled "an Act to amend the several acts respecting copyright," musical composition and cuts, in connection with prints and engravings, are added, and the period of protection is extended to twenty-eight years. The caption or title of this Act uses the word copyright for the first time in the legislation of Congress.

The construction placed upon the Constitution by the first Act of 1790, and the Act of 1802, by the men who were contemporary with its formation, many of whom were members of the convention which framed it, is of itself entitled to very great weight, and, when it is remembered that the rights thus established have not been disputed during a period of nearly a century, it is almost conclusive.

Unless, therefore, photographs can be distinguished in the classification on this point from the maps, charts, designs, engravings, etchings, cuts, and other prints, it is difficult to see why Congress cannot make them the subject of copyright as well as the others.

These statutes certainly answer the objection that books only, or writing in the limited sense of a book and its author, are within the constitutional provision. Both these words are susceptible of a more enlarged definition than this. An author in that sense is "he to whom anything owes its origin—originator, maker; one who completes a work of science or literature." So, also, no one would now claim that the word "writing" in this clause of the Constitution, though the only word used as to subjects in regard to which authors are to be secured, is limited to the actual script of the author, and excludes books and all other printed matter. By writings in that clause is meant the literary productions of those authors, and Congress very properly has declared these to include all forms of writing, printing, engraving, etching, &c., by which the ideas in the mind of the author are given visible expression. The only reason why photographs were not included in the extended list in the Act of 1802 is probably that they did not exist, as photography as an art was then unknown, and the scientific principle on which it rests and the chemicals and machinery by which it is operated have all been discovered long since that statute was enacted.

Nor is it to be supposed that the framers of the Constitution did not understand the nature of copyright and the objects to which it was commonly applied, for copyright, as the exclusive right of a man to the production of his own genius or intellect, existed in England at that time, and the contest in the English courts, finally decided by a very close vote in the House of Lords, whether the statute of 8 Anne, chap. 19, which authorised copyright for a limited time, was a restraint to that extent on the common law or not, was then recent. It had attracted much attention, as the judgment of the King's Bench, delivered by Lord Mansfield, holding it was not such a restraint, in Millar *v.* Taylor, 4 Burrows, 2,303, decided in 1769, was overruled on appeal in the House of Lords in 1774. Ibid, 2,408. In this and other cases the whole question of the exclusive right to literary and intellectual productions had been freely discussed.

We entertain no doubt that the Constitution is broad enough to cover an act authorising copyright of photographs, so far as they are representatives of original intellectual conceptions of the author.

But it is said that an engraving, a painting, a print, does embody the intellectual conception of its author, in which there is novelty, invention, originality, and therefore comes within the purpose of the Constitution in securing its exclusive use or sale to its author; while a photograph is the mere mechanical reproduction of the physical features or outlines of some object, animate or inanimate, and involves no originality of thought or any novelty in the intellectual operation connected with its visible reproduction in shape of a picture. That while the effect of light on the prepared plate may have been a discovery in the production of these pictures, and patents could properly be obtained for the combination of the chemicals, for their application to the paper or other surface, for all the machinery by which the light reflected from the object was thrown on the prepared plate, and for all the improvements in this machinery and in the materials, the remainder of the process is merely mechanical, with no place for novelty, invention, or originality. It is simply the manual operation, by the use of these instruments and preparations, of transferring to the plate the visible representation of some existing object, the accuracy of this representation being its highest merit.

This may be true in regard to the ordinary production of a photograph, and that in such case a copyright is no protection. On the question as thus stated we decide nothing.

In regard, however, to the kindred subject of patents for invention, they cannot by law be issued to the inventor until the novelty, the utility, and the actual discovery or invention by the claimant have been established by proof before the Commissioner of Patents; and when he has secured such a patent, and undertakes to obtain redress for a violation of his right in a court of law, the question of invention, of novelty, of originality, is always open to examination. Our copyright system has no such provision for previous examination by a proper tribunal as to the originality of the book, map, or other matter offered for copyright. A deposit of two copies of the article or work with the Librarian of Congress, with the name of the author and its title-page, is all that is necessary to secure a copyright. It is, therefore, much more important that, when the supposed author sues for a violation of his copyright, the existence of those facts of originality, of intellectual production, of thought and conception on the part of the author should be proved than in the case of a patent right.

In the case before us we think this has been done.

The third finding of facts says, in regard to the photograph in question, that it is a "useful, new, harmonious, characteristic, and graceful picture, and that plaintiff made the same * * * entirely from his own original mental conception, to which he gave visible form by posing the said Oscar Wilde in front of the camera, selecting and arranging the costume, draperies, and other various accessories in said photograph, arranging the subject so as to present graceful outlines, arranging and disposing the light and shade, suggesting and evoking the desired expression, and from such disposition, arrangement or representation, made entirely by plaintiff, he produced the picture in suit."

These findings, we think, show this photograph to be an original work of art, the product of plaintiff's intellectual invention, of which plaintiff is the author, and of a class of inventions for which the Constitution intended that Congress should secure to him the exclusive right to use, publish, and sell, as it has done by section 4952 of the Revised Statutes.

The question here presented is one of first impression under our Constitution, but an instructive case of the same class is that of Nottage *v.* Jackson, 11 Queen's Bench Division, 627, decided in that court on appeal, August, 1883.

After referring to the opinions of Brett, M.R., and Lord Justice Cotton, relative to the individual who is entitled to be considered the real author of a photograph (see page 466 of our volume for last year), he continued:—

These views of the nature of authorship and originality, intellectual creation and right to protection, confirm what we have aleady said.

The judgment of the Circuit Court is accordingly affirmed.

Our Editorial Table.

A Popular Treatise of Modern Photography.

Glasgow: George Mason & Co.

We have reason to complain, in the first instance, of a rather misleading announcement which appears on the cover of this book. It is stated to be "by George Dawson, M.A., formerly Lecturer on Photography, King's College, and Editor British Journal of Photography"—presumably *present* editor. Mr. Dawson was for a time, eighteen or nineteen years ago, *one* of the editors of this Journal; but it is scarcely just to trade on a long-broken connection as he is now doing. Of course, all who are acquainted with Mr. Dawson will be under no misapprehension in the matter; but we think it is only right that we should make this explanation on our own behalf.

The book itself is written for beginners, and contains a good deal of information—original and reprint—that will be found useful by those who have not an intimate back-knowledge in photographic matters. There are some inaccuracies, which are unavoidable in the first edition of any work of this description; but, on the whole, the information is sound.

The University Boat Race. By Wratten and Wainwright.

Messrs. Wratten and Wainwright have this year repeated their feat of four or five years ago, in securing a number of photographs of the annual meeting of the representatives of the two universities at Putney. As is usually the case on "boat-race day," the weather was anything but favourable for photographic purposes—for instantaneous work especially; nevertheless, Mr. Wratten has succeeded in obtaining, during the brief time at his command, about a dozen excellent representations of the race and its attendant incidents. Four of these are published, namely, No. 1, *Clearing the Course;* No. 2, *The Race;* No. 3, *Steamers Following;* and No. 4, *After the Race.* In all of these the various craft are depicted with singular clearness, while the smoke of the accompanying steamers gives a bright and lively appearance to the scene, though there is far less life on the river than we are accustomed to on the occasion of the boat race. These pictures will form an interesting reminiscence of the first victory of Cambridge after a long spell of ill success.

The Obsequies of the Late Duke of Albany.

By G. P. Cartland, Windsor.

These pictures, sent by Mr. Cartland, represent the reception of the late Duke's remains by Her Majesty at Windsor. The first picture shows the reception at the station yard; the second, the gun carriage bearing the remains, and attended by the sorrowing relatives of the deceased; the third picture represents the Guards' band following; and the last, Her Majesty's carriage, drawn by six magnificent white horses. The exposures given were about the one-sixth of a second, the plates employed being, we are informed, Messrs. Wratten and Wainwright's "drop shutter."

Meetings of Societies.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society, held on the 10th instant, the chair was taken by Mr. A. Mackie.

Mr. W. E. Debenham said it had been contended at the previous meeting that it was not practicable to precipitate bromide of silver by the Abney process, in a reasonable time, from a solution which should contain as much as (say) one-eighth of a grain to the ounce of gelatine. To prove that it was quite practicable he had, therefore, prepared an emulsion that morning, and then showed some dry films and a negative taken upon a plate coated with it. He also prepared a similar emulsion in the presence of the members, using gelatine one grain, bromide of ammonium twenty-three grains, nitrate of silver thirty grains, and one-tenth of a minim of hydrochloric acid to the ounce. The important point was to let the gelatine solution get cold before adding the silver. If it were hot the silver would emulsify instead of precipitate. After settling down, the supernatant liquid was poured off, and the precipitate emulsified in a solution of gelatine for an hour, at about 120° to 100° Fahr. The emulsion was very slow, but of good quality. The process was convenient when speed was of no consequence, and plates were wanted quickly; as from weighing out the chemicals to coating the plate had only occupied an hour and a-half. A few plates were distributed to those members desirous of trying them.

Mr. A. L. Henderson showed a lantern, consisting of a box with a small paraffine lamp, and furnished with two plates for modifying the light, coated with phosphorescent paint. There were also grooves to admit in addition plates of glass coated with aurine. He found that one plate of aurine and two of the phosphorescent paint gave a safe light for dark-room use. He remarked that the phosphorescent plate next the light was acted upon so as to give out light, whilst the second, shielded by the first, left for any time, did not become phosphorescent, as the first plate seemed to have absorbed all the rays capable of exciting phosphorescence; and as these rays were the same that acted upon the bromide of silver, he thought that the use of these phosphorescent plates as mediums for passing light for photographers' use should be advantageous.

Mr. Debenham said that it would be advantageous to make competitive experiments with plates coated with material of a similar colour to the phosphorescent tablets and of the same intensity.

Mr. Henderson replied that it was difficult to get plates coated to exactly the thickness required.

Mr. Debenham suggested using the colour in the form of an emulsion, and coating several plates to different thicknesses. One of these might, when dry, be selected of the desired thickness.

EDINBURGH PHOTOGRAPHIC SOCIETY.

The sixth meeting of this session was held in 5, St. Andrew-square, on Wednesday evening, the 2nd instant,—Mr. Wm. Neilson, President, in the chair.

The minutes being passed, the following gentlemen were unanimously elected ordinary members:—Messrs. Archibald Brown, John M'Laren, J. Keith Chisholm, David Munro, and Thomas Young.

Mr. Craig Christie moved that the Secretary be instructed to insert in the minutes expression of the sincere regret of the Society at the death of His Royal Highness the Duke of Albany, and that he prepare addresses of condolence to Her Majesty and the Duchess of Albany, to be signed in the name of the Society by the President, Vice-Presidents, and Secretary. This was passed without dissent.

Mr. Craig Christie moved that the following be added to the rules of the Society:—"That the Secretary shall call Council Meetings after consultation with the President, and that he shall give three days' notice to members."

The Secretary said that he had no objection to the proposal. It, however, occasionally happened that some matter of importance cropped up which necessitated prompt action, and when such was the case it might be greatly to the disadvantage of the Society if a delay of four or five days were made obligatory. He suggested that as the Council were about to revise the rules this matter might be referred to the Council. This was agreed to. He (the Secretary) then intimated that he had been favoured with two important papers by the Rev. T. F. Hardwich and Mr. Lewis Wright respectively, and proposed that the programme be departed from in order that these papers might receive the earliest publicity. Mr. G. G. Mitchell had courteously acceded to this, and proposed reading his paper at the next meeting, subject to the will of the meeting.

The proposal having been passed by acclamation, a paper by Mr. Hardwich, entitled *Notes on the Lime Light,* was read by the Secretary, and immediately after notes on the same paper by Mr. Lewis Wright. [See pp. 230 and 233, *ante.*]

Mr. J. M. Turnbull said he had listened with much pleasure to the able paper that had just been read and Mr. Wright's remarks thereon. Mr. Hardwich was acknowledged to be an able and careful experimenter, and members were bound to listen with attention and receive with respect any conclusions to which he might come. With one or two exceptions he agreed entirely with everything that Mr. Hardwich had said in his paper. He thought that the proper angle for the burning gases to strike the lime cylinder should be the greatest that could be given without giving a shadow on the screen—that is, as near a right angle as possible. He agreed with Mr. Hardwich that "light for all ordinary purposes could be got with three-quarter to one hundredweight on each bag;" but where the very best light is wanted to fill a twenty-feet screen he believed in having plenty of pressure. Square weights ought always to be used, or, still better, a long flat-sided weight cast for the purpose, in shape like a piece of pig metal. With regard to the ether generator: he had used it many times with convenience to himself, and believed it was quite capable of giving a light equal to the mixed gases. He thought it quite safe in competent hands, but it should not be trusted in the hands of those who were beginners, or who had only a slight knowledge of what they were doing. In making experiments with the generator packed in ice, Mr. Hardwich did not seem to be aware that all properly-made ether generators were jacketed or encased in a thick coating of some non-conductor of heat, such as cork raspings or sawdust, and consequently not easily affected by cold, or by a little heat such as that of a crowded room. With regard to the Chadderton accident: he quite agreed with the opinions of Mr. Hardwich, Mr. Wright, and the published opinion of Mr. Broughton, that the cause of the explosion was that there was ether in the bag. The fact of the generator being on the table and the gas bag on the floor was sufficient in itself to account for it. They could not have been placed in a more favourable position for the ether to syphon back on the slightest back-pressure arising. Such seems to have arisen from the internal pressure in the generator itself before even the lantern was lighted. He thought Mr. Wright's suggestion to open the hydrogen tap of the generator first in order to relieve any pressure a most valuable one. He did not think Mr. Wright's first objection to ether, namely—want of saturation—a serious one, as he had proved to his own satisfaction that either air or oxygen could be very easily saturated with ether to make them burn freely; but the second objection (that of back-pressure) was one that would require to be seriously met and remedied, either by the construction of a generator that could be blown back without sending the ether back through the tubes or by interposing some thoroughly tried safety contrivance. He had very little faith in back-pressure valves, &c., and the newly-suggested pumice chambers would require to be thoroughly tested before they could be said to be safe.

Mr. W. Hume remarked that the subject was a very important one, and it was a very grave matter to have even the faintest risk of loss of life at lime-light exhibitions. It was, therefore, well to seek by full discussion to eliminate, as far as possible, all the errors of manipulation which might lead to danger. With regard to the preparation of the oxygen: he did not find it necessary to weigh the ingredients; but, when making the gas himself, he simply blackened the chlorate with the manganese dioxide. When once the flow of gas begins the heat should be kept low, for a kind of fusee action goes on in the mixture till all the oxygen comes off regularly if a moderate heat be kept up below the retort. It is of the greatest importance that the tube leading from the retort be ranged out with a stout spiral wire each time the gas is made; for so much solid matter is carried over that it would ultimately choke the pipe if neglected after several makings, and to this cause he attributed some of the accidents that had happened. For those who suspect black materials like manganese dioxide, and do not feel sure of the tests for it, he mentioned that red oxide of iron would suit quite as well; indeed it was much preferred in some chemical laboratories, as giving the gas more free from chlorous compounds. Common sea-sand would also help to give a steady flow of oxygen when mixed with the potass chlorate. He had used the mixing burner he exhibited very frequently for the past five or six years with oxygen and coal-gas in separate bags under one-hundredweight pressure each, without any approach to a casualty; indeed, he considered it the safest arrangement that could be used. The mixing chamber in this burner has no packing whatever. It was not desirable or safe that the weights should fall off the bags; but the last time he gave an exhibition in that room one of the weights fell off the oxygen bag without anything going wrong except the diminution of light, and all went right when his assistant replaced the weight. On former occasions, too, while the light was burning he had lifted weights off and put them on again without any accident or even a snap. Indeed he could not see how an accident could happen with that arrangement without gross carelessness.

Mr. G. A. Wilson said, with reference to the pumice safety-chamber, his objection to it was that, after being repeatedly used or knocked about, some of it was apt to get pulverised and blown into the nozzle of the burner and so choke it up. The only safety-chamber he used was a common piece of cane inserted in the tubing near the burner. Through that no light would pass no matter what the composition of gases might be, and no dust would pass from it into the burner. The diameter and length would depend upon the pressure available or necessary. He had found, with one-hundredweight on the bags, a piece of cane half-an-inch in diameter and one inch or one and a-half inch long, thoroughly efficient. His reason for speaking so confidently of this safety-chamber was that some years ago, before ether was spoken of as a substitute for hydrogen, he had an idea that it might be used, and, therefore, tried several experiments with it. In one of those experiments he fixed a piece of cane firmly in the outlet of the ether generator, with another safety-valve nearer the lantern, and lighted the burner. This gave a splendid light for a short time, but the light suddenly disappeared, travelled along six yards of tubing, sent his first valve to pieces, and burned with great force at the cane, but did not pass through it into the ether generator. After considering a moment (for the noise was very great), he turned off the oxygen tap at the bag, and all was safe. If the flame could pass in one moment along six yards of tubing and stop at the cane, it appeared to him to be the simplest, cheapest, and most reliable safety-chamber at present known. If a piece of cane such as he described were attached to each burner he had not found it possible that an accident could occur, no matter what suction took place by the weights falling off, or in whatsoever proportion the gases were mixed, because they would not explode without a light, and the light was stopped at the cane. With reference to the ethoxo lime-light: he considered it safe so long as it was kept burning sufficiently to make the lime incandescent; but the moment it was turned down with the tap for the purpose of dissolving with a double lantern it became dangerous. He thought the danger due to the dissolving tap beginning at a considerable distance from the ether generator, and the intervening tube became filled with oxygen gas saturated with ether; and, as the little escaping, or rather burning, at the nozzle was not issuing at high pressure, the flame rushed back as soon as the dissolving tap was turned on. Nor is an explanation far to seek, for the ether vapour being heavier than the oxygen gas, some of it has a tendency to regain its original liquid form, and separates from the oxygen, falling back and down the tubing into the generator, leaving behind a decidedly explosive mixture which when liberated at the tap explodes; and it is just a possible thing, without the cane safety chamber, the flame may travel back to the ether generator. Some lanternists held that it was not possible for the flame to travel along tubing; but he maintained that such was not only possible but certain when using the mixed burner, if the weights should fall off the hydrogen bag, causing a suction of oxygen gas into the hydrogen bag. The oxygen gas being such a powerful supporter of combustion would keep the flame burning inside the tubing until it reached the hydrogen bag, and that burning caused a vacuum in the tubing so great that an ample supply of oxygen would be drawn in to form an explosive mixture, so that it was not only the falling off of the weights that caused the suction, but the combustion as well. The whole gas in the bag would then catch fire and explode, just as an ordinary gasometer would do if a light were applied. It was an undoubted fact that bags sometimes caught fire when the weights fell off, and that, he believed, might account for it. With reference to the lantern microscope: he had also been giving his attention to it, and had succeeded in showing a flea (the object, not the disc), six to twelve feet in size, clear and distinct on the screen, by using a specially-constructed lens of wide aperture and high power.

Hearty votes of thanks were accorded to Mr. Hardwich and Mr. Lewis Wright for their valuable papers.

Mr. Annan moved that it be remitted to the Council of the Society to petition, either by letter or deputation, the Convener of the Committee of the Parks and Gardens to remove the restrictions as to taking photographic views in Princes-street Gardens, also the Surveyor for Scotland of H.M.'s Public Buildings and Parks to remove similar restrictions against photographing in the Queen's Park.

Mr. William Hume, as an amateur, seconded the motion.

Several members gave their experience as to having been stopped by the park rangers, while others stated they had not been interfered with. It was considered a great hardship that amateurs and others visiting the city should be debarred from taking photographs where the general public were allowed free access. To such the loss of time in applying for the requisite permission meant the loss of their only opportunity under favourable circumstances. Ultimately an amendment by Mr. James Crighton was passed, empowering the Secretary and President to draw up a letter of appeal, or visit as a deputation, the Town Council for the removal of the restrictions on photographing in Princes-street Gardens.

Circulars concerning the Northampton Museum International Photographic Exhibition were distributed, and a vote of thanks to the Chairman terminated the proceedings.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.

The ordinary meeting of this Association was held in the Patents' Room of the Literary and Philosophical Society's Institute, on Wednesday the 9th instant,—Colonel Sheppee, President, in the chair.

The minutes having been confirmed, Mr. W. C. Fletcher was nominated for membership, and Mr. J. H. Inness, F. W. Morgan, J. Russell, and A. Ross were duly elected members.

A report was received from the Council with reference to the exhibition and to outdoor meetings. Some discussion followed, but finally it was adopted unanimously.

The report contained recommendations from the Council as follows:—That no open competition be held this year. That a private exhibition of members' work be held in the autumn, at which a print be selected for exhibition to members, the print selected not to be smaller than half-plate, nor larger than 10 × 8. The members to be the judges. Proposed outdoor meetings:—June, first Wednesday—Haward and Langley: leader, Mr. J. P. Gibson.—July, first Wednesday—Dilston and Devilswater: leader, Mr. J. W. Robinson, Jun.—July, third Saturday afternoon—Dilston and Devilswater: leader, Mr. Goold.—August, first Wednesday—Bywell: leader, Mr. Dodds.—August, third Saturday afternoon—Bywell: leader, Mr. Goold.—September, first Wednesday—Alnwick: leader, Mr. Auty.

The following offers, by gentlemen, members of the Association, had been accepted with thanks:—Mr. George Borrow: A silver medal for the best set of three pictures taken by a member at the Society's outdoor meetings this year.—Mr. J. P. Gibson: A prize for the two best pictures taken at the Society's outdoor meetings this year, the successful competitor not to have previously received a medal or diploma.—Mr. J. A. Maling: A silver medal for the best set of three transparencies taken by a member.

The meeting then adjourned to the adjoining lecture theatre, where

Mr. J. P. Gibson gave an interesting lecture on *Landscape Photography for Amateurs*. [See page 249.] After pointing out the numerous benefits to be derived from the practice by amateurs of outdoor photography, the lecturer showed how, by the rapid advance in the manufacture of photographic appliances, and their consequent cheapening, all necessaries for such recreation might be procured at no great expense. He explained how the technical details of dry plate work could be mastered, and proceeded to show how the many difficulties in the way of amateurs in their attempts at landscape photography were to be overcome. The paper was very well received. At its conclusion,

The President proposed a hearty vote of thanks to the lecturer, which was passed.

Mr. Allison, assisted by the Hon. Secretary, then proceeded with the lantern exhibition. Some beautiful slides were shown and much appreciated. The best thanks of the Association are due to Mr. Allison for his kindness in bringing his lantern, superintending the arrangements therewith, and for the loan of a very fine set of Egyptian slides. Also to Messrs. York and Son, and Messrs. Watson and Sons, of London; Messrs. Mawson, Swan, and Morgan, and Mr. J. F. Maling, of Newcastle; and Mr. J. Bedley Robinson, of Tynemouth, for contributions of slides.

The Hon. Secretary read a communication he had received from the Rev. T. F. Hardwich:—

"*Shotton Vicarage, April* 7, 1884.

"Dear Sir,—I am sorry that I shall not be able to attend the meeting of your Society on Wednesday, the 9th inst., and especially so as I see there is to be a lantern demonstration at the close. The lime light is just now attracting an unusual amount of attention in consequence of the jury at the Chadderton explosion inquiry having advised that restrictions should in future be placed upon its use.

"What we want, in my opinion, is a more general understanding of the causes which lead to these explosions, and then, I think, it would not be difficult to prevent them.

"I speak advisedly when I say that nine out of every ten accidents at lantern exhibitions with the oxyhydrogen or ethoxo lime-light are due to a sudden stoppage of the pressure by which the two gases are forced forwards, and to a return of one of the gases in the wrong direction. This may result either from a weight falling off a bag or from a rent in the india-rubber tubing. It may seem at first that the only effect of a rent in the tubing would be to allow a free escape of the particular gas passing through it; but, if you consider for a moment, you will see that it would also allow a return current of the other gas, so that the two gases would mix at the rent instead of mixing in the chamber of the jet. Under these circumstances there would probably be an explosion if a naked flame were near at hand.

"A lecturer using the lime light should examine his tubing with the same care that the coal miner examines his ropes; and, if the exhibition is likely to be a crowded one, he should put on a back-pressure valve to secure himself against a return current of gas. Of the two, I lay more stress on the use of back-pressure valves than of safety-tubes; but why should we not employ both, and in that way restore the confidence of the public, now so much shaken?

"If some photographic society were to offer a prize for the valve and tube most free in action and least liable to get out of order the ingenuity of mechanicians would soon supply the want.

"It must be borne in mind that back-pressure valves are intended to stop gas, and not flame; whereas safety-tubes are meant to stop flame, but not gas. By forgetting this distinction we may, perhaps, blame a safety-tube where it did not deserve it. A rent in the india-rubber causes an explosion, and we infer that flame must have travelled backwards through the safety-tube attached to the jet; whereas it was *one of the gases* that passed through the tube and meeting the other gas a little lower down formed an explosive mixture, which became ignited from the light in the lantern or some other source.

"My own experiments, so far, seem to indicate that an effectual safety-tube can be made without any difficulty, when it is protected from suction or forcing by the addition of a suitable valve.

"In my own practice I have seldom used these appliances; but if I be spared to see another winter I shall, when lecturing away from home, employ the blow-through or safety jet, if practicable, and if not shall protect myself as far as I can against all contingencies in the way now suggested. A blow-through of the kind described in the paper which I read last year before the Newcastle Photographic Association is very powerful, and for most purposes as good, or nearly so, as the mixed gases of the ethoxo lime-light. "T. FREDERICK HARDWICH."

GLASGOW AND WEST OF SCOTLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE usual monthly meeting of this Association was held in the Religious Institution Rooms, on Tuesday, the 8th instant,—Mr. Hugh Reid, President, occupying the chair.

The question-box contained the following:—"Has any member tried the North British dry plates?" Several members testified to their being extremely rapid, and better worked with a shutter.

The following new members were then admitted:—Messrs. H. G. Gillespie, Robt. T. Cochrane, Jas. S. Stewart, Jas. Bell, Chas. S. Mair, Wm. France, and Wm. Reid.

Mr. J. Y. McLELLAN then exhibited and explained Mr. Warnerke's sensitometer. Mr. McLellan, however, did not consider it altogether satisfactory, as from his observations it tended to deteriorate with age. Plates which he found of the same rapidity in practice last year gave the number 20 quite distinctly, this year only gave a little over 14.

Mr. W. GOODWIN suggested that temperature had a great effect on these phosphorescent tablets.

The discussion was continued by Messrs. Lang, Reid, and others.

Of the two plates tested by Mr. McLellan, both out of the same batch, one exhibited the number 14 and the other only 10. The plate exhibiting 14 had previously been treated by the Chairman with Dr. Eder's formula for rendering plates more sensitive, viz., nitrate of silver fifty grains, citric acid fifty grains, water one ounce. The plate was soaked for three minutes in one drachm of this solution to twelve ounces of alcohol. This showed an increase in the sensitiveness in the ratio of three to one, which corresponds with Dr. Eder's results.

Mr. W. C. BERGINS exhibited his novel form of portable tourist camera, and in the course of a few introductory remarks said that a portable tourist camera, which would unite all the qualities of a studio camera, an enlarging camera, and a landscape camera, was as impossible as a horse which would combine all the qualities of a racehorse, a Clydesdale, and a Shetland pony. His aim in designing this camera had been extreme lightness as well as the necessary strength. In showing the camera, which had been made throughout from his own designs and under his own superintendence, Mr. Bergins pointed out that it was a whole-plate, solid camera, made so that the four slides, two fronts, two lenses, and all other necessary apparatus were carried inside. The principal points were extreme lightness, the whole apparatus weighing only eleven and a-half pounds, carrying seven plates, very small bulk; and, although the camera was made solid, it could focus from five to eleven inches by putting the slides nearer or more distant from the front, the exact focus being attained by rack-and-pinion lenses. The tripod was made of bamboo cane going up like a walking-stick, and when a silk cover was drawn over it had the exact appearance of a pretty heavy umbrella.

The members examined and admired Mr. Bergins's camera and tripod, and he kindly answered a great many questions concerning it.

Mr. GOODWIN then read a short lecturette and gave a demonstration of *Photomicrography* [see page 248], taking a couple of very successful plates—one of a flea and the other of a bit of a cigar box.

The members were very much pleased with Mr. Goodwin's deftness of hand and his extremely-clear method of work, and doubtless many will now "go in" for this branch of photography.

The CHAIRMAN showed a camera-finder and view-meter which he had had made at a trifling cost according to the directions in the *Year Book* for 1884.

The members considered both very useful, especially the view-meter.

It was agreed, after a little discussion, that the first outdoor meeting of the season should be held on the first Monday in May, that the place be the Brig' o'Turk and Trossachs, and that members leave by the 6.50 or 9 a.m. trains.

After the usual votes of thanks a very large and successful meeting was adjourned.

LEEDS PHOTOGRAPHIC SOCIETY.

THE ordinary meeting of this Society was held on Thursday, the 3rd inst., in the Library of the Leeds Philosophical Hall,—Mr. J. W. Ramsden, Vice President, occupying the chair.

The following gentlemen were elected members of the Society:—Messrs. Hardy, Hubbersty, Stokoe, and Grimshaw.

Mr. H. Pocklington then read his paper, entitled *Notes on Developers.* [See page 249.]

Mr. WASHINGTON TEASDALE said he had tried, he believed, every kind of commercial plate. The conclusion he came to was that nearly every plate was capable of giving good results, and that good results could be obtained by most of the developing formulæ. The great question was how the developer was applied to the plate.

The CHAIRMAN said that for negatives he had a strong objection to either green or brown tones. He was anxious to obtain a colour that would allow the light to penetrate in such a way that he could be sure of getting on the print all the details that were to be seen in the negative. If it were a question of the colour of lantern slides then it was another thing altogether, and the result obtained depended whether they worked in what he would call the acid or the alkaline lines. He would give two formulæ, both giving good results:—

Pearlash	½ ounce.
Water	1 pint.

Add two grains of pyro. to each ounce.

If the plate were fixed in the ordinary hypo. bath the result would be a brown tone; but if a quarter ounce of pearlash be added to each pint of the fixing bath the result would be a golden-brown. If, now, any of the ordinary clearing solutions were poured over the plate the colour would change to a purple-black, and could be again changed into a golden-brown by immersion in the hypo. The second formula was—

Sulphate of iron	3 ounces.
Water	10 ,,
Tartaric acid	1 drachm.

Mix one part of the above to six parts of saturated solution of oxalate of potash. A plate so developed, if fixed in the ordinary hypo. bath, has a cold tone; but if fixed in the alkaline hypo. bath it has a beautiful purple-brown tone.

Mr. J. W. REFFITT reminded the members of a plan, suggested by Mr. Rogers, of washing the plate well after development, and, if not sufficiently dense, of increasing the density by flowing over it a solution of ammonia and bromide. In his own practice, if a plate did not come up satisfactorily, he found it best to mix up a fresh developer and place the plate in it, when details and vigour would at once appear.

In reply to a question,

The HON. SECRETARY said almost any tone of chocolate-brown could be obtained on a bromide plate by increasing the exposure and developing in a solution of ferrous oxalate with a large excess of citric acid.

Mr. TEASDALE, in reply to another question, said the best way to obtain a good negative from one that was rather weak was to make a transparency in the camera, under-expose, then over-develope, and, if the result were not satisfactory, to repeat the process in making the negative from the transparency.

The CHAIRMAN recommended the use of washing-soda with pyro. for the production of negatives from engravings, &c., and for photolithography.

Mr. W. T. GRIMSHAW exhibited some very pleasing effects of landscapes, &c., printed on ferro-prussiate paper.

The meeting was then adjourned.

BERLIN ASSOCIATION FOR THE CULTIVATION OF PHOTOGRAPHY.

THIS Association met on the 7th March,—Professor H. W. Vogel in the chair. Several additions having been made to the library, it was resolved to publish a complete catalogue of the books in the *Mittheilungen.*

A number of groups of Indians of the tribe called "Los Caribes" (Brazil), taken by an amateur, Carl Möhle, were then shown.

Some American portraits were exhibited, and gave rise to remarks upon the superiority of the American photographic printer over his European rival.

The discussion then passed to the training of the negative operator, and a wish was expressed by several of those present that suitable courses of lectures on chemistry and æsthetics might be inaugurated for them.

Herr QUIDDE remarked that he feared they would be but poorly attended. Many photographers to whom they might be useful lacked the time required to attend them and the money to pay for them, and, he feared, in many cases also the desire to benefit by them, as most young people knew that if they were sufficiently skilful manipulators they might get good situations without the trouble of real study. Very often the masters also would be the better for a little study.

The CHAIRMAN, while agreeing with what Herr Quidde had said, felt very much inclined to institute such a set of lectures, which would probably have to meet in the evenings or on Sundays, and the fee would have to be extremely small. He was aware that a course of lessons on retouching, taught by an academically-trained retoucher, had met with little or no encouragement, but he was willing to sacrifice something in the cause.

Herr OCHS (of Frankfurt-am-Oder) recommended the use of tartaric acid instead of sulphuric acid to acidify the iron developer—in the proportion of four grammes of tartaric acid to 500 c.c. of developer.

Herr JOOP recommended citric acid.

Herr HABERLANDT had tried the citric acid, but found that it made the film cockle. He had also been advised to slightly increase the proportion of sulphuric acid to the developer, but had found less delicacy in the high lights and a general hardness. [Dr. Vogel confirmed this last statement.] He had also once laid a half-dry gelatine negative in alcohol in order to dry it rapidly, and found afterwards that the parts which had still been moist when laid in the alcohol had been strengthened (intensified). The inference was that, for very *slight* intensification of gelatine plates, alcohol might be used. But plates so treated with alcohol must not be placed upright, but left to dry in a horizontal position; otherwise they would be apt to become streaky.

The CHAIRMAN and Herr JOOP had had similar experience with alcohol, but they could not give a sufficient explanation of its intensifying action.

Herr HABERLAND mentioned another peculiar case. A wet collodion plate which had been intensified with mercury had to be weakened with cyanide of potassium, which usually takes place readily enough. In this case, however, instead of being weakened by the cyanide the plate was actually intensified by it.

The CHAIRMAN said that old cyanide of potassium solutions contained a great deal of carbonate of potassium, and that the cyanide of potassium itself disappears by spontaneous decomposition, so that one would naturally expect the action of old solutions to be different from that of freshly-prepared solutions.

Dr. KAYSER showed a roll of sensitive gelatino-bromide film upon a flexible support two metres long. This he had at first tried to use (like Mr. Warnerke) by rolling it up in a dark slide, but latterly he had cut the sensitive film with its flexible support into pieces the size of the glass plate he would otherwise have to use. He also, to keep it flat, pasted these pieces upon cardboard the same size. The side of the dark slide was furnished with a light-tight sleeve, through which the operator inserted his hand in order to remove the exposed film.

A number of portraits, by Riemann, of San Francisco, and of lichtdrucks, by Schober, of Carlsrühe, were shown, after which a discussion on the merits and difficulty of producing burnt-in enamels followed.

The CHAIRMAN made a few remarks *apropos* of electric lighting, and the ignorance of the general public in regarding a thing as necessarily good *because it had been patented.*

The meeting was then adjourned.

Correspondence.

DRY PLATES IN SWITZERLAND.

To the EDITORS.

GENTLEMEN,—Mr. W. H. Harrison writes in the last Journal that only Monckhoven's plates are to be obtained in Switzerland. Allow me to say that my agent, Mr. C. G. Serinzi, 22, Rue de Lausanne, Geneva, keeps the plates manufactured by me in all standard sizes, and from him tourists and others may obtain what they require.

I may state, also, that there is no danger of the plates having been exposed to light, as no customs examination is required in Switzerland.—I am, yours, &c., J. DÉSIRÉ ENGLAND.

London, April 9, 1884.

IS A PHOTOGRAPHER AN ARTIST?

To the EDITORS.

GENTLEMEN,—I have noticed in your Journal some correspondence upon the question whether a photographer is an artist. In a case in our Supreme Court, in which the copyright in photographs was in question, a decision has been rendered, some portions of which may interest your readers.

The view I took in the argument was that each work must be judged upon its own merits, and that while some photographs could properly be classed as works of art, others might not attain to that dignity.

That view, substantially, was taken by the Court, as you will see. I send you a copy of the decision by this mail.—I am, yours, &c.,

32, *Park-place, New York, April* 4, 1884. A. T. GURLITZ.

[An abstract of this decision will be found in another page.—EDS.]

A QUESTION OF PRIORITY.

To the EDITORS.

GENTLEMEN,—I thank Mr. Lang for his letter, which is, so far, confirmatory of the impression I had as to the discovery of the commutability of the light impression on a chromo-gelatine film being an old one; but he has omitted to reply to the question as to *when* Captain Abney first published the discovery.

Will he kindly give the date, and the name of the publication in which it is to be found.—I am, yours, &c., A. COLLIER.

April 14, 1884.

Notes and Queries.

R. W. C. would like some reader to inform him "what metals the most readily transmit heat, and what metals resist heat the most. Also, if there be any composition that will convey water through fire and transmit the heat to it more readily than metal."

L. R. MCLACHLAN inquires:—"Can you advise me of a good process for coating canvas (for the purpose of enlargements) with emulsion? also, if there be any work published describing the method?"——In reply: We are not aware of any work of this nature. Can any reader afford the information?

B. F. writes:—"I am desirous of making a large number of lantern transparencies. Kindly advise which of the many processes now before the public I should adopt."——In reply: Our correspondent should confine himself to wet collodion and the copying camera. Let the collodion be rather thin, and by preference fully ripe, if not somewhat old. Develope with iron and tone with platina, if tones of a neutral character are desired.

"WHAT is the relationship between the gramme and the cubic centimetre? I have been reading formulæ professing to be translations from the French, and things have got a little 'mixed.'—GEORGE J. JOHNSON."——In reply: The cubic centimetre is a measure for fluids, whereas the gramme is a weight for solids. Both, however, amount to nearly the same thing, very much in the same way as our ounces and drachms, which are both weights and measures.

"IN your *Notes and Queries* of last week your correspondent, F. Dugon, attacks me for having 'thrown out inuendoes somewhat unjustifiable.' When one writes for the interest of fellow-labourers, and with the sole view of helping them, it is scarcely wise or gentlemanly for Mr. F. Dugon to throw out 'inuendoes' or to doubt an assertion which he cannot disprove or for one moment contend against. If your correspondent will send you one guinea for the benevolent fund if I prove my statement, I will send you two guineas if I fail. Will Mr. F. Dugon agree to this?—J. BERRYMAN."

FREDERICK W. MUNCEY writes:—"I should esteem it a great favour if you would answer the following, as I experience some considerable difficulty with stops in my lens (rapid rectilinear):—Which is preferable to use—a small stop and give long exposure, or a larger one and short exposure? I find the greatest difficulty in the subject of interiors as regards the stops. Any information on the above will be most gratefully received."——In reply: Always employ the largest stop by which the required degree of definition can be obtained. In the case of interiors it is well to use a much smaller stop than it would be desirable to employ when photographing a landscape or other outdoor scene.

"WILL you tell me how to proceed to chemically clean an article of solid silver with a good deal of *delicate frosted tooling* upon it, so as *not to polish* the tooled work? It has become much tarnished by exposure to the air, and the ordinary plate-cleaning materials do not bring it up *white* and clean, but sink into and leave a smudgy look about the tooled work. I have an idea that soaking it well in a solution of iodine and iodide of potassium first, and then in strong hyposulphite of soda, would restore its whiteness by turning the present oxidation into iodide of silver, and dissolving it. You may know of some better method—possibly of dilute *acids;* but I am afraid of venturing on them without some preparatory instruction.—LUX."——In reply: Articles of silver are "bleached" or frosted by first washing them quite clean, and then heating gently and with care, so as not to melt the solder, afterwards plunging into water to which has been added from twenty to forty per cent. by volume of sulphuric acid. Let "Lux" subject himself to an educational course as follows, previous to attempting his skill upon the special article described:—Place a shilling or a florin upon a ring of stout wire, and hold it over the flame of a spirit lamp until it becomes nearly white—which will be the case before it acquires a red heat—and then throw it into water strongly acidulated with sulphuric acid as described. When he is able by these means to make his coin of a pure matt white, like the new silver dial of a watch or like a disc of clean white paper, which he will do after one or two trials, he may then venture the treatment upon the silver article to which he refers.

Exchange Column.

I will exchange several cases of stuffed birds, in perfect condition, for photographic apparatus or accessories.—Address, H. STONE, Drayton, Taunton.

Wanted, a good portable studio, 15 × 6 feet will do, in exchange for photographic apparatus. See sale column.—Address, GEO. FEAR, photographer, Trowbridge.

I will exchange whole-plate J.S. portrait lens, rack focus, in perfect condition, cost £5 a year ago second-hand, for instantograph, or offers.—Address, E. B., 10, Wellington-street, Gloucester.

I will exchange Stanley's 5 × 4 portrait lens, camera, and stand for Lancaster's quarter-plate instantograph or *Le Méritoire* complete.—Address, J. GRIMSHAW, 16, Dale-street, Haslingden.

Wanted, in exchange for strong tripod stand, 6-inch brass triangle top, an old bellows camera, half-plate square, with or without focussing or dark slide.—Address, J. COLLIS, 5, Despencer-street, Cardiff.

I will exchange a 10 × 8 burnisher, new, plain cloth (woollen), background, and drying-box. Wanted, a half-plate *Le Méritoire* or the instantograph with three or more double dark slides.—Address, C. ARTHUR, Senhouse-street, Maryport.

I will exchange my dark box, on fifty-inch wheels, for Ross's No. 1 portable symmetrical lens or a pocket camera with at least three double dark slides. May be seen any evening after six o'clock.—Address, J. G. D., 30, Lower Robert-street, Plumstead, Kent.

Wanted, a fine 11 × 6 portable landscape camera, by Meagher, two single slides, stereo. arrangement, fine landscape lens, by A. Ross, fifteen-inch focus, rack and pinion, in exchange for a symmetrical or rapid doublet lens, or offers.—Address, H., 16, Berkley-square, London, W.

I will exchange a large quantity of joiners' and cabinet makers' tools, also a 10 × 8 bellows-body camera, with single back, folding tailboard, and rising-front, value £7, for a good 12 × 10 tourist's bellows-body camera, with not less than three double backs.—Address, SEDGWICK, South View, Sedbergh, Yorks.

I will exchange a 10 × 8 glass bath, in case, and glass dipper, also a half-plate glass bath, in case, with ebonite dipper, for a water-tight bath about half-plate. I have also a balustrade and pedestal, a landscape background, a large artificial rock, a quarter-plate camera, tripod stand, and Cassell's *Popular Educator*, in three large volumes, new. Wanted, Lancaster's pocket camera, printing-frames, view lenses, or what offers?—Address, JAMES BREMNER, 1, St. James's-road, Forfar, Scotland.

Wanted, a good 10 × 8 or larger modern tourist's bellows-body camera, with double slides and good wide-angle lens, in exchange for a splendid, large musical box, walnut, beautifully inlaid, with patent winder, &c., barrel sixteen inches long, plays eight operatic airs; also a mahogany sliding-body camera for plates 6½ × 4¾, with three dark slides and a quarter-plate portrait lens, all by Hocking and Co.; a glass bath for plates 10 × 8, with a quantity of silver solution, and a nearly new portable tripod with sliding legs.—Address, THOS. HIRST, Main-street, Sedbergh, Yorks.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

NOTICE.—*Each Correspondent is required to enclose his name and address, although not necessarily for publication. Communications may, when thought desirable, appear under a* NOM DE PLUME *as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.*

R. JOYNER.—Probably the negative, and not the paper, is at fault. See answer to "G. W. G."

H. W. B.—Several formulæ for negative varnish are given in our current ALMANAC, to which we refer you.

A. A. A.—The proportion of alcohol you have added to the emulsion is much too large. One-third the quantity would have been ample.

R. HAZEL.—The gentleman is still alive and, we believe, in perfect health, though he has long since relinquished the practice of photography.

HY. J. LOCOCK.—From your description of the apparatus we surmise it is intended for measuring the focal length of lenses, such as spectacle eyes.

THOS. WILSON.—The cause of the dull patches on the enamelled prints is due to their having been removed from the glass before the gelatine was thoroughly dry.

A. Z.—Common spectacle lenses will answer the purpose nearly, or quite, as well as more expensive ones. Any working optician will supply the lenses of almost any focus.

J. G.—The law requires that a license should be taken out to use a still for any purpose whatever—even for distilling water. We fear, however, that the law in this respect is frequently infringed, and a penalty incurred.

A. B. X.—The parcels post will carry glass if properly protected, so as not to be likely to cause injury to other parcels or to the officials. The Post-Office will not be responsible for breakage, so you must pack carefully.

W.—You do not say if you wish to make the plates or to purchase them ready prepared. From what you say we imagine the fault in your negatives is due to the development, and not to the preparation of the plates.

MAJOR GUBBINS.—1. The glass referred to is manufactured by Messrs. Chance Brothers.—2. There is no other society that holds its meetings nearer to your new abode than the Bristol and West of England Photographic Society.

OMEGA.—The paper, if it be at all like the sample enclosed, is quite worthless, except to be burnt and added to your residues. It appears to have been kept where some injurious fumes have had access to it, and so caused the bronzed discolouration.

C. W. W.—Very good work can be done by the Pretsch process; but, so far as we are aware, it is not now being worked in this country—at least under the "Pretsch" designation. As a rule, experts who work photo-engraving processes do not publish the details of those they employ.

G. W. G.—Probably the samples of paper you have employed were over-toned. Possibly, however, the negatives may be at fault. You must bear in mind that unless the negative itself be a strong and vigorous one it will be quite impossible to obtain rich purple tones with any paper.

FOGGED AMATEUR.—If you refer to the article by Mr. W. K. Burton in which the table was given you will find the information you require. The terms "twenty times" or "thirty times as sensitive as wet collodion" simply mean nothing in practice. The object of the extra gelatine discs is for use when very prolonged exposures are required.

LOTTIE.—From the charming little pictures enclosed you certainly require no instruction in the selection of your subjects. A little more experience will enable you to overcome your very slight photographic shortcomings. Over-development appears to be the chief fault in the examples forwarded. We shall, indeed, be pleased to receive the promised pictures.

RUSSELL STEELE.—So much has appeared in our columns during the last few months on the subject of light for the dark room that we are somewhat surprised at receiving your query. If you refer to the back numbers you will find all the information you require. We are sorry we cannot assist you further, as you do not say if you intend employing artificial light or daylight.

S. J. STEPHENSON.—The streaks and smears on the "chromotypes" arise from the waxing of the plates. After applying the solution you have not sufficiently polished the plate; hence the "smears." The plate should be polished, so that no trace of wax may be apparent on the surface. If there be, you may rely upon its showing on the finished print. "Flexible support" will give you a very good surface, but not equal to that given by glass.

AMATEUR.—Without being made aware of the actual quantity of chloride of silver in the paper it would be impossible for us to state the theoretical quantity of hyposulphite of soda which would be required to fix each sheet. Practical photographers rarely trouble themselves on this point, as the hyposulphite is so cheap they always employ a very large excess to be on the safe side. A small quantity only of acetate should be added occasionally.

PHOTOGRAPHIC CLUB.—At the forthcoming meeting of this Club, at Anderton's Hotel, Fleet-street, on Wednesday next, the 23rd inst., the subject for discussion will be—*On Lighting in Landscape Photography.*

TRADE CATALOGUE.—From Messrs. W. Watson and Sons, 313, High Holborn, London, we have received a copy of their new *Catalogue of Photographic Lenses, Cameras, and Accessory Apparatus*, new and second-hand. It is very comprehensive, occupying sixty-eight pages.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
April 22	Bolton Club	The Studio, Chancery-lane.
" 23	Bristol Amateur	Studio, Portland-st., Kingsdown.
" 23	Photographic Club	Anderton's Hotel, Fleet-street.
" 24	London and Provincial	Masons' Hall, Basinghall-street.
" 24	Liverpool Amateur	Free Library and Museum.
" 24	Oldham	Hare and Hounds, Yorkshire-st.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. STEWARD, Optician,
For two Weeks ending April 16, 1884.
THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

April.	Barometer.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max. Shade Temp.	Min. Tem.	Remarks.
2	29·64	S	57	52	105	69	49	Bright & Clear.
3	29·52	S	57	53	105	69	52	Cloudy.
4	29·59	SW	51	48	105	63	48	Cloudy.
5	29·30	SW	52	49	95	56	47	Cloudy.
7	29·49	N	47	47	—	56	45	Raining.
8	29·92	W	49	46	77	57	44	Cloudy.
10	29·97	NE	46	42	85	54	40	Cloudy.
11	30·03	E	44	42	77	51	41	Cloudy.
12	30·07	NE	40	43	63	52	42	Overcast.
14	30·07	NE	45	42	77	52	39	Cloudy.
15	29·99	NE	45	42	68	52	40	Cloudy.
16	29·87	NE	44	41	—	47	39	Overcast.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1251. Vol. XXXI.—APRIL 25, 1884.

LENSES OF THE PAST, PRESENT, AND FUTURE.

The comprehensive lecturette *On Lenses*, delivered before the London and Provincial Photographic Association, by Mr. W. E. Debenham, and which will be found on another page, evoked a pleasant discussion, in the course of which several matters not generally recognised by the generality of photographers were elicited.

Some, for example, are deterred from forming an intimate practical acquaintance with photographic optics on account of their imperfect knowledge of mathematical science. To these it will be consoling to be informed that there are some professional photographic lens manufacturers who are quite ignorant of mathematics, yet of whose productions the great excellence is universally admitted. As one speaker said, a profound acquaintance with chemical laws is not absolutely necessary in the preparation of sensitive plates possessing even great merit, and so is it as regards mathematical acquirements in the construction of a photographic lens. On the authority of one who took part in the debate, himself a mathematician, we learn that Mr. Leon Warnerke underwent an arduous course of study in mathematics in order to qualify himself for becoming properly acquainted with the nature and working of photographic lenses, only to throw this all aside afterwards in favour of the simpler and better mode of ascertaining their capabilities by screwing them on the camera and witnessing in what manner they behaved when projecting an image on the ground glass.

In the testing of lenses this method is unexceptionable; but where mathematical knowledge is really required is in the working out of new forms or systems of lenses, although it is known that some of these new systems have not been the result of such investigations as are here implied.

The system introduced eleven years ago by the Astronomer-Royal for Scotland, for enabling a picture to be obtained on a flat plate by the full aperture of a portrait lens with such a degree of marginal sharpness as to be susceptible of after-amplification, was explained by still another speaker, who showed, by means of diagrams on the black-board, the path taken by the central and oblique rays after entering the anterior surface of the interceptor, which consists of a large plano-concave lens placed immediately in front of the sensitive plate, with its concave surface next to the lens. It was explained how, by the agency of this intercepting corrector, the oblique or marginal rays, which would otherwise have been brought to a focus at a point far short of the sensitive surface when the centre was sharp, were converted into a condition of parallelism, and in this state brought into closer proximity to the surface of the plate when they were liberated, and allowed to converge to a focus on the sensitive film.

In the course of the discussion an opinion was also hazarded as regards the probable nature of the lens of the future. This, the speaker said, would, he thought, partake of the general character of the dialyte, by which he meant a front lens of positive focus, whether achromatised or not, that would have its aberrations controlled by a back lens of a negative description. The reader acquainted with the history of photographic optics will readily perceive that this principle was identical with one of the two forms of lens calculated by Petzval. Of these one was the portrait combination; the other, after being allowed to remain dormant for many years, eventually emerged as the orthoscopic—mistakenly so named, seeing that it was not orthographic at all, and, from the nature of its construction, could not possibly be so. We may add that no such claim was even advanced on its behalf by the inventor. Since those days, however, the problem has been again considered, especially by Steinheil, who, by taking advantage of the superior qualities of optical glass now procurable, has modified the form of the dialytic lens with certain well-marked advantages.

But even in its original form—or, perhaps, more correctly, with a very slight departure from its original form—this lens possesses features not generally recognised; for the orthoscopic objective was discarded in favour of others before its powers and capabilities were well understood. So potent is the influence of a negative combination upon one of positive character, that by the mere separation of the components to the extent of a quarter of an inch, a difference is produced in the focus of the objective—in some instances exceeding one inch; while such an extent of separation, small though it be (especially in a lens of long focus), materially influences both the definition and flatness of field. Such is the degree of perfection attainable as regards definition that Petzval employed a combination of this form as an object-glass to a telescope. Central definition of such a quality, conjoined with marginal sharpness in fair ratio, are properties which should secure for any combination of this kind the greatest consideration.

With two such antagonistic combinations as a positive and a negative it is possible to effect a compromise of their respective characteristic powers in a more perfect manner than if both were positive, and possessing features, whether for good or for evil, in a similar direction. This method of combining opposite forces has its parallel in chemical manipulation, in which by the judicious admixture of an acid and an alkali, or of any bodies which react upon each other, a third substance will be obtained, either in a state of neutrality or with a more or less marked preponderance of either of the combining substances at the will of the chemist.

In previous articles we have spoken of thickness as an element in the correction of a lens, especially as regards spherical aberration. Perhaps the most notable example of the application of this factor in correction is to be found in the recently-introduced antiplanat of Steinheil, in which the back combination, like that of the original orthoscopic, is negative. But, whereas the individual components of the orthoscopic back were very thin, those of the newer lens are thick in an abnormal degree—in a degree exceeding all others hitherto made, if we correctly estimate some diagrammatic illustrations of the objective in question, with which we must confess personal unacquaintance. This extra thickness of glass is not, however, confined to the lens to which reference has just been made; but is now a peculiarity in several others of entirely different construction, though they in some degree owe their inception to the continental *savant* previously named.

It will be gratifying if the various papers, lectures, or lecturettes on lenses which are now being occasionally brought before some or other of the societies prove the means of inducing photographers to turn their attention, in a more earnest manner than heretofore, to the nature and construction of lenses. Intricate chemical investigations and manipulations are made by the non-professional chemist; what is there to hinder a similar outcome of scientific ingenuity from being brought to bear upon lenses? The pleasure to be derived would far more than compensate for the imaginary trouble, while photography would be the gainer.

A NEW DEVELOPER.

It may surprise some of our readers to learn that the new developer which today we introduce to their notice is only an old friend with a new face—neither more nor less than sulphite of soda. The remarkable properties of this salt—which to those who have given it a fair trial are too pronounced to admit of dispute, and too valuable to allow it to fall into disuse—have yet been so much the subject of discussion, allegation and denial as to its peculiarities having followed one another in a most confusing fashion, that we determined to institute a series of experiments to set dispute, at anyrate upon some of its properties, at rest. Incidentally we discovered, while prosecuting our researches, that sulphite of soda possessed a power, similar to that possessed by ammonia and the fixed alkalies, of developing, when combined with pyrogallol, the image on a gelatine plate.

The course of our experiments showed, in the first place, that sulphite did not produce green fog; in the next, that in all probability it is the reverse of a retarder; and, thirdly, as we say, that when mixed with pyro. it was capable of developing a plate without any other chemical being added. We have made a large number of trials, and have still more in progress, but none of them are calculated to throw any doubt upon the conclusion at which we have arrived. It will suffice for our purpose if we here describe some of the leading experiments we made.

A mixture of nine grains of pyro., eighteen grains of sulphite of soda, and four ounces of water was made, and a plate which had had the same exposure that would have been required for ammoniated pyro. development was placed in it. After a lapse of about ten minutes the lightest portions of the image began to show themselves, and the negative then gradually gained in detail and intensity till, in ninety minutes, a printing negative of first-rate quality was produced, and one which we do not hesitate to say might have been placed in the hands of ninety-nine out of a hundred printers without their observing anything unusual in it.

This was a fact sufficiently remarkable to render further investigation desirable. The first thought that might naturally arise would be regarding the purity of the sample employed. It was "recrystallised sulphate of soda," purchased from a first-class house, and answering every test for ordinary impurities. As this salt, however, is manufactured by the addition of a measured quantity of carbonate of soda to a solution of sulphurous acid neutralised with soda, there was the chance that, though recrystallised, there might in the successive crystallisations have been retained in the crystals sufficient carbonate to act as a developer without any question of sulphite. We carefully tested the sample, and found no reason to suspect the presence of that salt. Litmus paper is no real test, for the sulphite is a salt with an alkaline reaction naturally, so that, however rigidly it may have been purified, it would turn red litmus paper blue; hence the addition of an acid till neutrality to litmus paper was reached would not necessarily show that free alkali was the cause of the acid being "killed."

We, nevertheless, added citric acid to a solution of sulphite till no change was capable of being produced by it upon litmus, and then we ascertained the amount of carbonate of soda required to neutralise this quantity of acid. We arrived at the conclusion that one grain of carbonate represented the fullest neutralising capacity of twelve grains of sulphite.

Possessing these data we mixed a fresh batch of solutions, composed only of carbonate of soda and pyrogallol. Taking six grains of pyro., and one grain of carbonate of soda as representing the utmost alkaline equivalent of the twelve grains of sulphite, we placed in it one half of an exposed plate, and developed it side by side with the other half in the pyro. and sulphite. In an hour's time the latter (which was fully exposed) reached a density almost sufficient for printing purposes, while the sodaic solution in the same time gave a poor, feeble, under-exposed image utterly worthless for any purpose whatever. Solutions were then made with three and with six grains of carbonate to the same quantity of pyro. as before, namely, six grains. The whole plate became covered with fog before any image had time to appear, and at the conclusion of an hour not a trace of one was visible through the fog.

It thus appeared probable that the sulphite, as well as possessing a power of initiating development, might also act like a bromide in preventing fog; and, to test this we exposed fresh plates and developed them as we did the last, with the exception that we added twelve grains of sulphite to each solution, giving the same exposure. The effect of the addition was remarkable. In place of hopeless fog a soft and delicate image was brought out quite free from fog, and showing evident signs of over-exposure.

It is clearly evident from this record of our experiments that sulphite of soda, when joined with pyro., possesses a power of its own—quite irrespective of any free alkali that it may contain—of completing the development of a picture, and we have shown also that it assists, or is assisted by, carbonate of soda to the same end. What its precise function is when associated with ammonia should, in practice, be well known; that point, however, it is not our purpose at present to discuss. We are continuing our experiments with larger proportions of sulphite and other variations, and we shall lay them before our readers if they present, as is most probable, further points of interest.

We may conclude our present remarks by pointing out certain characteristics of the negatives we obtained. Firstly: in none of them (prolonged as was the development) did the sickly, deep yellow "pyro. stain" become visible—a stain which even sulphite does not entirely prevent in a long development. This stain appears to require the presence of ammonia for its production. Secondly: not a trace of green fog was visible, though the plates under experiment could be made to exhibit it under a forced ammonio-pyro. development. Finally: there is every reason to believe from these recorded results that sulphite is the reverse of a retarding agent—a result contrary to the recorded experience (erroneous, as we believe) of many experimentalists.

THE EFFECT OF HEAT ON BICHROMATED GELATINE WHILE IN A FLUID CONDITION.

The interest taken in processes based on the action of light upon gelatine in conjunction with the alkaline bichromates, such as the numerous photo.-relief processes, appears to be constantly increasing. There is no disguising the fact, however, that all processes dependent upon the reaction of light on bichromated gelatine are beset with difficulties to those who are unfamiliar with those reactions. Perhaps, on the present occasion, it would be more correct to say the reactions of the bichromate upon the gelatine itself under different conditions and before its exposure to light. This is a point which, if not entirely disregarded, certainly has not received that amount of attention which is commensurate with its importance.

It not infrequently happens that an experimentalist will take up a process and work it in strict accordance with the directions and formula given, and yet he will entirely fail in obtaining anything approaching a successful issue. Another, working with precisely the same formula and apparently under the same conditions, on the contrary, will succeed in securing a result of the most satisfactory character. Now, both may have kept absolutely to the same formula, even to using the same kind of gelatine—upon the character of which much at all times depends; yet, upon comparing notes, these two experimentalists fail to detect wherein lies the discrepancy in the results at which they have each arrived.

If an expert be consulted, the first suggestion probably will be that the two samples of gelatine employed were of a different character, the one being suitable to the particular process in question and the other the reverse. A further opinion, generally hazarded on similar occasions, is that the cause of failure is due to the bichromated film being dried too slowly and at too high a temperature, or, perhaps, too rapidly. The conditions under which the films were dried are certainly some of the most prolific sources of failure or success in many of the processes which are dependent upon the solubility of the gelatine after exposure to light, as in the case of the stannotype, the Woodburytype, the carbon, and processes of an analogous character. This branch of the subject has, however, so frequently been treated in these pages that it is quite unnecessary to dwell further upon it on the present occasion. Our object now is to point out another cause of failure which frequently arises when the films are formed in the sensitive state; that is, when the bichromate is added to the solution of gelatine before the film itself is produced, as is the case with many processes.

We are led to these remarks after reading the paper by Mr. W. Lang, Jun., on *Poiterin's Photo.-Relief Process*, which he read before the last meeting of the Glasgow Photographic Association. In his communication, after giving the formula for the gelatine mixture employed, Mr. Lang says:—"A concentrated solution of bichromate of potash was added to the warm gelatine *just before using.*" The italics are ours. Now the time of the addition of the bichromate to the gelatine is an important point in connection with many processes beside the one in question; and its importance is not very generally recognised—at least by those who have had but limited experience in this particular direction. The importance to be attached to the time that the bichromate is in contact with the gelatine while it is in a fluid and, consequently, a heated condition is very often overlooked in describing the working details of a process; or, if it be mentioned at all, it is very often unheeded by the experimentalist, and this frequently conduces to want of success or uniform results.

Let a solution of gelatine of a soluble kind be prepared and divided into two parts. To one let a given proportion of bichromate of potash be added, the mixture kept in a fluid state for (say) a couple of hours, and afterwards a film be formed with it—either on paper as in the carbon process, or on glass as in the Woodburytype. At the same time let a corresponding film be produced with the other portion of the gelatine solution, but, in this instance, with the same proportion of bichromate added immediately before using. Then let both films be dried under precisely similar conditions, and afterwards printed under identical circumstances.

Upon developing these two films a very marked difference will be observable between them. The one in which the bichromate was added at the last moment will, doubtless, develope rapidly and without the slightest difficulty; the other, on the contrary, will be very difficult to develope, if it do not prove to be absolutely insoluble. This, in all probability, will be the case, particularly if the temperature at which the gelatine was maintained had been at all elevated. If, however, a picture can be developed, a considerable difference will be perceived in the sensitiveness of the two films. That in which the bichromate was added just prior to the film being made will probably require as much as twice or thrice the exposure of the other. This simple experiment will serve to explain several of the discrepancies which at times have been met with when experimenting with bichromated gelatine processes.

It will now be manifest, in making comparative experiments with bichromated gelatine films generally which are prepared in the sensitive state, that in all instances the bichromate should be added as nearly as possible the same time before the film is formed or becomes set, in order to obtain uniform and reliable results. From the foregoing it will be seen that if a large quantity of gelatine, with the bichromate in it, be prepared at once and considerable time elapse before it is used up a marked difference in sensitiveness, solubility, and general behaviour may be anticipated between those films which are first and those which are last produced.

From what has been said it will be pretty obvious to all that the larger the proportion of bichromate salt present in the gelatine, and the higher the temperature at which the mixture is maintained, the more exalted will be the sensitiveness and insolubility of the film. It is tolerably well known that moist bichromated gelatine films, practically, are not rendered insoluble by the action of light; but it is not so well understood that an insolublising action is slowly set up in the gelatine if it be kept long in a fluid condition with the bichromate in it, which action results in total insolubility when the film is dried.

THE LATE REV. F. F. STATHAM, M.A., F.G.S.

The amiable and genial President of the South London Photographic Society is no more. He died of bronchitis (from which he had been suffering for several days), on Tuesday last, the 22nd inst., at 7.30 a.m.

How much this Society, which he loved so long and so ardently, owes to him, besides its existence, will probably never be revealed. The sad bereavement is the more affecting from the circumstance that the "silver wedding" of the President and the Society was to have been celebrated in a manner becoming the occasion on the 10th of next month. Fitting preparations were being actively made for the auspicious event, including the presentation of a suitable testimonial to a president who, by his unflagging attention and kindly interest, had secured the affection and esteem of not only the members of the Society and of London photographers generally, but also of the numerous photographers from the provinces who have occasionally come to town to attend the annual technical meetings of the South London Photographic Society.

Mr. Statham had for many years been rector of the populous parish of St. Mary, Newington, London, and had endeared himself to everyone by his unremitting attention to his duties. We shall next week have a more extended notice of our deceased friend, accompanied by a portrait.

The interment will take place at Norwood Cemetery tomorrow (Saturday), at 4.30 p.m., the first portion of the service taking place at St. Peter's Church, Walworth, at 3 p.m.

Mr. S. D. McKellen writes, in connection with our last week's article on *Adapting the Camera to Lantern Purposes*, that the exact method described by us has been adopted by him and applied to every one of his new cameras. He rightly judges that this fact was not known to us when we wrote, or we should, of course, have mentioned it. The arrangement is, however, of sufficient value to deserve all the publicity we can give it.

Two new societies are announced—one at Nottingham, the report of the first meeting of which appears in the usual column; the other at Monte Video, probably the first organisation of that description in South America.

An unusual compliment has been paid to English journalism by one of our American contemporaries in the publication twice over of an article which appeared originally on "this side." As the subject matter of the article generally did not seem to warrant such special treatment we have sought for some tangible explanation of the extraordinary phenomenon, but have signally failed, unless—and the idea strikes us as too ludicrous to be accepted as a real explanation—the cause is to be found in the fact that the editor of the journal in which the double reproduction occurs is in the reproduced article spoken of as "that admirable example of the photographer, artist, operator, publisher, and man ———" (but, respecting his modesty, we reserve the name). If that be the explanation, then we are puzzled to know something else. Is it the suspicion of being considered a "photographer," an "artist," an "operator," a "publisher," or a "man" that most tickles our contemporary's fancy? Perhaps when the time comes round again in the June number for the third periodical republication he will supply the information as an append.

Every photographer takes an interest in incandescent lamps—that form of electric illumination with which photography seems connected through the name of Swan, though, as a matter of fact, it is the particular kind of electric light least suited of all for illuminating the sitter. The Paris Opera is to be entirely lighted by these lamps, and already the work of fitting has begun, four hundred being now in use. Six thousand is the entire number required.

Our contemporary, the *Chemical News*, contains a droll "notice to imposters." It appears that a large number of scientific men have been victimised by a fluent rogue, who passes himself off as a chemist in distress, and on the strength of his tale has received sums of money from all quarters. The editor of the *Chemical News* gives a general notice, "in the hope that the gentleman in question, being satisfied with the good haul he has got out of tender-hearted men of science, will in future devote his talents to harder-hearted men of the world, who are so much more able to indulge in the luxury of giving."

That such impostors are to be met with in photographic ranks our readers, doubtless, know too well, but they have generally walked from the last town (usually a distance of forty or fifty miles) before they have ventured to press their tale upon those they interview. A close series of questionings will, however, in most cases dispose of their claims if the photographer have a fair acquaintance with or knowledge of his brother photographers. A contributor to these pages once had an experience very suggestive of the impostor the *Chemical News* describes. A distressed gentleman called upon him at his private residence, and represented himself as a private tutor belated. His story was disbelieved, and he departed, calling at a neighbouring house where ladies only resided. Quickly discovering the fact he so terrified the inmates that they gave him money to get rid of him. The next day he made his appearance at the said photographer's studio, a single night's rest having converted him into a photographer's assistant. He did not recognise the features of the photographer, and displayed considerable surprise when told he would be given into the hands of the police if he did not leave the neighbourhood at once.

In a recent address *On Engineering Progress*, the chief engineer of one of the American railways predicted that aluminium was destined at no distant day to replace steel for rails and bridge construction. We hope that it may not be distant, for then this most useful metal would doubtlessly find an immense field of utility in photography; but we much fear our hopes are built upon sand.

The use of nickel, however, has become thoroughly naturalised amongst us, and, whatever may be the probabilities as to aluminium, photographers will continue to make use of nickel as a plating to iron or steel. This plating is usually performed by the aid of electricity; but, according to Stolba, small objects can be satisfactorily coated without a battery. He gives the following directions for the purpose:—A concentrated (saturated?) solution of chloride of zinc is diluted with twice its volume of water. This mixture is boiled in a copper vessel, a few drops of hydrochloric acid being added if there should appear a precipitate of basic chloride of zinc. Next, a small quantity of powdered zinc is added—an addition which causes a deposit of zinc upon the vessel. Hereupon sufficient chloride or sulphate of nickel is added to the bath to give a distinctly-green colour, and the previously-cleaned articles are then immersed in the liquid in contact with zinc and allowed to remain there for fifteen minutes, the temperature being maintained at boiling point during the operation. If the coating be insufficient the articles are again immersed till the deposit is of sufficient thickness. In this way he claims to be able satisfactorily to coat articles of zinc, cast and wrought iron, steel, and copper.

The following formula is recommended for a cement for fastening together articles of brass and glass:—One part of caustic soda, three parts of resin, and five parts of water, and then kneaded into half the usual quantity of plaster of Paris. The cement will stand heat very well, and hardens in from one-half to three-quarters of an hour. If zinc white be substituted for the plaster of Paris the hardening will be slower.

At a meeting in the Parker Museum at the close of last month, the chair being occupied by Sir Joseph Lister, Bart., a most interesting demonstration was made before a distinguished audience by Mr. Watson Cheyne, of a subject which is attracting world-wide attention at the present time—the great group of minute organisms known under the name of *Bacteria*. These minute forms of animated matter play a vast part in the economy of nature, decay and disease being inseparably linked with them. Most of those fell diseases that in the history of man have destroyed millions of his kind are set down to the presence and growth of these animalculæ, each disease having its own characteristic bacterium. A complete knowledge of their peculiarities of size and conformations is necessary to the spread of a knowledge of their properties, and, in consequence, of a possibility of finding a remedy against them, and here photography plays a most useful part. They cannot, however, be photographed just as they are found, and they require to be stained with certain chemical preparations before being placed in the micro.-camera—some needing one stain, and others a different one. Details of the manner of doing this which have been found most useful by experts we may bring before our readers at some future time. Dr. Robert Koch, at the meeting we speak of, exhibited a large number of these photographs upon the screen, and they were inspected with the closest attention. Investigations into the nature of these marvellous bodies are, comparatively speaking, in their infancy, and we may be sure that photography will play no mean part in elucidating them.

LIME-LIGHT EXPLOSIONS AND THEIR PREVENTION.

I have read your sensible leading article on *Lime-Light Explosions and Their Prevention* with much pleasure, and agree with you that, in the words of the old proverb, "it is easy to take a horse to the water, but it is not so easy to compel him to drink." Still it may be hoped that lantern exhibitors generally will be wise in time, or they may, by-and-by, have to lecture to empty benches.

You recommend back-pressure valves as a preventive of lime-light explosions; but I think one reason why they are not more in favour is that there are little practical difficulties in using them. The metal valves are apt to "stick" and the oiled silk to become porous, so that at last the gas passes almost as easily in one direction as in the other. I have lately used thin vulcanised rubber sheeting in my Chadwick valves with advantage; but care must be taken not to screw them up too tightly, or the india-rubber will cockle and make the valve leak.

Hemming's safety tube is perfect of its kind, but scarcely available for the lime light, as the chlorine in the oxygen would be sure to rust the wires. I used this tube for years in King's College, London, and never knew an instance of the oxyhydrogen flame passing back into the receiver; but then the flame was burnt near the mouth of the tube, and there was no forcing nor suction. When safety tubes fail in the lantern it is, without doubt, from one of these two causes. The latter—namely, suction—can be prevented by the use of back-pressure valves, but the former only by placing the safety tube in the *front part* of the jet immediately above the mixing chamber; and this, in the case of an old jet, is not always convenient. I have proved that the pumice safety tube, alluded to in my paper, will resist a considerable amount of forcing without allowing the flame to pass; but it will not stand the "exhaustive testing" proposed by Mr. Lewis Wright. On connecting one of these pumice chambers with the H end of the jet by means of a long tube of stout vulcanised rubber, and then closing the O tap of the jet so as to allow no room for recoil, I succeeded in driving the flame quite through the pumice and shattering the balloon on the other side. In this case the volume of the gas was large and the expansive power on explosion sufficiently great to overcome the resistance. I might, perhaps, have prevented it by using a longer column of pumice, but then another difficulty would have arisen, viz., diminished pressure of gases and diminished light.

Altogether the subject is one which requires consideration, but I believe it will eventually be worked out to a satisfactory conclusion. Why, for example, could not a metal valve be placed immediately in front of the safety chamber to break the violence of the explosion and partially close the tube? Or, as an alternative, a side opening might be made, stopped with a cork or a valve. Some vent must be found for gas exploding, unless the volume be very small; and if an outlet be not provided it will either burst the rubber or force its way through the safety tube.

The best plan would doubtless be to construct the jet in the first instance with a small chamber, of about half-an-inch in diameter by half-an-inch in length, immediately below the nipple, to be filled with pounded and sifted pumice or with the finest shot procurable, or with coarse emery powder. If, in addition, a back-pressure valve were placed on the nozzle of each gas bag I believe you would have "a burner by which an explosion would not be possible by accident, by carelessness, or by design."

Since writing the above I have received the Journal of the 18th instant, containing a report of the meeting of the Edinburgh Photographic Society, and also a communication from Mr. G. R. Baker, to which I hope to reply next week.

T. Frederick Hardwich.

STANNOTYPE.

No. X.

At this stage the process of stannotype may be said to end, inasmuch as the subsequent printing operations are in all respects identical with Woodburytype. Stannotype is, in fact, merely a simplified method of producing a printing-mould from which proofs on gelatinous ink can be made.

The printing-press, as used for this purpose, consists in its improved form of an accurately-planed iron bed, to one end of which is hinged an arched beam carrying the top plate of the press, which is also accurately surfaced. The top plate is attached to the arch of the press by means of a screw and binding clamps, a ball-and-socket arrangement allowing it to be fixed in any position with regard to the bed of the press.

When the mould is ready for printing two or three thicknesses of stout blotting-paper or "drying-board" of the same size as the mould are damped and laid upon the bed of the press with the relief superposed. The three clamping nuts having been loosened and the top plate allowed perfect freedom of movement, the press is closed by means of the lever handle provided for that purpose. The top plate will now lie in contact with the upper surface of the mould, and, provided all the surfaces are true, there will be perfect contact. The middle screw under the arch of the press is now tightened, by which means the top plate is forced into contact with the mould. In this manner the degree of pressure is varied according to the requirements of each particular mould. The top screw is then tightened, which clamps the top plate firmly to the arch of the press, and, finally, the bottom screw, which governs the ball and socket, and fixes the position of the pressure surface. If the press be now opened and the top plate lifted it will always return to precisely the same position and with an equal degree of pressure.

The mould is prepared for printing by wiping it over with a piece of flannel saturated with a mixture of paraffine and olive oil, as thin a layer of grease being left on as possible. This operation is to be repeated after pulling each print, in order to enable the gelatinous ink to leave the mould. If any portion of the surface escape oiling the print is nearly certain to stick and tear away the tinfoil, necessitating the removal of the old and its replacement by a new facing.

The ink is composed simply of coloured gelatine, which may, we believe, be purchased in a concentrated form, requiring only solution in warm water. Those who prefer to make their own ink can, however, easily do so. A thick solution of any good, *hard* gelatine, varying in strength from fifty to eighty grains to the ounce according to the temperature and season, forms the basis. This is coloured by means of indian ink with a little alizarine or purpurine added to give warmth. A very convenient liquid indian ink is obtainable at the establishments of most artists' colourmen. The alizarine or purpurine are dissolved in strong ammonia, and added as desired to the blackened gelatine, very little being required to produce the desired effect. If the ink be made up with the addition of ten to twenty per cent. of alcohol it will keep for a very long time.

No hard and fast rules can be laid down as to the exact composition of the ink, as this will vary not only with the season and temperature but also with the depth of the relief and the nature of the subject. The chief points to be observed are that more gelatine will be required in hot weather than in cold, in order to compensate for the retarding action of the increased temperature on the setting of the ink. As regards the colouring matter: this should be increased in inverse proportion to the depth of the mould, a shallow mould or one deficient in contrast requiring more colour than a deep, well-contrasted relief. However, half-an-hour's practice at the press will teach the operator more than a volume of written instruction.

The paper employed is of a special character, made expressly for this purpose. Ordinary photographic paper of good quality and even texture is treated with a solution of shellac in borax, and then submitted to heavy pressure between steel rollers or plates, by which means a fine, smooth, and impervious surface is imparted, which prevents the ink soaking into the paper and destroying the purity of the lights. The whole secret of success in this style of printing rests in the paper, and to attempt to make shift with inferior or unsuitable paper is simply to waste time.

We now proceed to the actual operation of printing. The ink, carefully filtered into a convenient-sized bottle or jug, with suitable arrangement for keeping it at the proper temperature, is placed ready to the right hand of the press. The paper, cut to size, is also placed within easy reach, and clear of the greasy flannel used for oiling the relief. The mould having been properly levelled and oiled, as already described, the press is opened and a pool of ink poured on to the centre of the printing surface. A piece of paper is taken and dexterously, but without hurry, laid over it and the press closed. The paper is "sprung" into a curve and laid down upon the mould in the same manner as in sensitising albumenised paper. Upon closing the press the superfluous ink is squeezed out at the edges of the mould and collects in a groove at the edge of the bed of the press, whence it may be removed in the solid state and remelted when necessary.

The ink which escapes at the edges will serve as a guide to the time necessary to allow the picture to set. Thus, as soon as the surplus ink from the last closing of the press has become firm the press may be opened and the print removed without fear. This is done by simply lifting it by one corner, and slowly, but firmly, peeling it away from the mould. It is then laid face upwards on a sheet of plate glass and the thick mass of solidified ink removed from the edges by means of a steel spatula. The print is then ready for the next operation of "aluming," if that operation be considered necessary, or otherwise, for drying.

A word may be said as to the necessity for observing a proper temperature when using the ink. If it be too hot it will take longer to set, and so slow the printing operation; while its greater thinness will cause it to run away from the higher lights under pressure, and so produce hardness and patchiness in the prints. If too cold it will partially set before the press can be closed, with a result that may be readily imagined.

The first adjustment of the press will rarely be found to be exactly adapted to the requirements of the mould; but an examination of the first proof will show what readjustment is required. Thus, the pressure may be too great, or *vice versâ*, or the top plate may not be in strict parallelism with the printing surface. Again: the ink may be too dark or the contrary, or a thousand-and-one little details may strike the eye of the practised printer, who will know how to remedy or modify them.

With regard to the "fixing" with alum: though not absolutely necessary, many persons prefer to adopt it as an additional safety. If not so fixed or hardened the picture, of course, remains soluble in warm water, and so is liable to damage. The fixing process consists in immersing the prints for from five to ten minutes in a saturated solution of alum (carefully filtered), after which they are rinsed in one or two changes of water and hung up to dry, when they become practically insoluble.

There is nothing special to be said with regard to the drying, except that it is important here, as in every other portion of the process, to avoid dust, owing to the sticky nature of the surface of the moist print. When dry the prints are trimmed and mounted in the usual way.

ELIMINATION OF HYPOSULPHITE OF SODA.

We have lately had occasion to investigate the condition of a number of silver prints which, about twelve years' ago, were made under test conditions as regards the probability of their fading owing to presence of hyposulphite of soda.

While it is known that several substances—peroxide of hydrogen and hypochlorite of lime, *inter alia*—will decompose the minute traces of hyposulphite of soda left in a print as the result of hasty or imperfect washing after fixation, without injurious action upon the print itself, provided a sufficient degree of dilution be practised, the anti-hypo. agent in the case in question had been one of the salts of lead—the acetate. We may here observe that the prints referred to had successfully withstood the ravages of time, when such is understood to be confined to the period above mentioned. Indeed, there is a certain degree of justification in speaking of twelve years as quite a respectable period of duration in the life of a silver print, when it is well known that many succumb before the expiration of four or five years.

The strength of the lead bath necessary to ensure the safety of silver prints, so far as such safety can be ensured by the removal of the hyposulphite of soda, is about one grain of acetate of lead to an ounce of water. The method of employing it is to fix as usual in a solution of hyposulphite of soda, rinse the prints in three or four changes of water, then transfer them to the lead bath, in which they may remain from five to ten minutes, concluding with a final washing to remove the lead. The whole operation occupies far less time than is considered necessary to remove the hyposulphite by simple washing, while it ensures the desired end being attained in an effective manner.

One of the readiest and best tests for the presence of hyposulphite in a solution is that which is so well known and often described as the iodine and starch test. Upon a print having been cut in two parts, and one half quickly and somewhat roughly treated with the lead in the manner above described, while the other was allowed to soak in water, occasionally changed, during an entire day, the former showed by the test mentioned not the slightest presence of the fixing agent, while in the latter its presence was quite apparent.

In the olden times—that is, between the years 1840 and 1850—the salts of lead were frequently employed by calotypists in eliminating hyposulphite of soda from their prints. It then became *passé*, or was permitted to fall into a state of desuetude, eventually being rediscovered or resuscitated in America by Mr. Henry J. Newton, a New York amateur, who is now justly entitled to the honour of its modern introduction.

But, however anomalous it may appear, we do not hold the opinion that hyposulphite of soda, *per se*, induces fading in a print; for, as we have already placed upon record, and as the experiments and opinions of others will confirm, a print, otherwise properly treated, may even at a final operation be immersed in a (weak) solution of this salt (sodium hyposulphite) and dried without subsequent washing, and remain quite good for many years, retaining its pristine brilliancy. This was, in days of yore, also specially noticed by M. Blanquart-Evrard, Mr. Thomas Sutton, and others.

TISSUE FOR BURNT-IN ENAMELS.

Experiment with the transfer process of Lieut. Pavloffski demonstrates that by making the mixture of gum, honey, and bichromate up as a tissue, not only is there more certainty in the result, but the firing is much facilitated, as the collodion is apt to deflagrate and spoil the image, and also prevent the glaze from burning to the proper brilliancy unless the tablet be overloaded with glaze flux.

This modification is not published for the mere motive of making a different formula, but for the reason that in the writer's hands the process as published did not realise expectations; therefore, the modification was tried, and success was the result of the initial trial, which was repeated with subsequent ones.

Of course there is nothing novel in this change of procedure, as the process as published by Lieut. Pavloffski is upon the same lines as Swan's original carbon process, which was soon afterwards altered in a similar way, with the result that the modification has entirely superseded the original method.

The formula that was successful is as follows :—

Gum arabic	1 ounce,
Water (boiled)	12 ounces,

dissolved by the aid of very gentle heat in about eighteen hours. Strain first through muslin and then through flannel. Now take a tube of Hancock's china colour (for water) and mix the contents with three drachms of honey in a mortar by means of an ivory spatula; then add by degrees the above solution of gum, and when thoroughly mixed add two ounces of a saturated solution of bicromate of potash and strain through three thicknesses of fine muslin.

Now polish a piece of glass of any convenient size and smear with a little vaseline, which polish off with a clean linen rag; then spread a comparatively thick film of the sensitive compound, and place the plate upon a levelling-stand until semi-dry. A piece of plain Saxe paper cut to size is now damped, and, after being laid in position over the tissue compound is lightly squeegeed into contact; and the plate may be placed away to dry in a closet at about 120° Fahr., or in front of a fire, and when the desiccation is complete the film adhering to the paper backing is stripped off. Safe-edge the negative to be printed from, and expose for about half the time that a carbon print would require.

Prepare the enamel tablet by washing first in a weak solution of soda; then rinse and apply a weak mixture of water and nitric acid. Again rinse and coat with a filtered solution of—

Gum arabic	1 drachm.
Water	5 ounces.
Saturated solution of bichromate of potash	½ drachm.

Then dry and expose to light, so as to harden the film.

The exposed tissue is dipped in cold water, afterwards squeegeed into contact with the prepared tablet, allowed to stand for a few minutes, and then immersed in tepid water. Strip off the paper backing and at once transfer the tablet to cold water, gently laving the picture until the development is nearly complete. Then place in a dish containing a mixture of water twenty ounces, methylated spirit one ounce; transfer to another containing equal parts of water and spirit, and finally to one containing methylated spirit only.

The picture is now dried by the aid of heat, and then coated with a varnish of oil of tar and essence of lavender. When this becomes tacky dust upon it a glaze or flux powder by means of a small pepper dredger, and place the tablet at the mouth of the furnace until evenly heated throughout; then transfer into the muffle, and in a few minutes the firing will be complete.

The process is much simpler and the manipulations easier than either the dusting-on or the substitution method.

It cannot be said as yet how long the sensitive tissue will keep in good condition; but, judging from the life of bichromated pigmented gelatine, a week will perhaps be the limit. To obviate the necessity, therefore, of preparing the tissue throughout as wanted, omit the bichromate in the formula, sensitise the tissue by immersion in a two-per-cent. solution of bichromate as required, and dry in front of the fire. "Gup."

ON THE PREPARATION OF GELATINE PLATES.

[A communication to the Bristol and West of England Amateur Photographic Association.]

In taking up this subject upon which to read a paper before the Association I do so with a considerable amount of diffidence, as it has been so fully and ably treated in the journals by those who have been able to devote not only their spare time but the whole of their time to it—both theoretical and practical students.

However, as I have, ever since I adopted the gelatine process, made almost all the plates I have used, I am perhaps somewhat qualified to offer some few remarks upon this subject, which remarks I shall endeavour to make of as practical a nature as possible. In this determination I am perhaps somewhat strengthened by the belief that much assistance can be given by verbal explanation and ocular demonstration which written treatises will not adequately convey, and by certain inquiries made by various members which have seemed to imply a desire that I should give such demonstration. This being so, I cheerfully accede to the request, if by so doing I can impart information or render any help, even in any small degree.

I shall endeavour to treat the subject under two heads, namely, *Formulæ and What to Avoid*, and *Modus Operandi and Dangers Incident Thereto.*

Formulæ and What to Avoid.

Primarily I would say hereon—"Adhere to what is simple, and when you get a good formula that suits you in all respects stick to it."

Gelatine plate-making requires much system and as much uniformity as is possible, so that by often searching for novelties or being led away by much-belauded formulæ, when one is already working a process which gives certain and reliable results, there is great danger of sacrificing a certainty for an uncertainty, and wasting much valuable time, which, in the present day, I am sure no one can afford to do.

The formulæ may be classed under two heads, namely, those involving digestion, and others boiling. The former has been a very favourite method for somewhat slow plates; but I cannot help recommending those desirous of making plates to adopt the latter course, namely, boiling where possible, because much time is thereby saved, half-an-hour or so taking the place of twelve or fourteen hours. Greater certainty is assured, the temperature during digestion sometimes creeping up in a most unsatisfactory manner during the operator's absence, the emulsion being thereby damaged. For a business man it is far more convenient, as the whole operation can be completed during the leisure of an evening, when in the other case the stoppage of the digestion arrangements for setting, &c., &c., have to be conducted very often at a time when one's thoughts are being drawn towards the shortly-to-be-encountered business of the day, resulting in hurry and a want of deliberation not conducive to careful and satisfactory manipulation.

Of course in a paper such as this it is impossible to go into the thousand-and-one varieties of modes of getting more or less at the same end, especially as, to a certain extent, one must perforce be guided by the difference of taste regarding speed, colour of plate, mode of development, &c. I may, however, give my own ideas as to the class of formula which, taken altogether, is the most desirable.

I do not feel at all drawn to those formulæ which include amongst their ingredients chloride; for my experience has been that the result is a cold, grey colour, neither pleasing in appearance nor facilitating the judgment of density. I have found the most reliable plates, and those possessing most vigour in every respect, accompanied by clear shadows and a general appearance of pluck, together with a rich warmth of colour in the resultant negative, have been prepared with an emulsion containing iodide; and, so far as my own practice is concerned, I see no prospect of my omitting this from my emulsions. The negatives I have brought for your inspection are those from which my pictures exhibited at the Bristol International Exhibition were printed; and I think I may say that they are more of the wet-plate class of negative than a good many gelatine negatives one sees—alike as regards colour, clearness, and general pluck. They were all prepared with an emulsion containing iodide.

Another important point—in fact, the all-important one—in the make of the emulsion is the complete, rapid, and yet steady admixture of the bromo-iodide and silver. For this purpose, various nicely-constructed rapidly-revolving whisks and emulsion vessels have been constructed; but I consider we are all of us greatly indebted to the mode lately introduced by, I believe, Mr. W. K. Burton, and which method commends itself to me as being the most perfect (and almost automatic) that we could possibly possess. Instead of pouring the solution of bromo-iodide into that of the silver, the dry silver in crystals is placed in a hot stone bottle, all the bromo-iodide solution is poured into it, and it will at once suggest itself to you that only as the crystals dissolve can the compound be formed, and thereby a steady and complete mixture is formed, only requiring vigorous shaking till the crystals are heard to rattle no more. I have been exceedingly pleased with this new idea, and can most certainly say that the results, as regards fineness of film and regularity, have been in my hands all I could desire.

We next come to a point upon which it is quite impossible for anyone to make any definite statement with reference to what is correct or what is incorrect, each class being most desirable and suitable in its respective sphere—I mean the rapidity of plates.

For my own part, I prefer for general landscape work a plate of about five times the rapidity of an average wet plate. I am inclined to think that much beyond this involves the danger of a probable loss of pluck and clearness in the shadows; also an absence of latitude in exposure and treatment very desirable as qualities in a plate for general landscape work. Of course, I do not for a moment under-estimate the great value, in frequent cases, of rapid plates, and always take a few with me when out for a day's photography.

MODUS OPERANDI, AND DANGERS INCIDENT THERETO.

Under this section I shall have to say but little—that is, not accompanied by demonstration—so that if it be somewhat disjointed I must beg you to excuse it.

I need hardly say that one of the most important points in connection with the actual operations is extreme cleanliness. This requires more care and promptitude than in many other branches of the art, as particles of old emulsion are very liable to stick to and remain on dishes, vessels, &c., thereby causing mischief to fresh batches of emulsion, and being in frequent cases the cause of the failures so exercising the minds of operators. Great care is necessary in the choice of gelatine, and samples containing any grease (a most general defect) should be discarded in favour of those of purer quality, which should be both hard and soft, and mixed in the proportions which a few experiments will soon determine as the best suited to the manipulation and requirements of the operator. I find no brands of this material superior to Heinrich's and Nelson's "X" for hard kinds, and Nelson's No. 1 for soft. There is, I believe, another of this latter class made at Wintherthur, in Switzerland, which is also very good, but I have not tried it. There are three things which a would-be plate-worker should have arranged at the very outset of his endeavours, as being absolutely necessary for convenient comfort in working (and I maintain no man will succeed who is not comfortable in this work). These are a good levelling-cupboard, a spacious drying-cupboard, and a light-tight cupboard. You may say—Why a cupboard for levelling? Would not a large slab do equally well? A slab would answer the purpose, but would not do anything like so well; for if on any emergency you should be called from your room when coating, you have only to close your levelling-cupboard, when everything is perfectly safe till your return to complete the operation. This is a matter of great convenience. And, while on the subject, I may say that such cupboards should open and close easily, and with no makeshift fastenings; for it sometimes happens that one wants to get out a plate from the drying-box to test it in a hurry, and, unless the fastenings are simple and sure, it is very probable that the result will be a number of plates fogged whilst in the drying-box.

I may, perhaps, with advantage describe these two boxes. My drying-box is a little above the ground—say one and a-half foot—and the levelling-box above. The latter is fitted with six shelves, each accommodating six 10×8 plates, making a total of three dozen. The shelves are arranged in such a manner that on closing the box it at once becomes an additional drying-box. The drying-box proper holds nearly sixty 10×8 plates on edge, in two rows.

I will now make up a small quantity of emulsion, remarking, as a caution, that before commencing this operation the manipulator must be careful to see that he has everything well arranged and at hand, so that when in the dim light necessary to success—but none the less awkward for working by—he shall not have to hunt and grope about for things with the certainty of breaking not a few.

H. A. HOOD DANIEL.

[Mr. Daniel then fully described the mode, and gave a demonstration of the making of gelatine emulsion and coating plates with his revolving coating machine, and concluded with a few remarks on the development of gelatine plates.]

ON LENSES.

[A communication to the London and Provincial Photographic Association.]

IN treating upon the subject of photographic lenses certain optical terms have to be introduced, which will, therefore, be explained without going more deeply into the science of optics generally than is necessary for the intelligent consideration of the subject in hand.

Planes of Definition.—It is to be regretted that in such a science as optics, where the calculations are made upon very exact bases, such an incorrect term as "plane of definition" should have come into use. The surface upon which true definition is projected is almost always a curve. It must, therefore, be borne in mind that, if the expression "plane of definition" be employed in what follows, it is only to be understood in the conventional sense.

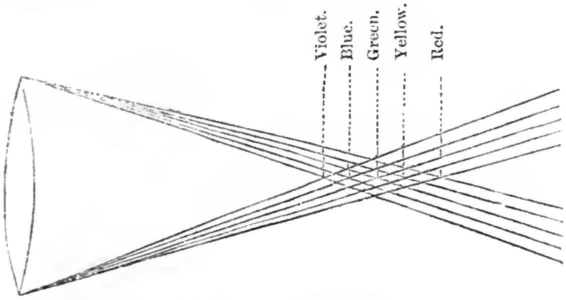
Focus, Equivalent Focus, and Conjugate Focus.—The focus of a lens is the place at which the rays proceeding from it meet to form an image. The word "focus" is also employed to mean focal length for parallel rays, and in the case of a single plano-convex or double-convex lens is ascertained by measuring the distance of the image which it gives of the sun, or any very distant object, from some point in the lens itself. With a double combination the expression "equivalent focus" is used to denote the focus which would be possessed by a single lens, giving an image of the same size as that produced by the combination. There are various means of ascertaining the equivalent focus of a combination. A very common one is to focus some object of the same size as itself, and then to take one-fourth of the distance from the ground glass to the object, as the focus required. This method is not quite accurate, for it takes no account of the effect produced by the separation of the lenses, and is not always practicable, as there may not be a camera extending sufficiently to give an image of the same size as the original. A method which I published in 1879, in connection with a proposal to introduce a standard of rapidity for lenses, which standard has since been adopted, is, I think, to be preferred. Focus an image of some definite proportion; then measure the distance from the ground glass to the original, multiply by the number representing the proportion, and divide by the square of a number larger by one than the number which has been used as a multiplier. Thus, if marks twelve inches apart are made, or a foot-rule be planted with a head-rest against the background, and these marks, or the length of the rule, are focussed to be three inches apart upon the focussing-screen, measure the distance from the background to the screen, multiply by four (the number of times that the image is smaller than the object), and divide by twenty-five. This will give the equivalent focus with only one-quarter of the error that exists when focussing the object of full size, and is quite near enough for the purpose required. Conjugate foci are the distances respectively of the object and the image from what is known as the optical centre of the lens.

Aperture, Angular Aperture, and Rapidity.—The aperture of a lens is its working opening as limited by the diaphragm. The angular aperture, often spoken of simply as "aperture," is the proportion between this opening and the equivalent focus of the instrument. It has been customary to denote this aperture by means of a fraction, f, the focus of the lens being the numerator, and the relation of the focus to the aperture being the denominator. Thus, $\frac{f}{4}$ describes the opening of an ordinary portrait lens, which, having a focus of twelve inches, has an opening of three inches. The rapidity of lenses is in inverse proportion to the square of the number used as denominator; but as the calculation of this is rather involved, it has been decided to accept $\frac{f}{4}$ as the standard or unity, and to reckon diaphragms by the length of exposure required in comparison with this unity. Thus, with a diaphragm of $\frac{f}{8}$, requiring an exposure of four times that required with $\frac{f}{4}$, the diaphragm is, on the universal system, numbered four.

It might seem unnecessary to add (but that I know it is not universally understood) that when from any reason a small stop must be used the most rapid lens is no more rapid—disregarding any variation due to colour or difference of reflecting surfaces—than the slowest one of the same length of focus which is capable of having the same-sized stop; so that if, in order to get what has been called "depth of focus," a small stop has to be used, there is no object on the score of rapidity in using a rapid lens, and perhaps a slow lens may from its other properties answer the purpose better.

Achromatic, Actinic.—The various rays which, compounded, make up white light are refracted or bent aside in different degrees. They are, therefore, dispersed as well as refracted, and those rays which possess the greatest chemical power, or produce the most effect photographically (particularly the violet), are more refracted than those, such as the yellow, which give the greatest visual power. The effect of this is that, with any simple lens, a series of images of different colours is formed at different distances from the lens itself. The image will be most distinct to the eye when the yellow rays are in focus, but will give the sharpest photograph at or near the place where the violet rays come to their focus. In a lens which is not corrected, therefore, the camera back has to be shifted a little in after focussing. The extent to which this will be required varies with the kind of glass used, but may be taken as from one-fortieth to one-thirtieth of the focal length. In the diagram, as in other diagrams, the amount is exaggerated in order to make it easily seen.

FIG. 1.

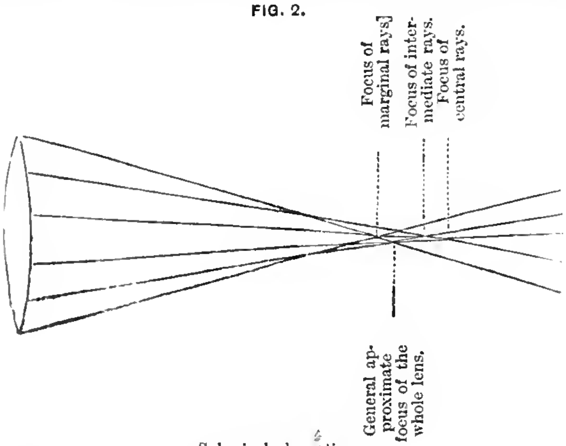


Chromatic dispersion by a single lens.

In uncorrected telescopes the evil is seen in coloured fringes surrounding light objects. Newton thought that the defect was irremediable, but it was afterwards found that different refracting substances dispersed the light in different proportions from those in which they were refracted, and, therefore, by uniting a convex lens of a substance of low dispersive power with a concave one of a substance of high dispersive power, it was possible to let the dispersive forces balance each other, and leave a surplus of refractive power in the convex lens to form an image. Acting upon this discovery Dollond, more than a century ago, constructed the achromatic (without colour) telescope. There is a slight difference between the amount of correction given to lenses for visual purposes and those for photographic use. The word "actinic" applied to lenses means that they are corrected for photography.

Spherical Aberration.—Spherical aberration is so important that it is well to understand clearly what it means. It is that characteristic by which the different parts of a lens uncorrected for this defect bring the same object to different foci. It is evident that this

FIG. 2.



Spherical aberration.

must result in confusion or want of sharpness. When an image is projected by an ordinary uncorrected lens, the marginal portions of the lens bring the rays which pass through to a focus nearer the lens than the focus of those rays which pass through the centre of the lens, and the rays passing through the portion of the lens between its centre and its margin are focussed at an intermediate place. This is called "spherical aberration," and where it exists perceptibly no truly sharp, well-defined image can be obtained, as every point is represented by a circle. The nearest approach to a distinct image is where the circle of confusion is small and the concentration of rays great, as marked in the diagram. If a stop or diaphragm be now used, cutting off the marginal rays, the focus will be lengthened to the point where the central rays meet

Aplanatic means without spherical aberration. W. E. Debenham.

(To be continued in our next.)

ACTINISM AND COLOUR IN THEIR RELATION TO DARK-ROOM ILLUMINATION.*

I will now mention another of Professor Tyndall's experiments, from which I think I have discovered an important point bearing on dark-room illumination. Having taken a piece of red ribbon and held it in the green rays of the spectrum, he found that the colours were quenched, but that heat had been generated; but when he held it in the red rays the colour was sent back to the eye unchanged. The quenching of the colour must, therefore, have resulted from the fact that the wave-lengths of both colours were lengthened to that of an invisible heat ray (I suppose I ought to say of an infra-red ray).

I also thought it was most probable that if a certain colour were reflected from or transmitted through a substance it would also pass through glass of the same colour unchanged, just as white light passes through clear white glass; and, if it were so, it would be useless to put two thicknesses of ruby glass of the same tint in a dark-room lamp, because if light passed unchanged through the second, one piece of ruby and one of white glass would do nearly as well. I say "nearly as well," because in the case of ruby glass the colour is only on one surface, and is not in the substance of the glass as it is in the green; therefore the colour is not so even. I further believed that if I placed on a piece of white paper a substance which reflected red light of exactly the same tint as my ruby glass the red colour reflected from the substance would pass through the ruby glass unchanged, and would be of the same tint as the white paper appeared to be when viewed through the ruby glass.

After trying dozens of experiments, with more or less success, chance came to my assistance. On looking through the ruby glass I noticed that the red ink in the well on my writing table looked like perfectly clear water. I at once wrote a few words in red ink and was pleased to find that on looking at them through the coloured glass *they were quite invisible*. This proved that when light had been brought to one wave-length by the ink the reflected colour had passed through the glass unchanged; if it were not so I should have seen the writing. I looked at the same paper through green glass, and the red ink looked black—indeed of a deeper colour than if it had been written with black ink. This evidently shows that it is unnecessary to use a number of thicknesses of the same media after we have once obtained a *pure, even colour*. Then we need simply cut off the power of the light, and for this purpose ground glass or white tissue paper would answer equally well.

I now come to the question—Why does Mr. W. E. Debenham's combination of green glass and yellow paper give a whiter light than either colour alone? We know that if we throw the blue and yellow rays of the spectrum on one point we obtain a pure white light. Mr. Debenham's colours, through not being perfectly complementary, evidently transmit the remaining portions of the colour together with the white light. But there are other combinations of colour which produce white light beside the blue and the yellow. The following are given in Ganot's *Eléments de Physique*:—Orange and Prussian blue; yellowish-green and red; yellowish-green and violet. Though to the eye all these produce the same pure white light, they would, most probably, have a very different effect when thrown on a sensitive film; and, from our knowledge of the actinic force contained in the different coloured rays, there seems no doubt that, if we could get pure colours, the white obtained by a combination of red and yellowish-green would be the safest for photographic purposes.

Again: the question arises—How is it that these various combinations of colour produce white light? It cannot be that, like the Kilkenny cats, they have annihilated one another; and as I could not see that an explanation was given by the absorption theory I have been thinking it over.

We know that in light there is a certain amount of actinism and luminous power, and that the two combined go to make white light. Now, it is very evident that as the combination of any of the two colours given above produce white light, *the combining colours must contain in themselves, without the addition of any other rays, those forces in exactly the same relative proportions that are necessary to produce white light.* This shows that white light does not consist of a great number of different constituent parts, namely, the ultra-violet, the seven colours of the spectrum, and the infra-red rays; but that they must all be due to the varying powers of two opposing forces, the intensity of which depends on the opposition which the different portions of the pencil of light meet with in their passage through the prism from the different points of incidence. Is not this another point in favour of my theory—that there are only two forces in light, and that the colour of each ray and the amount of actinic power in it is due to the different proportions of these forces producing that ray?

In reply to Mr. Macdougald's remarks: the example which he gives as being "on all fours" with that of light, viz., the three different properties of sugar, is not to the point, because if he take an ounce of sugar and divide it into seven equal parts the grains in each part will be equally translucent, equally soluble, and equally sweet; but if we divide white light into seven parts (viz., the seven colours of the spectrum) by the prism, we find that each part contains different proportions of actinicity and luminous intensity. The present theory that refrangibility, actinicity, and luminous intensity are inherent properties of one set of vibrations in one light-carrying medium does not explain the *causes* why these inherent properties are present in varying proportions in each ray.

The reason my first article on this subject was written was to ask whether it would not be better to treat them as distinct forces. Old

* From pressure on our space we have been compelled to leave over this article for several weeks.—Eds.

experimentalists, adding heat to the number, treated them as such; but they made the mistake in thinking that the prism split up the pencil of light into distinct divisions.

The theory of the inherent properties is like a countryman's explanation of the contents of a London sausage:—First of all he cut it up into equal portions. In one portion he found a greater amount of a mysterious white substance, and less of a no less mysterious red substance, than in another, and he explained the matter by saying "these are inherent properties of a sausage." He might have been justified in leaving the subject at that point, because the amount of white or red substance in the different portions is not governed by any fixed laws; but in the case of light it is far different.

A diagram was exhibited by Captain Abney in a lecture given at South Kensington, in 1876, in which the maximum of actinic force in a pencil of light transmitted through a prism on to a film containing silver bromide was shown to be at G. I ask—does not this prove that there is a force in light governed or controlled by some other force? If it were not so there would be no reason why actinic force should not be as powerful at the B as at the G lines. The amount of heat at the different points of the spectrum, as shown in a diagram by Professor Tyndall, proves that with the decrease of actinic force we get an increase in the length of the waves towards the ultra-red rays. This indicates that in order to obtain a safe light for dark-room illumination we must use a medium which will allow the long wave-lengths to pass freely, but which will stop the short ones, and with them actinic force; or, I should say, it must lengthen them, and render the vibration slower. There are certain of the elementary liquids—bromine for instance—and also solutions of the solid elements—such as sulphur, phosphorus, and iodine—which do this to a great extent. I am at present engaged in experiments in which I am using a saturated solution of iodine in place of coloured glass or paper. Theoretically this would help us in obtaining a safe light, and shortly I hope to show practically that it does so.

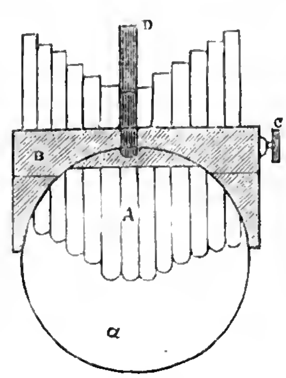
In Professor Stokes's experiments on the invisible ultra-violet waves he proved that, by causing them to impinge on a paper wetted with a saturated solution of sulphate of quinine and afterwards dried, they were brought within the range of vision in consequence of the vibration being made slower and of greater wave-length. In my last article I mentioned that by Professor Tyndall's experiment the visible rays were lengthened to the length of invisible heat rays through being thrown on black ribbon. How will the absorption theory explain these facts? How can a thing be said to be absorbed or annihilated when it is changed into something quite different? HERBERT S. STARNES.

[In connection with Mr. Starnes's previous article we were compelled to say that we could not hold ourselves responsible for his views, and the same remark applies with even greater force to his present one. It is really no use discussing a subject upon the basis of a series of new theories, or rather hypotheses, which none but their originator can accept. If Mr. Starnes had carefully studied the authorities he quotes so freely, he would scarcely have committed himself to a statement of belief that because certain colours of the spectrum superposed produce white light that such colours employed in the form of glass screens would transmit a white light safe for photographic purposes. The safety under the latter conditions would be undoubted, if safety can be said to be a necessary accompaniment of absolute darkness. Nor do we think that any of the authorities will support Mr. Starnes in his argument that white light is "due to the varying powers of two opposing forces"—actinism and luminous power. The fact that "chance came to his assistance" to teach him that characters written in red ink upon white paper are invisible when viewed through glass of the same colour, seems to prove that Mr. Starnes, while attempting to elucidate the more abstruse questions connected with light, has neglected to study the elements of that science, otherwise he would have been acquainted with a circumstance familiar to every schoolboy of a bygone period, when science teaching had not reached its present stage of development. One more instance of the writer's illogical arguments is to be found in the suggestion that two thicknesses of ruby glass are no better than one in a dark room, because the light passed through one would also pass through the other unchanged. As well might we say that one sheet of tissue paper will have the same effect in stopping light as a whole ream! Seriously, our columns are kept open for the purpose of discussing matters of practical photographic interest—not of ventilating new hypotheses which, so far as we can follow them, seem to be quite at variance with observed facts. Here the discussion must close.—EDS.]

NOTES FROM THE NORTH.

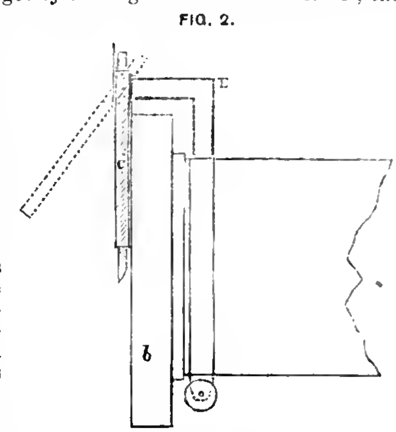
At the request of my friend, Mr. Alexander Henderson, of Montreal, Mr. John Parker, of Glasgow, has recently sent me a description and drawings of a sky-shade devised by the former on the lines of the very useful instrument invented by the latter, but modified so as to be workable in the rigorous climate of Canada West. Mr. Henderson writes appreciatively of the efficiency and simplicity of Mr. Parker's *shade*, a description of which appeared in the number of this Journal for November 9, 1883, but says that the photographers whom business or pleasure take as far west as the Rocky Mountains, frequently having to work in a temperature of 20° or 30° below zero, cannot, with the indespensable fur gloves, tear or cut the paper to the required shape, and to overcome that difficulty he has devised the following, which the drawings will fully explain.* *Fig.* 1 is a front view of the lens, with the shade arranged for a picture with distant mountain at the head of valley and trees at sides. A, narrow strips of brass, grooved and tongued like ordinary flooring. B, the brass frame, in which they slide easily, the necessary friction being got by turning the milled head C. D, the rod by which the shade is attached to the support E (*fig.* 2), to which it is hinged just firmly enough to remain at any desired angle and to move easily when required. *Fig.* 2 is a side view of the lens, showing the method by which the shade is attached, the dotted lines indicating it partly raised. Those who remember the description of Mr. Parker's sky-shade will see that the only material difference between it and that just described is the substitution of permanent sliding strips of brass for the temporary pieces of paper or cardboard, and no doubt the substitution will effectually answer the purpose which Mr. Henderson had in view. Mr. Parker's shade, either as originally introduced or in its improved form, should have a place in the "kit" of every photographer who aims at including clouds in his pictures, or wishes to place the distant hills and the near foreground on his negatives in something like the relation they bear to each other when seen by the eye.

FIG. 1.



a, Front of lens.

FIG. 2.



b, Front of lens tube.

The "ethoxo" light is having a bad time of it, but not worse than it deserves. The readers of the Journal will probably remember that, several years ago, I sounded a note of warning when the vapour of sulphuric ether was first proposed to be substituted for hydrogen in the production of the "lime light." I wrote feelingly on the subject, as I had for a number of years carried embedded in my muscular tissue certain pieces of glass, the result of such an explosion, and naturally thought that if such accidents occurred in the hands of those who had been trained for half a lifetime to the handling of dangerous substances they were much more likely to happen to those whose practice was regulated by "rule of thumb."

That the "ethoxo" apparatus, as constructed by its inventor, can be worked with safety and give a very brilliant light I know, as I have assisted more than once at exhibitions where it was employed; but *I knew the operator*, and that makes all the difference. The average peripapetic "magic lantern showman" knows just enough to get a good light when all goes "as it used to do," but is utterly incompetent to successfully overcome a hitch or correct anything abnormal in his arrangements; and I would as soon smoke my pipe in a powder magazine as stand beside him while using the "ethoxo" apparatus. I, therefore, heartily endorse the first recommendation of the jury in the Chadderton explosion case, to the effect that "ether-oxo gas should be prohibited at all public entertainments."

I see that Mr. A. Duthie, at a recent meeting of the Glasgow Photographic Association, tries to revive the old scare of hypo. in the mounts, and that "Free Lance," in taking him to task thereanent,

* The generic idea of this shade has been so frequently published in this Journal, or its ALMANAC, as to leave us a little in doubt as to who was really the first of those whose claims to its paternity are before the world. Among those whose names we at this moment recollect in such connection, as independent inventors, are Messrs. Baynham Jones, G. S. Penny, and W. M. Ayres. But, unless we are misinformed, a shutter of this class was on exhibition in the editorial office of this Journal nineteen years ago. Query: Who was *its* inventor?—EDS.

seems to imply that he also is a believer in the presence of that deleterious substance in at least some of the cardboard employed in mounting prints. I should like to know the test on which Mr. Duthie relies as a proof of the presence of hypo. So far as my memory and the pages of the Journal may be relied on, I think the test that has generally been applied is the blue starch iodide; and in an article on paper-making, published in THE BRITISH JOURNAL OF PHOTOGRAPHY some years ago, I showed conclusively—to my own mind, at least—that it is altogether fallacious. The reason is not far to seek. A trace of sulphurous acid discharges the starch iodide colour as thoroughly as a like quantity of hypo., and it is hardly possible for even a trace of the latter body to remain in the finished paper, while in some kinds of paper it is impossible but that the former must be present.

It is well known that hypo., under the name of "antichlor," is almost universally employed to get rid of the chlorine used as a bleaching agent; but anyone who has seen the extraordinary amount of washing to which the antichlorised pulp is subjected will easily understand that nothing short of spectrum analysis could detect the infinitesimal trace that can remain in the finished article. On the other hand, the "animal size" used in a large quantity of the paper manufactured in this country at least is, for technical reasons, made from animal matter approaching the state of putrefication. Sulphurous acid is employed as an antiseptic, and any washing that would remove it would also remove the size itself. *Verb. sap.*

JOHN NIÇOL, Ph.D.

THE PRESERVATION OF THE EYESIGHT OF PHOTOGRAPHERS.

As one who has given close experimental study during the past few months to everything published in these pages in relation to developing-room illumination, will you kindly allow me to summarise the practical results of the whole examination? The following are my conclusions, and all but the last one will probably be generally accepted; but, in defence of the value of that last one, I am prepared to do battle if need be.

To get the best results, and the best light for the comfort and preservation of the eyesight:—

A. Daylight should never be used as the original source of developing-room illumination.

B. The flame used should not be a bright white one, but yellowish. Green would be good if easily practically obtainable.

C. The coloured screen of the lantern should not be transparent, but translucent.

D. The light from the lantern should be at a low elevation in relation to the surface of the plate under development, an angle of about 40° or 45° from the top of the coloured screen being about the maximum.

E. The lantern window should be a very large one, so that the whole room is comfortably lighted up.

F. It is safest to *begin* the development a yard or more from the lantern window.

G. Under no circumstances should two coloured screens of the same material be used in the window of one lantern.

H. All lantern windows are faulty as regards comfort and preservation of the eyesight which do not possess at least one layer of a green colour.

The following are my reasons for advocating the foregoing eight rules:—

A. The chief reason why daylight should not be used as the original source of light is that it is so enormously rich in those actinic rays which photographers are striving to keep out of the developing-room. Why begin the operations with a maximum instead of a minimum of the adverse force? Another objection to daylight is the irregularity of its intensity, so that a coloured window which is safe at one time may be unsafe at another, and the operator, therefore, uncertain of the real cause when some of his plates begin to fog.

B. A yellowish flame is better than a bright white one, because it is less rich in those actinic rays which the operator desires to avoid. A candle, therefore, is better in a lantern than a paraffine lamp. In permanent establishments, perhaps, as good an easily-available light as any is that of an argand gas flame after the central hole of the argand burner has been plugged at the bottom by means of a cork. This stops the entrance channel of the air to the centre of the flame, and renders the flame longer and yellower.

C. The coloured window of the lantern should not be transparent, but translucent. When ground glass or tissue paper or other semi-transparent fabric is used the rays from the flame do not fall directly upon the plate, but are more diffused, and leave the window at a larger angle. Nearly all the light from such windows is actually reflected light, as in the Starnes' lamp. For instance: the water of the sea is transparent, but when broken into foam it is no longer transparent in the mass, but translucent. The rays of light are reflected in all directions inside and outside each of the innumerable microscopic drops of water in the foam, and finally reach the eye after myriads of reflections. It is the same with the transparent drops of water which build up clouds. So is it with powdered glass, or with paper. The light falling upon the vesicles of cellulose in paper is reflected and refracted in all directions numberless times before it escapes on the other side of the sheet of paper, and with each reflection it loses some of its actinic power, both because of the selected colour of the paper and because of the act of reflection itself; for the actinic rays have less power of penetration through coarse media than the red and yellow rays, which is why street gaslights look redder and yellower in a London fog the farther they are off. The true canary medium paper sent me by Mr. Fry owes its safety to its thickness, and consequently its power of breaking up the rays of light in its interior. Otherwise its colour is very inefficient for the purpose, and this may be proved experimentally by putting its component particles more in optical contact with each other by soaking it in gum-water; it will then be found to be as unsafe a sample of paper, so far as its colour is concerned, as could well be selected. The discussions on these subjects at the photographic societies will continue to be unscientific and desultory until these two elements of safety in any screen are distinctly specified and separated from each other by the readers of memoirs, and the true value experimentally determined by them for each. When fabrics are used as screens the authors of papers should state exactly the weight in grains per square foot of each sample of paper or fabric. This would give a rough idea to readers how far their thickness may form an element of safety. I am not in favour of thick screens, but of very thin ones, intensely coloured with light and brilliant, not dark-coloured, dyes—those, in short, which let plenty of light through, highly coloured. Oil silk specially made and dyed for the purpose would, I think, in time drive everything else out of the market. The fault of tissue papers and coarser fabrics is their irregularity; they are, actinically considered, full of holes, so that their "grain" can be printed through a single thickness of any one of them upon a gelatine plate charged with bromide of silver.

D. Figures to prove this point were given in a preceding article of mine. When the light falls from a higher elevation than 45° or 50°, a very large percentage of it reaches the sensitive plate in the dish, which light was previously reflected from the surface of the developer without reaching the plate. Thirty or forty per cent. of danger of fogging can be avoided by attention to this rule.

E. The lantern window should be a very large one for the benefit of the eyesight. There is no reason why it should not be the whole length of one side of the room, however large the room may be, and it should have a row of gas jets behind its long translucent screen. The intensity of light declines inversely with the square of the distance from the source, so the light from the long lantern, lighting up the whole room, will be harmless enough, the end of the long lantern where it comes upon the developing-table at one corner of the room being the only part to be careful about.

F. The way to exercise the care mentioned as desirable in the last paragraph is not to begin the development too close to the lantern window. Begin it three or four feet off, and, when the image is pretty well out, bring the developing dish to within two feet of the window, which should be (say) one foot high, with its lower edge touching the surface of the developing-table. By beginning with a fairly good screen, and paying attention to this matter of distance, which is of much more importance than small variations in the actinic absorption of the screen, it is astonishing in what a bright light it is possible to work. Monkhoven's plates are very good ones, yet I develope them habitually with safety in a brighter and cooler light than I ever saw in use in the days of the old collodion process. In the history of religions the gods of one age of thought became the devils of the next age, and in the photographic day now dawning the old ruby and red lights which Mr. Debenham has killed will be regarded as the exploded devils of the earlier photographers, and I believe that pure yellow and orange will go after them to the same limbo.

G. This proposition needs no defence. The first coloured screen has filtered out all the actinic rays it had the power to absorb, so a second one of the same material can do little more by its colour; consequently its presence, practically speaking, but darkens the room, and has little influence but that of injuring the eyesight of the operator.

H. This may be a point of temporary contention. Quite recently I stated that a doctor who threw red or yellow rays constantly upon the eyes of a man of weak vision would be considered mad; also, that if the fields and forests were of these hot colours we should all soon be blinded. Why then have them in the developing-room? It is true that the green rays are dangerously near to the blue in the spectrum, and that the blue must be sharply cut off for developing-room purposes. It is possible to find a screen composed of two sheets of different greens which would do this, and the right greens can be easily discovered by means of a polychromatic negative. But the yellows which will do this are more numerous, and altogether Mr. Debenham's selection of yellow *plus* green colours rests upon a sound scientific basis. His green is not the best he could have chosen. An intensely bright apple or sea green would be better. He can easily hit the best colours by the use of a polychromatic negative with tissue papers.

As a fact other operators than Mr. Debenham, few in number, have habitually used a more or less green light; but to him belongs the honour of having brought its utility, by his energetic public action, so very strongly before photographers, that its value can be no longer practically ignored, and the eyesight of large numbers of operators must thereby be preserved. He has favoured me with specimens of the materials he uses. The yellow is the element of safety; it is a thick paper, highly coloured, so has the advantages of the Starnes' lamp combined with fairly good absorption of the blue rays by colour. His green is altogether unsafe, but gives the cooling effect, and cuts off a few actinic rays which escape the yellow. An improvement would probably be to select a thick green paper, which green must be one of the few (I admit there are but few) greens which are tolerably safe, and to use very thin screens of bright yellow. His light will then be cooler. My light, from only two thicknesses of highly-coloured yellow and green specimens of the thinest tissue paper, is brighter than his, area for area, and probably if it were to be severely tested is not so safe. But what does that matter? Development six inches further from the lamp more than cancels all the difference, and this slight alteration of position of the developing dish is no great hardship.

A number of screens of *white* tissue paper will give the safety of the Starnes' lamp by their interior reflections and refractions; experiments might well be made in this direction. Each additional sheet means, in other language, but increasing the distance of a bare candle-flame from the plate.

Other experiments might be made with two magic lanterns by throwing two discs upon the screen so as to overlap each other, and placing a differently-coloured paper in each lantern. The result of mixing two *lights* is altogether different from the result of mixing two differently-coloured *paints*, and to an astonishing degree to those who have not tried it. In mixing paints red and blue make violet, yellow and blue make green, and so on, as everyone knows; but in mixing differently-coloured *lights* altogether different effects of colour are produced, and if Mr. Debenham does this at his forthcoming lecture to the London Photographic Society, he will be able to state and to show the actual colour of his light, which at the present moment he confesses himself unable to describe.

As the object of these lines of mine has been to save eyesight, the means of happiness and comfortable home to many a struggling brother of my craft, it may be well not to close this article without making their meaning perfectly clear for practical work to those who do not study the simplest scientific principles. I mean to those who offer "your likeness and a rasher of bacon for sixpence," and who, in the open air or otherwise, produce the old soot-and-whitewash likeness, embellished with comets and other astrological mysteries. These should go to the nearest shop where plenty of coloured tissue papers are sold, and select one very bright green and one very bright yellow—the colours so bright that they, unlike those of the other tissue papers, light up the faces of the persons turning over the various sheets of coloured papers in the shop. The brightest yellow and the brightest green being thus chosen, those two papers should be selected and pasted upon a cardboard lamp as its window, the light inside the lamp being then a common candle. So long as the operators *begin* their development (say) two yards from this lamp, and bring the plate nearer as the development approaches completion, I will answer for the safety of the development, and that they will be working in a brighter light than they have ever known before, if they have been ruining their eyes by the Debenham-killed dead-and-gone red glasses. If the colours thus bought chance to be very good they can work with safety even within but two feet of the light. A top and bottom to the lantern are worthless. The white light escaping beneath cannot get directly into the dish; the top light after reaching the ceiling and coming down again is practically harmless, in accordance with the law that the intensity of the light varies inversely with the square of the distance. These are the simplest instructions I am able to give without testing shop papers spectroscopically, or by means of a polychromatic negative. The latter method is infinitely the best for practical purposes.

Where is the manufacturer of the future who will first introduce into commerce a variety of intensely-stained green and yellow oil silks, more especially green? If I remember rightly, away here from books of reference, boiled linseed oil is the vehicle used in giving transparency to thin silks. If so, there should be no difficulty or expense in making coloured experimental specimens in a small way in the first instance. W. H. Harrison.

Lucerne, April 17, 1884.

ON THINGS IN GENERAL.

What a pleasure it is to see the familiar name of Hardwich in the Journal. It brings one back to the time when not only was no library complete without a copy of "Hardwich," but when it formed the only technical library of almost every photographer in the country. A quarter of a century has seen many changes brought about in photographic operations and processes, but I shall hold with almost affection to my early editions of Hardwich's *Photographic Chemistry*. The latest contribution of the reverend gentleman to the practical side of magic lantern work, so closely connected with photography, is very valuable, and, in connection with that by Mr. Lewis Wright, deserves most careful attention from those interested in such matters.

There are at the present time a large number of persons interested in lantern work—from the manufacturer who constructs the lantern to the exhibitor who uses it; but most of all is the photographer concerned, who bids fair to be almost the entire producer of, or at least intermediary in, the production of slides. The slides, too, are growing in value as an educational influence, from the scientific and accurate character of the diagrams and illustrations they exhibit; hence it is that the importance of taking every step to ensure safety during exhibitions becomes, if possible, intensified, and the experiments of the capable gentlemen I have named are of value. Few people but those who have had personal connection with the subject have any conception of the crass ignorance and the marvellous carelessness of some who use oxygen and hydrogen or ether for their lanterns. Safety-jets, if a real safety-jet could be devised, would be a great boon to nervous watchers; but a pseudo safety-jet would be worse than all. I once saw evidences of an accident that would exemplify my meaning—a room with the windows blown out and the ceiling damaged. A number of young men met for social improvement, and one cleverer than the rest got up some oxy-hydrogen experiments—mixed gases—a safety-jet of his own construction, an iron tube, some short lengths of wire packed in, and a big nail to tighten it. Of course there was an explosion, but, providentially, no harm was done to the assembled students beyond a terrible fright. I fervently hope that the practical outcome of the experiments initiated and the theories described will result in the invention of a jet which may really deserve the name of "safety."

Messrs. C. and J. Darker's polariscope exhibition was of a most interesting character, and the repetition of such lectures as that which accompanied it are calculated to be of great value. Photography has passed its period of babyhood now and requires real, intellectual food, of which the rising generation cannot too readily avail themselves. The race will be for the swift and the strong, and the combatants of the future will have to equip themselves with something far in advance of the mere dexterity acquired by practice if they are to take a forward position and its equivalent—high pecuniary recompense.

Science and art must be combined in one for the picture photographer; but mechanical and scientific photography is now of such importance that the artist will not always be needed. An interesting side light has been thrown on this phase of the subject from several quarters lately, and the ruling of Mr. Justice Miller, in the Supreme Court of the United States, in the Oscar Wilde copyright case, though on a technical law point, incidentally gives his views on this old "art" question. In the picture in question he held to be proved (the proof being an important link in the argument) the existence of those "facts of originality, of intellectual production, of thought and conception on the part of the author," which were more important to be proved in the case of copyright than in one of patent right.

By-the-bye, I am much obliged to the editor of the *St. Louis Photographer* for the flattering terms in which he speaks of me; but when he quotes from my lucubrations *verbatim* I should be glad if he would do so correctly. The March number of that capital journal contains what he terms "the following extract from 'Free Lance'"—a sentence that in its present form "Free Lance" most certainly never wrote. Something like it may be found in what I have written, but at present I do not at all remember writing anything like the paragraph quoted which I have just come across in the pages of the above journal.

Photography has afforded plenty of food for the lawyers of late, but I never felt greater satisfaction in reading law reports than I have lately when I see how a few disreputable scoundrels have been laid by the heels—how one man for publishing those loathsome abuses of our art which, at all risks, are still perpetrated gets a long term of imprisonment; how another for theft committed while receiving the courteous and kind treatment of his victim is given some time for enforced reflections upon optics in general and photographic lenses in particular; and how a land shark this time has actually been caught and made to disgorge. The more of such rogues and *canaille* there are punished the better will the ranks of photographers be for it; they can well bear some weeding out.

The Swansea case, in which the right to a negative was decided by the County Court Judge not to be vested in the client, is important. I believe there are far more of such cases occur in practice than ever come up for judicial arbitrament. The mere fact of such claims being made are a great annoyance; for the professional photographer in the daily discharge of his duty has, in the nature of his work, distractions and mental strain enough without being subjected to a gratuitous worry of this kind. Perhaps, however, such an important judgment as the one just referred to may help to nip in the bud many another attempt at a similar imposition.

I wonder what possible use can be found in quoting from the *New York Sun* a method of dissolving gum in "collodion and alcohol" for attaching false whiskers, and stating that the mixture, which dries immediately, can be removed by grease or spirits. The facts are as absurd as the recipe is futile.

I think Scotch photographers in general will not agree with Dr. Tulloch's dictum, given at a meeting of the Dundee and East of Scotland

Amateur Photographic Association, that "a gelatine negative rarely prints quite satisfactory without after-treatment," Dr. Tulloch being in the habit of using bichloride of mercury followed by ammonia to nearly all his negatives! I think he had better change his plate-maker, for gelatino-bromide would not be worth having if every negative had to be intensified. FREE LANCE.

A DAY ON "THE ISLAND."

PERHAPS there is no tract of land in the world which compresses into such a small space so many diversities of configuration as the Isle of Wight. It is a miniature of the great country from which it has been separated. There are moors and fells as bleak as those of Cumberland or the West Riding; chalk downs which recal Kent and Sussex; wooded undulating plains like those of Hampshire; and great stretches of rich arable land as fertile and as carefully cultivated as any in Leicestershire. Amid such a variety of scenery, with the sea continually presenting itself as a background, and historical reminiscences upon every side, the amateur would be hard to please indeed who did not find subjects enough to gratify his photographic propensities.

In these days of rain and tempest, when outdoor photography is at a discount, and the ever-vigilant eye of the Astronomer-Royal fails to detect a ray of sunshine for weeks on end, there is a pleasure in recalling past campaigns with the camera, and hunting out from some secluded drawer batches of old prints of valley, fell, torrent, and roadside inn, everyone of which recals some pleasant companion or enjoyable excursion. But more profitable than these musings over bygone days is the pleasure of mapping out operations for the future. There must be many who are making preparations for the bright spring weather which will shortly be upon us, and to such a short sketch which may direct their attention to "fresh fields and pastures new" must be of interest. Let me endeavour, then, to give a brief description of what may be done within the limits of one day upon "The Island," as it is proudly called by its inhabitants, to the exclusion of all other islands upon the surface of the globe.

To my friend Johnson, of London, the path to the Isle of Wight lies through the Waterloo Station. Behold him there at an early hour of the morning, clad in a fearful and wonderful Ulster, and the slouched hat dear to the artistic and Bohemian mind. No need to inquire the object of his mission, for under his arm is his folded stand, and in his one hand he bears the most compressible of cameras, while the other is occupied with a handy deal box containing plates and necessaries. Johnson goes through the formality of paying fifteen shillings and receiving a return ticket to Ryde in exchange; and then, with a feeling that come what may his retreat is secured, is whirled off in a third-class carriage.

The journey to Portsmouth occupies about two hours and a-half, and the traveller is eventually deposited upon the harbour pier, alongside which the fine, roomy "Victoria" is snorting impatiently out of its two funnels, and in full readiness for its short voyage. There the doctor, with apparatus corded and strapped, has been stamping up and down for a-quarter of an hour waiting for the London train.

From the quarter-deck of the "Victoria" a magnificent view of the harbour was to be obtained. There was a-quarter of an hour yet before the steamer could get the baggage aboard, and our photographers spied their opportunity. There was a clattering of straps, a turning of keys, a fitting of joints, and two uncouth three-legged, one-eyed creatures sprang into being. It was one of those bright, breezy mornings on which mere existence is a pleasure, and which gladden the heart of the photographer. A few bystanders gather curiously round, but the operators are imperturbable. The carrier is slipped in, the slide is slipped out, the shortest of exposures allowed, and the deed is done. Surely a more interesting view was never committed to gelatine. In the foreground lie three great three-deckers—the "Victory" (the old historical flagship of Nelson), the "Duke of Wellington," and the "St. Vincent." Beside these great floating monsters is moored a tiny gunboat—a representative of the modern tendency of naval architecture as compared with the ancient. By the side of its companions it looks like a duckling among swans; yet in its very insignificance lies its strength, since it offers no target for an enemy's shot. Around and between these vessels a swarm of steam launches, yachts, and shore boats fill in the scene, while behind it all the quaint little town of Gosport lines the water's edge and forms a background to the picture. Both plates were complete successes, giving as good an idea of the effect as can be produced without the blue of the sea, the grey of the houses, and the fluttering, coloured pennons of the men-of-war, with the artistic dash of brilliant scarlet from the coats of the marines upon the quarter-decks.

And now the good ship "Victoria" gives a final snort of expostulation, and churns up the water impatiently with her paddles. "All aboard!" shouts the captain. The warps are thrown off, and the vessel steams slowly out of the harbour, passing under frowning batteries, where the black-mouthed cannon peep sullenly out, as though sulky at having no more honourable task than the firing of salutes for so many hundreds of years. The channel here seems to the uninitiated to lie dangerously near the shore, even the largest ships passing within a stone's throw of the beach. There is a story, indeed, that on the occasion of some great wooden man-of-war going out in the beginning of the century she ran her bowsprit through the coffee-room window of the Blue Posts Hotel, considerably to the astonishment of some gentlemen who were dining therein. How far this is legendary and how far true is for some local historian to decide.

After touching at Southsea Pier the steamer stood right across for "the Island." Finer views could hardly be obtained than those of receding Southsea, with its charming variety of colour, white and red alternating in the houses, and the long line of shingle with the waves breaking merrily against it, or of the approaching shores of the Isle of Wight, with its undulating wooded hills, and the towers of Osborne peeping above the trees on the extreme right. Both were transferred to the plates of the photographers, together with a beautiful seascape of the Solent, with a solitary man-of-war lying at anchor at Spithead, and the three marine forts which stand out of the water like so many gigantic cheese-boxes, and command the winding channel which leads to the harbour. As the light was somewhat glaring the sky-shade was used in taking these views.

The Solent is five miles broad between Portsmouth and Ryde, so that twenty-five minutes of steaming brings the travellers across. Johnson's train has landed him on the pier at ten o'clock, and it is now hardly eleven, so that our excursionists have still a long day before them. Ryde pier is a very long one. As Johnson remarked, if it were a little longer there would be no need for any steamers at all. Happily there is a steam tramway which runs down it, and saves the necessity of trudging over half-a-mile of planking. The town itself is a decidedly hilly one. It is not so steep as the side of a house, but considerably more so than the roof. If you slip anywhere within half-a-mile or so you run a chance of reaching the beach in a shorter time than ever you took to traverse the same distance before. This is when you do not happen to bump into an inhabitant. In that case it is the inhabitant who gyrates down to the shore. If balloons were substituted for cabs in this town it would allow some small degree of comfort during the short time which will elapse before the whole thing goes adrift and slides majestically into the sea. I could say several ill-natured things of Ryde, but I refrain. A sense of my duty to the public, however, compels me to warn all future photographic travellers against every form of spirits in the island; for malignancy and venom they transcend anything I have ever imbibed, except, perhaps, the trade rum of Africa, which, drunk raw out of a broken cocoa-nut shell, tastes like a torch-light procession.

To follow our travellers, however: the first move after getting into the town of Ryde is to repair to a large horse-and-trap agency there, and to engage an open carriage for the day—a matter which is not a very expensive one. Thus provided, the whole island is at their command. Should their taste lie in the direction of Royalty, it is but six miles from the palace, where there are many beautiful views to be had; and just beyond lies the quaint old town of Cowes, with the many studies of the finest yachts in England which can be obtained there. If, however, the artist be of a historical and archæological turn, then he should wend his way to the little town of Newport, the capital of the island, where, besides its many inherent beauties, there is the opportunity of viewing and photographing the venerable castle of Carisbrooke, in which Charles I. was imprisoned before being taken to London and tried by the Parliament.

To confine myself to actual facts, however, the travellers, after a council of war with their driver, decided upon a somewhat more ambitious scheme than either of those indicated above. This was to drive right across the island, after first inspecting the Roman antiquities which have been lately unearthed at Brading. Brading is about four miles from Ryde, and as the road runs along the hills overlooking the sea the view was a beautiful one. Twice was the Doctor tempted out of the carriage and twice did splendid seascapes reward him; while Johnson, more improvident of plates and less accustomed to such scenery, excited the slumbering wrath of the driver by a long series of stoppages at the most inconvenient places—a wrath which showed itself in many mutterings and shruggings of shoulders, and was only eventually washed away by copious offerings of beer.

Brading is a pleasant little spot, and derives its principal importance from the magnificent specimen of a Roman villa which has been dug up in the immediate vicinity. From a short distance this interesting relic looks more like a quarry than anything else; and, alas! the operations of the photographer are confined to a distance, since the picturing of the tesselated pavement and other remains are a monopoly which the vagrant artist is not allowed to infringe upon. The tourists had to content themselves, therefore, with this general treatment of the subject, and then, after being divorced from their cameras, were led through the different chambers by a remorseless guide who explained the habits and customs of the "hancient Romans" in a manner which was more amusing than trustworthy.

The road from Brading leads to Newport, but there is a side road which opens into the highway between Ryde and Ventnor, and this was selected by the driver. This main road, which runs from north to south across the island, passes over a succession of undulating hills, from the summit of every one of which a magnificent view is to be obtained. Curious features in the scenery are the numerous monoliths—long perpendicular stones erected upon the summits of hills, either as landmarks or for some other purpose. These abound in the Isle of Wight. A succession of little villages were passed through on the way, offering as fine a selection of rural "bits" as could be found anywhere—the little wayside cottage with thatched roof, diamond-paned windows, and clematis or Virginia creeper fringing the doorway; or, perhaps, the grizzled, round-shouldered proprietor, with his black pipe in his mouth, sitting "*sub tegmine fagi*," densely unconscious that he is about to be endowed with a franchise, and that the press of the country are clamouring about his wrongs. There is often more interest in a little scene of this sort, selected artistically and well worked out, than in the broadest and most ambitious rendering of the beauties of nature.

Ventnor is about twelve miles from Ryde. As you plunge into the heart of the country the sea disappears entirely, and you might imagine yourself in one of the midland counties of England. About three miles from Ventnor there is a large inn on one side of the road and a wicket gate on the other. Here the coachman pulls up with decision. At first, knowing the habits and customs of coachmen, our travellers imagine the inn to be the reason of this peremptory halt; but the landlord quickly sets them right, and they learn that the wicket gate is the attraction. Passing through it, camera in hand, they pick their way down a winding path and then across a brawling torrent. From there the path runs down a thickly-wooded valley, the trees meeting overhead so as to hide the sky, and the stream gurgling among the bracken far beneath. This is the famous Shanklin Chine, and certainly a more beautiful or fairy-like scene could hardly be conceived. The Londoner did it justice, however, in the two plates which he expended over it—a proceeding very jealously watched by the custodian of the place, who derives his income largely from the sale of prints.

Leaving the Chine behind, the carriage rolled over a tolerably-level road a couple of miles in length, terminating in a steep hill, which was rather a pull for the tired horse. Up to this, as I have said, there were no signs of the sea, but on reaching the crest of the hill a wonderful view lay before the party. Almost directly beneath was the ocean, stretching right away in every direction to the horizon. Coming so unexpectedly I know of no view in the world which gives such an idea of an infinite expanse. Here and there one looks straight down on the deck of some steamer or sailing ship, ploughing across to St. Malo or tacking along to Southampton. They look like toy vessels—mere specks in the enormous stretch of water around them. It is needless to say that cameras were once more in requisition, and this magnificent seascape packed away in our plate-carriers.

When one leaves Ryde he fancies that he has seen the steepest town in the world, but his mind broadens when he comes to Ventnor. It is very much steeper, and gives the impression of being a little more than perpendicular. It is the fact of being built on the side of this hill that gives the place its great reputation as a resort for consumptives. No wind but the balmy south one can get near it. Still there are drawbacks, and when a consumptive falls out of his front door down the High-street and into the sea his language is just as virulent as that of any healthy man.

Commend me to the "Crab and Lobster" Hotel at Ventnor. Its situation is charming, its fare excellent, and its charges moderate; or, at least, moderate for the island, which is never at any time an economical spot. At one of the open windows which line the elegant coffee-room, and through which the summer breeze wafts the perfume of many a flower unknown in higher latitudes, there sat that day two pampered and enervated photographers who had solemnly packed away their cameras and delivered their whole minds up to the one idea of a comfortable dinner with a soothing pipe to follow. After all they had a right then to indulge in a little *dolce far niente*, since they had accumulated a finer variety of picturesque effects and interesting views than could have been taken in a week in a less-favoured locality.

It was necessary for the Doctor to be back in Southsea by nightfall, and the Londoner was also determined to be back in town by the evening train, so that after a climb over the curious little town the carriage was discarded and the train taken back to Ryde. Here the six o'clock boat was caught, and by seven the professional man was among his patients, and his friend within two hours was striding once more along the platform at Waterloo—a poorer man by some two pounds, but a richer one by the varied assortment of artistic pictures which he bore in his little deal box, as well as by the store of iodine and ozone which had renovated his lungs and oxidised the carbon of London.

In this little sketch I have simply attempted to give some idea of the pleasure and instruction which may be compressed into a single day by dint of a little energy and enterprise. A few such excursions during the summer months would, without being any great drag upon his purse, teach the Londoner the beauties of his own native land, and furnish him with a splendid series of pictures. If there be any one of my readers whose attention is drawn by this short article to the magnificent field for outdoor work presented by the Isle of Wight, then I have not written in vain. A. C. Doyle, M.B., C.M.

RECENT PATENTS.

PATENTS APPLIED FOR.

No. 6,442.—"Folding Strip Photographic Accessory." J. P. Graham.—*Dated April* 17, 1884.

No. 6,491.—"Menu or Programme or Photograph Holder." L. Mallock.—*Dated April* 18, 1884.

PATENT SEALED.

No. 5,062.—"Improvements in Perspectographs or Instruments for Reproducing Pictures, Plans, or Drawings." G. M. Cruikshank.—*Dated October* 24, 1883.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
April 29	Bolton Club	The Studio, Chancery-lane.
,, 30	Photographic Club	Anderton's Hotel, Fleet-street.
May 1	London and Provincial	Masons' Hall, Basinghall-street.
,, 1	South London	Society of Arts, John-st., Adelphi.
,, 1	Bolton	The Baths.
,, 1	Leeds	Philosophical Hall.
,, 1	Dundee	Lamb's Hotel, Reform-street.
,, 1	Coventry	Coventry Dispensary.
,, 1	Yorkshire College	College, Cookridge-street.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

At the technical meeting of this Society, held on the 22nd instant, Mr. W. Bedford occupied the chair.

Mr. W. F. Donkin showed two platinotype prints of the same subject, by Dr. Huggins, made upon linen. One of the prints was mounted in the ordinary way, and the other was immersed in glycerine and set between two glasses. The last-mentioned print had a very rich appearance in the shadows, resembling in this respect an albumen print.

Mr. W. E. Debenham supposed that mounting behind a glass with gelatine would give the same appearance.

Mr. A. Cowan showed a contrivance for carrying dry plates. The box was of cardboard, and opened along one edge. It slid into a lid or outer case—the open edge first. In the box itself was a book with leaves of a pure white paper. The plates were placed between the leaves of the book, and could be easily taken out and replaced in the order of their exposure. The box occupied less space than one with grooves, being only two inches in thickness.

Mr. T. Bolas suggested that it would be better to have rims to the leaves of the plate book.

Mr. Donkin had had a tin plate box, with grooves, which only measured two and a-half inches in thickness.

Mr. W. Ackland considered metal objectionable.

The Chairman said that the discussion suggested a question:—What is the best method of packing plates?

Mr. W. England thought that the use of paper mats was best. Some paper, however, made marks. He had found this particularly the case with white Bristol board, while with a greyish paper there were no marks except occasionally with large plates.

Mr. Lyddell Sawyer then read a paper criticising the exhibits at the recent lantern exhibition of the Society, in the course of which he contended that there was too much mutual congratulation, when sincere, outspoken criticism would be more beneficial.

Mr. Bolas said Dr. Mayer, of Carlsburgh, had what might be considered a representative collection of slides for the lantern, and suggested that he should be requested to send a selection for exhibition at a future meeting of the Society.

The discussion turned upon the production of warm tones in lantern slides.

Captain Abney said that Colonel Wortley and Mr. Cooper were among the first to achieve this upon bromide plates.

The colour of Mr. Wellington's exhibits being referred to,

Mr. Cowan said that for the warm colours Mr. Wellington had given very long exposure. He (Mr. Cowan) had given as much as 280 times the proper exposure, and brought out a good transparency by using bromide as a restrainer, sixteen grains to the ounce, in the ferrous-citro-oxalate developer.

Mr. Peek said that he had developed a plate with oxalate and found it under-exposed. He had afterwards treated it with warm water, and obtained a relief which did not appear to be under-exposed.

Mr. Cowan had tried Mr. Warnerke's method of washing away the gelatine, as in the carbon process. In one case he had exposed through the back of the glass, and after development had used water sufficiently hot to wash away the whole of the gelatine; but a powdery positive image was left upon the glass.

Captain Abney said that exposure through the glass would not answer with Warnerke's process. The development must be upon the surface that had been exposed.

Mr. Bolas inquired whether Mr. Peek had tried inking the plate which he had treated as described, and, if so, whether it was capable of yielding a good transfer.

Mr. Peek replied that he had, and that a good transfer did esult.

Mr. Bolas considered that in that case it should prove a valuable process.

The meeting was shortly afterwards adjourned.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society held on Thursday, the 17th instant, the chair was occupied by Mr. W. K. Burton.

The Chairman, in calling upon Mr. Debenham to deliver a lecture on lenses, said that the subject was one requiring great exactness, and the lecturer from the strict accuracy of his writings was particularly qualified to deal with it.

Mr. W. E. Debenham then delivered his lecture *On Lenses* [see page 263], illustrating his remarks by a large collection of lenses, by diagrams, and by photographs produced with some of the instruments under consideration. At the conclusion of the lecture,

The Chairman said that Mr. Debenham had kept clear both of the Scylla of inaccurate and slovenly statement and the Charybdis of those horrible-looking mathematical formulæ which were quite unintelligible to photographers generally. As a means of ascertaining the equivalent focus of a lens the following method was the one which he had found the most convenient:—From his window a row of electric lamps was visible. Of these he focussed two distant ones upon the ground glass of the camera. He then marked the points which they occupied, unscrewed the lenses from the mount, and in place of the diaphragm inserted a piece of card having a pinhole aperture. The camera was then racked until the images of the lamps occupied the same places that they had done when using the lens. The distance of the pinhole from the ground glass was the equivalent focus of the lens. Any bright distant lights would serve instead of electric lamps, but they must be distant. On the importance of flatness of field he quite agreed with Mr. Debenham. He had seen one of our leading opticians, when examining lenses, satisfy himself that the correction for central definition was perfect, without considering the requirements of photographers that that definition was required to be upon a flat surface. As to the diffusion-of-focus system applied to lenses: that was due to Mr. J. Traill Taylor, who some time previous to the advent of Mr. Dallmeyer's lens had read a paper upon the su ject before an Edinburgh society. With respect to the varieties of single lenses: he had compared two—one the wide-angle landscape lens, and the other a lens of the old type made by Mr. A. Ross. He had been surprised to find that with the old lens he could get a certain definition with a larger diaphragm than with the other, and by placing the diaphragm near the lens could cover as large a field. Finally: he would endorse Mr. Debenham's advice to use the central and flattest part of the field only—a narrow angle that is—whenever the subject permitted of it. He thought it would be generally admitted that the best focal length was two or three times the length of the picture.

Mr. J. T. Taylor, referring to the difficulty of getting flatness of field with a large aperture, showed by a diagram on the black board Professor Piazzi Smyth's method of overcoming this difficulty by means of an additional lens close to the plate. This lens had a flat surface next the plate, and a concave one in front of the same radius as the focus of the lens used in forming the image. The image was thus received upon its concave surface and transmitted to the flat surface of the plate behind. This arrangement was not to be considered as forming part of the lens itself, but was an addendum to it. He thought that the photographic lens of the future would in all probability be constructed on the principle of the orthoscopic or dialytic lens—that is, one having a concave posterior element like the lens which Petzval had for a time laid aside. Referring to American lenses Mr. Taylor said that several years ago Mr. Morrison, of New York, had constructed lenses giving similar results to the non-distorting wide-angle. He had also constructed rapid group and copying lenses, for which claims were made similar to those of the European "rapid" or Steinheil aplanatic class. These were corrected in a different manner from those just referred to; but doublets of Ross and Dallmeyer had the advantage of being more easily constructed and, therefore, cheaper. The general form of these lenses resembled some described by Sir J. F. W. Herschel in The British Journal of Photography in 1861, and it was interesting to know that among the various diagrams then published was also one similar to the system more recently adopted by Mr. Dallmeyer as the back of his patented portrait lens.

Mr. J. Cadett remarked that he had gone through a course of mathematical optics without it being of much benefit to him, and he adopted the advice of Mr. L. Warnerke, who was a good mathematician and had studied the subject—"put the lens on to a camera and take a photograph, then judge from the result." What was wanted was a practical work on the subject, giving reasons for the particular curves employed, the nature of the compromises that were made, and the effect of deviation in particular directions from the specified details. As Mr. Debenham had once said—"Optics is not a matter of opinion, but of mathematical proof."

Mr. A. L. Henderson said that he had worked with an additional lens hung on to the back of a portrait combination, and would like an explanation of the effect which that produced. He also inquired whether the contact surfaces of a lens might not with advantage be vitrified together instead of being cemented with Canada balsam.

Mr. Debenham had not investigated such an extraordinary case as the addition of a lens not centered with the other lenses. As to vitrification he could see no advantage in it, and the lenses would probably be deformed in the process.

Mr. J. Barker said that he had two lenses of the same focus but of different diameter. On using the same sized stop in each, the one of large diameter worked nearly twice as fast as the other. He found that by the addition of a spectacle lens to an ordinary instrument it would work very well, although with an altered focus. This allowed of the number of lenses required of different foci being reduced.

Mr. A. Cowan's experience did not coincide with Mr. Barker's as to the difference of speed amongst lenses of equal aperture and foci. He had for experiment taken photographs with lenses of the most opposite type, but found that when stopped down in the same ratio no difference could be detected in their rapidity.

Mr. A. Mackie said that Mr. Debenham's able and lucid lecture would have shown how important it was to know something about the instruments we use. For ascertaining the equivalent focus of a lens he always employed the method described by the lecturer, and found it simple and satisfactory.

Mr. W. Coles inquired whether, in estimating the rapidity of lenses, account had been taken of the difference between using them at different distances from the subject.

Mr. A. Haddon said that the Society had amongst its members some who had studied the subject of photographic lenses. Would it not be possible to form a committee of lens grinders? Many made their own plates, and some certainly would like to make their own lenses.

Mr. Debenham, replying to the Chairman, said that he had used the Grubb single lens in portraiture with an opening No. 12, answering to $\frac{f}{4}$. As to the slowness of the smaller lens, mentioned by Mr. Barker, that might, to some extent, be accounted for with respect to marginal rays if the lenses were set far apart, but not for central rays. With a rather large stop, for all rays not central or nearly so, the amount of light which might otherwise pass through would be reduced by the lens appearing cut off at the sides. If there were thought to be any more difference in speed than could thus be accounted for, he would like to examine the two lenses referred to. As to the difference of exposure required according to distance, there were two elements in that. One which could not be calculated was the veiling of the shadows by haze, equivalent to what was called auxiliary exposure. With objects of the same class within ordinary limits, the difference of speed due to the lens being used at a longer focus for near objects was small and would not be likely to mislead the operator. For copying or other work, when exceptional proportions had to be obtained the distance would have to be taken into account.

On the motion of the Chairman, seconded by Mr. Haddon, the usual vote of thanks was accorded to Mr. Debenham. The next lecture will be on *The Science of Polarised Light*, by Mr. C. Darker, and will be given on the 8th of May.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

On Wednesday, the 2nd instant, this Society held its monthly meeting at 181, Aldersgate-street. The minutes of the previous meeting were read and confirmed. Mr. J. R. Nisbett and Mr. J. F. Lattimer were proposed and elected members of the Association.

Attention was called to a paragraph in the *Photographic News*, of the 14th ult., suggesting that paid canvassers should be engaged. The matter received the consideration of the Board, but no action was taken.

The other business having been dealt with, the meeting was adjourned until May 7th, at eight o'clock.

PHOTOGRAPHIC SOCIETY OF IRELAND.

The usual monthly meeting of this Society was held on Friday last, the 18th instant, in the Royal College of Science, Stephen's Green,—Mr. Thomas Mayne in the chair.

The minutes of the previous meeting having been read and confirmed, Dr. Robert Brown and Mr. James Robinson were elected members.

The Chairman then called on Mr. C. W. Watson for a communication, entitled *Retrospect*. In his remarks,

Mr. Watson gave a short *résumé* of photography from its earliest stages, tracing out the various improvements that had from time to time taken place up to the present period. Mr. Watson's paper was most interesting, and elicited a well-sustained debate.

Mr. J. V. Robinson gave some valuable information on the various methods of enamelling. In his hands the process of coating a previously chemically-cleaned sheet of glass with collodion, then applying a coat of best negative varnish, over that a thin layer of gelatine, and lastly pressing the print on the same and squeegeeing the air-bubbles out, had worked the best. The enamel proved tougher, the surface of the collodion apparently not being so easily damaged as when the application of varnish was omitted.

Dr. Scott exhibited and explained a very simple and ingenious form of actinometer which he had made. He had taken two pieces of sensitised albumenised paper and exposed one to the action of light for thirty seconds and the other for one minute. The colours thus procured were then accurately imitated on a piece of glass. The *modus operandi* was as follows:—When an exposure is to be made in the camera take out a small piece of paper and expose it until one or other of the colours has been obtained, noting the time necessary to secure the change. The paper thus acted as a standard. He (Dr. Scott) had tried this on several occasions and had never found it to fail.

Mr. J. V. Robinson exhibited a whole-plate camera made by himself, also a new camera-stand, the chief merit of which was the method of shortening the legs, the bottom or single lath sliding between the two upper laths and being clamped by a band of brass.

Mr. Watson also exhibited a new $7\frac{1}{2} \times 5$ camera. The various movements, as also the method of extending the base-boards, attracted a considerable amount of interest.

The next and last meeting for the present session will be held on Friday, May 9th.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

The twelfth general meeting of the session was held in the Religious Institution Rooms on Thursday, the 10th instant,—Councillor Robertson, President, in the chair.

The minutes of the previous meeting were read and confirmed.

Mr. Wm. Lang, Jun., then read an interesting paper on *Poitevin's Photo-Reliefs* [*ante* page 249] and showed a number of very fine specimens of work, which were much admired and freely criticised.

The Chairman in a few words thanked Mr. Lang for the great trouble he had been at in getting up the paper and illustrations.

The next business was the nomination of office-bearers for the ensuing session to be elected at the next meeting.

Mr. McGhie exhibited a number of magic lantern and window transparencies printed by contact on Cowan's gelatino-chloride dry plates. He (Mr. McGhie) said the process was exceedingly simple. The specimens before the meeting were the first experiments he had made with the plates, and they were very satisfactory in every respect. In his experience he had found magnesium to be the most satisfactory light for printing with. One and a-half inch of ribbon burnt seven inches from the frame was sufficient exposure for an ordinary negative. He also showed a new combined shutter and sky-shade by Guerry. The shutter had two flaps, one of which covered the sky for a certain part of the exposure, which time is regulated by a little lever.

The meeting terminated with votes of thanks to Mr. McGhie and the Chairman.

NOTTS. PHOTOGRAPHIC ASSOCIATION.

A meeting, consisting of a number of gentlemen interested in the art of photography, was convened on Friday evening last, the 18th instant, at the Corn Exchange, Nottingham. Amongst others present we noticed the following:—Messrs. Bourne, Geo. Shepperley, A. Cox, Byron, Carnell, Sands, Dodds, Donahay, Inger, Taylor, &c. The meeting was well attended by amateur and professional photographers, and the interest exhibited proved beyond doubt the willingness to co-operate in this direction to make the Association a success. Mr. George Shepperley occupied the chair, and at the close of the meeting over thirty members were enrolled.

The Chairman commenced his remarks by observing that some twenty-three or twenty-four years had been allowed to elapse since Nottingham possessed any organisation for the encouragement and support of photographic art; and, as almost all towns in the kingdom of any magnitude furnished opportunities to stimulate and foster experiment and research in this direction, it had long been a subject of general surprise that they should lack such advantages. He pointed out how in the leading London societies members of the profession with well-known reputations for skill attended regularly the monthly meetings and demonstrated by illustration and experiment the various new processes and apparatus. He alluded to the opportunities offered to art-students by the existence of the Art Museum School of Art and instruction at the Town University, and thought it anomalous that with these encouragements no such photographic association should have its existence in their midst. No occupation with which he was familiar was more pleasurable or fascinating than the pursuit of this subject when once preliminary details had been mastered. He hoped the large and influential gathering which he had the pleasure of addressing, representing as it did the principal professional and amateur talent of the town, was an augury of the probable permanent character of the association which they were then desirous of establishing. He called upon the gentlemen present to make themselves thorough and practical in their attendance, and he had then no doubt whatever to the ultimate successful career of the Association. He (the Chairman) then called on Mr. Sands to address the meeting.

Mr. Cox followed with a promise of his co-operation in the undertaking.

Mr. Bourne, in the course of some remarks, promised the meeting he would submit the large collection of his own works to the members, and give them his personal support and assistance.

Other gentlemen spoke, after which the following officers were appointed to act:—*President:* Mr. G. Shepperley.—*Vice-President:* Mr. A Cox.—*Committee:* Messrs. Townsend, Torquet, Inger, Byron, Dodd, Collins, Bourne, Pendry, Stanley, and Spray.—*Treasurer:* Mr. H. Sands.—*Hon. Secretary:* Mr. W. Donahay, Hyson Green.

Mr. Wilson, supported by Mr. T. B. Dodd, Hon. Secretary, made a communication from the Naturalists' Society of their willingness to accept the Association as a section, meeting at the social guild and enjoying all their privileges, the Association having its own officers to transact business.

Mr. Byron proposed that the kind offer through the Hon. Secretary be allowed to stand over, and the meeting be adjourned till Friday, the 25th inst., at 8 p.m. This was seconded by Mr. Carnell, and carried.

A vote of thanks was then passed to the Naturalists' Society for their kind offer; and after a vote of thanks to the Chairman the meeting was brought to a close.

ST. HELENS ASSOCIATION FOR THE PURSUIT OF SCIENCE, LITERATURE, AND ART.

Photographic Section.

A meeting of this section was held on Wednesday, the 26th ult.,—Mr. Heather presiding.

The Chairman showed a transparency printed by exposing forty-five minutes to his ruby lamp. It was under-exposed, but enough to account for fog.

Mr. Brook exhibited an enlargement on Hutinet's gelatino-bromide paper, developed according to instructions and with the solutions recommended by M. Hutinet. This was admired very much.

Some members stated that they had a difficulty in getting the high lights clear.

Mr. Taylor thought this was due to poor solutions, as he got them quite clear when he used solutions made up from Hutinet's formula.

Mr. Sherlock showed a number of prints of ferns in natural colour.

The Chairman and Mr. J. J. Houghton exhibited a selection of lantern slides they had made.

A large number of prints by members were passed round for inspection.

Discussions on Cowan's plates, waxing photographs, photographing interiors, lantern slides, emulsions, mounting photographs, and photographing in natural colours closed the proceedings.

Correspondence.

AMATEUR PHOTOGRAPHIC SOCIETY OF MONTE VIDEO.

To the Editors.

Gentlemen,—I have great pleasure in announcing the formation of an amateur photographic society in this city—I believe the first of its class in South America.

Apart from the idea of stimulating the love of the art of photography, the Society intends to import apparatus, &c., to be sold to the members at a small profit, which proceeds will be placed to the fund destined to cover the expense of building a gallery fully fitted, and the acquirement of instruments, too costly for individual pockets, exclusively for the use of the members.

Please accept the most hearty thanks from the Society for the interest you so earnestly take in the progress of the art, and please, through the medium of your valued Journal, congratulate our fellow societies in the name of the Amateur Photographic Society of Monte Video, wishing them all a long life and a merry one.

The following are the officers of the Society:—*President:* Don Francisco Zas.—*Vice-President:* Don Federico Vidiella.—*Treasurer:* Don William Lafone.—*Accountant:* Don Henry Elliott.—*Secretary:* Don Horace Ellis. (All honorary.)—I am, yours, &c., Horace Ellis.

Monte Video, March 25, 1884.

A RECLAMATION.

To the Editors.

Gentlemen,—In your review last week of *A Popular Treatise of Modern Photography*, exception is taken to a statement on the title-page, and attention is called to some inaccuracies, presumably arising from imperfect revision of the proof sheets.

In justice to myself I desire it to be clearly understood that my connection with the work extends only as far as page 53. I had nothing to do either with the contents of the title-page or with selecting the printed matter after the above-named page.—I am, yours, &c.,

George Dawson, M.A., Ph.D.

Notes and Queries.

"Will you please give me a good recipe for blackening the inside of the dark slide, both for wood parts and metal?—W. A. K."——In reply: Mix with ordinary negative varnish or lacquer a sufficient quantity of lamp black or vegetable black to impart a dead black colour, and apply it by means of a brush. This answers for both wood and metal; but for the latter heat ought to be applied in order to make the varnish adhere properly.

J. G. inquires:—"1. To whom must I apply for a license to keep a still, and what will it cost?—2. Are all portrait lenses alike in definition that have the same aperture and equivalent focus if made by two different makers—one being sold at £6 6s., the other at £15 15s.?"——In reply: 1. Apply to the Excise. We do not know the cost.—2. Certainly not; but if formed of glass free from colour they will work with equal rapidity. The definition will depend upon the curves selected and the perfection of the workmanship.

Mr. F. Dugon, in the course of a rejoinder to Mr. Berryman, says that he is willing to take up the gauntlet thrown down by that gentleman; but he adds:—"There are several difficulties to be overcome. The first is as to finding a referee. Another difficulty is this: processes are published which in the hands of experts are good, but in the hands of others are total failures. Your correspondent will oblige by suggesting how these difficulties are to be surmounted."

Mr. A. L. Henderson, writing *apropos* of the enamel topic now being mentioned in our *Notes and Queries*, says:—"I hope J. Berryman is not one of the many who, when they fail, when trying any particular process or formula, believe that something important has been kept back and 'misleading remarks made,' especially as far as my process is concerned. If J. Berryman will give full details about the misleadings of others he will confer a favour—at least on myself."

B. F., writing on the subject of photo-enamels, expresses a hope that Mr. Berryman will give a practical article on the subject. Referring to Mr. Dugon's success, as alleged by himself, he thinks it is scarcely ingenuous in him, a relative of and assistant to a well-known skilful photo-enameller, to allow it to be inferred that such knowledge as he may possess is the result of having "witnessed a free demonstration of an enamel process," and of his having succeeded fairly well in his very first attempt—presumably in consequence of such demonstration.——In reply: Granting the high vantage ground occupied by Mr. F. Dugon in this connection, still we do not see anything at all improbable in anyone being able to produce these charming little photographs, with more or less success, after reading the various articles which have appeared on the subject and then witnessing the process of burning-in the picture.

In a communication, dated April 19th, "S. T. W." says:—"In your issue for yesterday you give a formula for a rapid emulsion, contributed by 'Ajax.' As I am but a beginner in emulsion-making I am rather puzzled to know whether 'Ajax' means that the emulsion is to be melted in the solution of glycerine, alcohol, and thymol prior to coating, or whether the cake of emulsion is to be taken out and melted with the addition of water. If the latter, what quantity of water must be used? If you would favour me with this information in your column of *Notes and Queries* you will very greatly oblige."——In reply: We imagine the cake of emulsion is simply to be immersed, not melted, in the glycerine-alcohol solution. Perhaps "Ajax" will supply an answer.

"SEGELOCUM" (Lincoln) writes:—"A new album of views of this city, similar to the albums published by Rock Brothers, has just been brought out by a local stationer, who has, without my permission, copied several of my newest and best photographs. The pictures are cabinet size—litho. copies *traced* direct from the photographs, and copied as nearly as possible. I wish to know if I have any possible chance of redress, or if I can protect myself in any way. The photographs were not copyright, but I am informed that I could stop any further production of the views. Is it *imperative* that a photograph shall be registered *prior* to the sale of the same?"——In reply: There is, in our opinion, no chance of our correspondent obtaining any redress for what has been done. We base this opinion on the second clause of the Fine Art Copyright Act of July, 1862, in which it is stated that "Nothing herein contained shall prejudice the right of any person to copy or use any work in which there shall be no copyright." The inference from this is, we think, that if a photographer do not protect himself by obtaining copyright in his productions any person is at perfect liberty to copy them. Such protection must be secured previous to the issuing of a single copy; that is imperative. But whether obtaining copyright for the pictures, now that there has been acknowledged copying of them, will act retrospectively we are not only by no means certain, but have a strong conviction that it will *not* do so. And, not only so, but registration *now* will only, at best, act prospectively in the sense of preventing further copies being made from such picture without having power to stop the issue of those made previous to registration. No action can be brought on account of pictures issued previously. In this respect the law of copyright as regards books is quite different from that relating to photographs. In respect to books: registration need not be made until the morning of the day on which an action for infringement or piracy is to be tried; but this registration, although effected at the eleventh hour, acts retrospectively. While such is our opinion with regard to this imperfectly-understood question, we would be glad to be favoured with that of others, especially of any who have what we may term an "experimental acquaintance" with the subject.

Exchange Column.

☞ Several "Exchanges" are crowded out till our next issue.

S. WELLS (Goole).—Your notice is virtually an advertisement, and cannot be inserted in this column.

I will exchange Shew's gem camera, with four lenses, for outdoor camera or large view lens.—Address, D., 2, York-street, Covent-garden, London.

I will exchange a duplicate set of THE BRITISH JOURNAL OF PHOTOGRAPHY for the last four years for years previous to 1874 of either JOURNAL or *News*, or any one year for the *News* of 1880; also a large quantity of duplicate numbers to exchange for others; want to make up set.—Address, W. E. DEBENHAM, Massingham House, Haverstock-hill, London.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPHS REGISTERED.—

William Hudson, 62, High-street, Bordesley, Birmingham.—*Four Photographs of the Misses Ormond.*

Edmund Eccles, Broad-street, Bury, Lancashire.—*Three Photographs of the Rev. E. J. Smith, of Bury.*

William Watts, High-street, Staines.—*Photograph of Train Containing the Remains of the Duke of Albany.*

REV. FRANCIS JOHNSTON.—Received. In our next.

R. A. and two other correspondents this week have not enclosed their names and addresses; hence, according to our rule, their communications remain unanswered.

PORTRAIT LENS.—For the width of studio mentioned four feet opaque at each end will answer very well indeed. If the studio were wider five or six feet would possibly be better.

R. CRONIN.—Far too much pyrogallic acid has been employed in the development of the negatives. One-third the quantity in future will be quite sufficient. We shall at all times be happy to render you assistance.

A. B.—The change that takes place when crystals of sulphite of soda are exposed for a long time to the action of the atmosphere is that the sulphite is converted into the sulphate. No change is produced by light.

FREDK. W. MUNCEY AND S. A.—If the negatives treated with mercury are too thin they may be improved by treating them with a solution of Schlippe's salt; but if they are already too dense there is no satisfactory method of reducing them.

WM. LANG, JUN.—We are unaware if that particular modification of the collotype process is being practised, but we believe it is not. Those who employ collotype and kindred processes commercially are very reticent as to any information on the point.

BRADFORD.—You certainly should not condemn the paper because you fail to obtain rich purple tones upon it, if the negative you forward for criticism be a fair sample of those you are printing from. Such negatives will certainly not yield brilliant prints on any brand of paper.

E. MEARS.—The design for the shutter will do very well; but for very rapid exposures a smaller opening would, perhaps, be better. The sample of paper enclosed does not appear to be the "true" kind, but we have little doubt that it will answer the purpose quite as well.

PHOTO.—The spots appear to be due to very minute particles of some pernicious material getting into contact with them. If the prints had been mounted on cards printed in bronze powder we should be inclined to attribute them to that. Possibly particles of lime came in contact with them while they were drying or after they were mounted.

A TYRO.—The larger lens will do quite well for the small work, provided the camera will expand sufficiently long for focussing. Few half-plate cameras, of ordinary construction, will extend to sufficient length for a 10 × 8 inch lens. If, however, yours will do so there is no objection to its employment.

J. BATLEY.—For highly-finished carbon pictures on opal glass the kind of glass known as "dead smoothed pot opal" is the best. Egg-shell surface should not be employed for such pictures, notwithstanding it may be somewhat lower in price. The difference in the cost of the two kinds is but trifling as compared with the more artistic appearance obtained on the dead smooth surface.

Q. E. D.—1. Any ordinary water-colours are suitable for working up carbon enlargements on matt opal glass. You will, of course, have to match the colour to that of the picture, as there are different colours in "carbon" enlargements.—2. Opal pictures by the carbon process are certainly best unvarnished.—3. The colour may be obtained from Mr. W. E. Debenham, 158, Regent-street, W.

M. E. D.—The polished surface of the portion of print enclosed appears to have been produced by heavily rolling on a highly-polished plate. A highly-glazed surface may be obtained on unmounted photographs by squeegeeing them down on a plate of glass immediately on being taken from the washing water, and allowing them to dry upon the glass. When the prints are mounted the glazed surface will, of course, be destroyed.

H. J. G.—You certainly can recover the silver by the method you suggest, but what advantage will be gained? When you have the residue as a chloride it is much easier to deal with in recovering the metal than if it were in the form of sulphide. Where, then, is the advantage of dissolving the chloride residues in the hyposulphite of soda, and then precipitating them as sulphide, from which the metal is not so easily recovered?

ZENO.—Zinc vessels will certainly not do for containing the hyposulphite of soda in which to fix prints. It would be much better to procure earthenware dishes than attempt to employ any kind of metal. If your prints are small, and cost is an object with you, common brown earthenware baking-dishes may be employed. If the sizes you work are large, then you had better construct a wooden tray and coat it with paraffine wax. This will have no injurious action on pictures.

W. H. SIMS.—The common copperas of the oil-shops may be used for making the iron-developing solution for wet-plate work, provided it be tolerably pure. Many operators we know prefer it to the ordinary protosulphate of the chemist, as they find that the small proportion of persulphate from the oxidation of the crystals conduces to intensity and greater clearness of the shadows. The objection to the commoner article is that there is always a risk of its being contaminated with other salts. Being sold by the oilmen at such a very small price, little or no care is taken to preserve it from contamination.

RECEIVED.—*Practical Guide to Photography.* Marion and Co. In our next.

PHOTOGRAPHIC CLUB.—At the forthcoming meeting of this Club, at Anderton's Hotel, Fleet-street, on Wednesday next, the 30th inst., the subject for discussion will be—*On the Preparation of Lantern Slides.* This being a lantern night, members and visitors are invited to bring slides.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.—At the next meeting of this Society, to be held at the Society of Arts, John-street, Adelphi, on Thursday next, May 1st, at eight o'clock, Mr. Norman Macbeth, R.S.A., has kindly promised some *Notes on the Composition of a Picture*, when it is hoped that not only will the members attend to welcome this eminent artist, but also make use of their privilege to introduce a friend.——In consequence of the lamented decease of the President, the dinner announced for the 10th proximo has been definitely abandoned; but the subscription list remains open, the form the memorial will take remaining for the decision of the committee.

CANADIAN PHOTOGRAPHS.—We have received a number of interesting pictures of Canadian scenery and life by Messrs. Barraud Brothers, of Barrie, Ontario. As examples of photography they show that our Canadian brethren are fully alive to what constitutes good photographic work—as, indeed, we were prepared, in this instance, to expect, since we know that Mr. H. T. Barraud, on a recent visit to this country, laid himself out specially to discover all that was to be learnt in connection with photography. As specimens of Canadian scenery the pictures before us lead us to feel that we should be glad of the chance of being "out and about" with the camera in the same region.

LONDON GAZETTE, *Tuesday, April* 22, 1884.

ADJUDICATION.

ROBERT BANKS, 32, Victoria-street, and Rembrandt House, Alexandra-road, Manchester, and 7, Talbot-square, and South Pier, Blackpool, photographer. First meeting, April 29, at 11.30 a.m. at the Official Receiver's, Manchester.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1252. Vol. XXXI.—MAY 2, 1884.

MIXING EMULSIONS.

The question raised in Mr. W. K. Burton's article upon this subject is one of the very highest importance to all who manufacture emulsions, and one which, at the hands of amateur makers at least, has never yet received any great amount of attention. On this account alone, therefore, Mr. Burton's details of his experiments will be of value as forming a starting-point from which other experimentalists may work; and we have little doubt but that before very long this line of inquiry will have been subjected to a considerable amount of research.

With the results of Mr. Burton's experiments we entirely agree; but with some of his deductions therefrom we must, to a certain extent, disagree. Thus, so far as the result of a mixture of two emulsions is concerned, we have invariably found that the mixture partakes more of the character of the more rapid than of the slower of the two, even when the proportion of the former is comparatively small. The physical qualities of the mixture, however, will be found to vary very considerably with circumstances; but, as a rule, we have found that in mixing a rapid, thin emulsion with a slow and dense one in anything like equal proportions, the good qualities of both are retained in the mixture—that is to say, that there is no great falling off from the sensitiveness of the one or the vigour of the other in the combination.

This may at first sight appear a somewhat anomalous state of affairs; for, as we well know, a certain weight of ice melted in a given weight of water at a known temperature will produce a temperature which may be calculated with unvarying exactitude. A mean is, in fact, struck between the two. In the case of the mixture of two emulsions of different sensitiveness, however, it will be found upon second thoughts that the conditions are altogether different. If the sensitiveness of the molecules of silver bromide were an interchangeable quality which enabled it to average itself throughout the whole mass—if, that is to say, a molecule of highly-sensitive bromide coming in contact with a molecule that was but feebly so, could impart some of its excess of that quality to its slower brother, and so form two molecules of equal and moderate sensitiveness—then we should have the conditions present in the case of a mixture of ice and water or of water at two different temperatures. But we have yet to establish the fact that such a power exists in sensitive bromide of silver; indeed, it is evident from Mr. Burton's and other experiments that it does not exist.

If, on the other hand, we assume—as Mr. Burton seems inclined to do—that the insensitive bromide exists in the mixture as so much inert matter, we should have as a result of such mixture an emulsion possessing all the sensitiveness of the more rapid of its two constituents, but giving less density of image in consequence of the non-reduction of the slower molecules. But experiment does not prove this to be the case; for, as has been stated, the sensitiveness under these circumstances is slightly lowered, while the loss in density is so small in proportion to the attenuation of the layer of sensitive bromide that it is evident there is a screw loose somewhere in that theory.

Our own view may be briefly stated, namely, that there is no *real* loss of sensitiveness, and that the slow bromide is *not* present as inert matter. With regard to the first: the apparent falling off in the rapidity of the mixed emulsion is due rather to the decreased density of the image, visible more distinctly in the delicate gradations which are usually taken as the test of the degree of action. A similar effect is produced by merely diluting an emulsion (either of gelatine or collodion), when the thinner films will give images which are apparently less exposed than the others; but it is scarcely reasonable to imagine that the mere addition of water to a gelatine emulsion, or of ether or alcohol to a collodion emulsion, can lower the sensitiveness.

Turning to the question of the inertness or otherwise of the slow bromide: we may refer briefly to Captain Abney's experiments with double films made some years ago. That gentleman found that if a plate were coated with an extremely rapid (but thin) film of emulsion, then with an isolating layer of albumen, and, *after exposure*, was covered with a film of *slow* and *dense* emulsion (collodion being used in both cases), the image produced on developing the compound film exhibited the qualities of the latter emulsion as regards density, though the exposure was only such as sufficed for the more rapid film. But, most curiously, upon separating the two films of collodion each caused an image partaking of the physical characteristics of its particular emulsion—the one being thin, the other dense—and this in spite of the fact that the latter had *received no exposure to light*, but had had the reducing action transmitted to it second-hand.

Now, it is pretty evident, if such an action proceed in the case of two separate films, that it will proceed also in an emulsion or film in which molecules of exposed and unexposed silver bromide (or, what amounts to the same thing, molecules of widely-different sensitiveness) exist in far more intimate contact. In other words, that the impact of light which suffices to impress the more sensitive molecules may leave the less sensitive particles intact; but that the molecular disturbance set up by the developer in the sensitive molecules suffices to transmit the reducing action to the surrounding insensitive ones, which thus add their share to the general density of the impression.

It is, of course, not only possible, but probable, that the withdrawal of developing force which the reduction of the unimpressed molecules entails may cause a practical decrease in the sensitiveness of the impressed ones. Be this as it may, we think it is certain that even the most insensitive or actually-unimpressed bromide takes part in the formation of the image; and the theory or hypothesis we have sketched goes far to explain the discrepancies between theory and practice alluded to by Mr. Burton.

VIEWING LANTERN TRANSPARENCIES WITHOUT A LANTERN.

It is matter for regret that one cannot employ binocular vision in the examination of a transparency, such as a lantern slide, under circumstances involving a high degree of magnifying. Could this be effected, a very pleasant table instrument might result with which one could while away many an hour in looking at these attractive pictures, which would then be seen under conditions more favourable than, and with apparent dimensions quite as great, as when they are projected on a large screen for the benefit of the multitude, and when no time is afforded for studying any one or more special subjects in detail.

According to the optical conditions given by Mr. Robert H. Bow, C.E., when, twenty-one years ago, he submitted to the Edinburgh Photographic Society his table stand with lens and holders for use in the examination of transparencies, the lens, which ought to be of meniscus form, should have a focus not greatly exceeding the diameter of the picture that is to be examined, which would give a focus of about three and a-half inches for a lantern picture of the usual dimensions of three and a-quarter inches. The diameter of the lens employed by Mr. Bow was one and a-half inch, and a plate of ground glass was inserted at a distance behind the picture sufficient to ensure its being so far beyond the focus as to prevent the texture of the granulated surface from being seen.

But this instrument, elegant and useful as it might be made, unfortunately recognises the examination of the picture by one eye only. To render it applicable for both eyes Mr. Rowsell, the inventor of the graphoscope, introduced an instrument under the designation of the "photoscope," if we recollect aright, by which both eyes could be employed. It consisted of a wide tube having a large lens at one end, and at the other a receptacle for the pictures, these being erected upon a stand suitable for placing upon a table. This was imitated under various names both at home and abroad, one American *pseudo*-inventor paying it the compliment of applying for a patent for the "invention" in that country.

But all these tubular large-lens instruments are ineffective as contrasted with Bow's arrangement, on account of the feeble extent to which the pictures are enlarged. With the latter one forgets that he is looking at a small picture, because of its subtending such a large visual angle that the eye roams over its surface as if Nature herself were being viewed. One likes, however, to have the use of both eyes, and this cannot be done with the short-focus lens. With the tubular large-lens system both eyes, it is true, can be employed; but the amplification is so trifling as to fail in evoking feelings akin to those elicited by the other plan.

Desirous of combining in one instrument the advantages of both systems, we have constructed a piece of table apparatus which shows a lantern transparency under all the conditions for successful examination that can be dictated.

Having determined upon the adoption of four inches as the focus possessing the greatest general utility, we endeavoured to effect the intended purpose by combining together large lenses of a diameter not less than the intended focus, so as to give an image free from colour and able also to yield the requisite amount of displacement to ensure parallelism of the beams when entering each eye respectively. Eventually this end was attained by a combination of three lenses of four and a-half inches diameter; but as two of these were achromatic, one being uncorrected for colour, the great expense of such an optical arrangement for popular purposes may readily be conceived.

Reasoning upon the best methods by which the same effects could be secured by a smaller expenditure of optical means, and tracing by a diagram the path taken by the ray from the picture to the eye, it was easy to perceive that the conditions of displacement lay in a direction opposite to that required for the examination of stereoscopic pictures. Hence, by entirely reversing the positions of the prisms in a stereoscope, so that their thin edges were turned to the outside instead of the inside, the condition as regards displacement was satisfied, but the requirements of amplification were far from being so met in a corresponding degree.

We next obtained two achromatic lenses of four inches focus, and by mounting them so that the axes of the eyes should be outside of those of the lenses to a material extent, we obtained both displacement and magnifying power. But now another difficulty intervened. When the separation of the lenses was such as to cause the coalescence upon the retinæ of the single image thus transmitted by the pair of eyepieces the whole of the picture was not equally sharp. When, on the other hand, the lenses were so arranged as to give individual sharpness, the retinal coalescence was imperfect; besides, owing to the necessarily-small diameter of an achromatic lens of four inches focus, and the necessity for having the axes of the eyes very near to the margins of the lenses, the whole of the picture could not be properly seen.

To secure greater dimensions in the eyepiece we next employed two pairs of achromatics of plano-convex form, each being eight inches in focus. But still it was found necessary to separate these systems so far apart as to cause the eyes to look through a point much too near to their margins. Eventually, and as the result of many trials in order to secure the best effects, we have adopted eyepieces composed each of a plano-convex achromatic of eight inches focus, combined with a lenticular prism also of eight inches focus. This prism is one of the class so universally adopted as eyepieces for the well-known prismatic stereoscopes, and it is no small advantage in connection with them that they can be purchased at an exceedingly low price.

The manner in which these eyepieces are mounted is as follows:—The achromatic lenses—which, like the prisms, are of a class that can be purchased very cheaply, and are one inch and three-quarters in diameter—are mounted so that their centres are separated two and a-quarter inches, or a rather less distance apart than the width of the eyes, the point to be aimed at being the making of the axes of the eyes to fall a little to the outside of those of the lenses. The flat side of this lens is next to the eye. Now, immediately outside of it is placed the prism, but, as already hinted, it is made to take a position quite the opposite to that assumed in a stereoscope; for in an eyepiece of this description the thin edge must be to the outside instead of being inside, as in the other case mentioned. The body of the instrument is four inches in length, and at the end opposite to that in which the eyepieces are inserted is a groove capable of receiving a lantern slide-adapter of the class on which an improvement revolutionary in its scope was so cleverly effected by Mr. Alexander Cowan a few weeks ago, and for particulars of which we refer the reader to page 150, in our issue for March 7th last.

The arrangement above mentioned—namely, the combination eyepiece and the adapter—forms a system so perfect for employment in the examination of lantern transparencies as to induce us te believe that this mode of viewing them is greatly to be preferred to that of projection on a screen; although the fact that only one person can examine them at a time is necessarily a drawback to the enjoyment to be derived from such inspection.

Immediately outside of the aperture through which the light is admitted to the picture a plate of carefully-selected flashed opal glass is inserted. At first we experienced a little difficulty in obtaining opal glass of the requisite purity of colour, and in the interim provided a highly-satisfactory substitute in the form of an emulsion composed of clarified gelatine and oxide of zinc spread upon glass. This forms a fine, homogeneous backing to the picture, permitting the most delicate details to be plainly perceived. Either of these two backings is to be preferred to ground glass, no matter how smooth it may be, and even though it be so far removed from the picture as to be quite out of focus. If preferred, a plate of glass having bands of transparent colour painted across it may be inserted behind the backing glass; and we have secured some pleasing effects by placing thin and partly coloured gelatine films behind, mounted so as to give a warm or cold tone to the picture by the mere rotation of a roller in the manner of a window blind. We can also impart such effects as a natural colour to the sky while the foreground is green.

From the hints here given we hope that such readers as desire to utilise their lantern transparencies in an exceedingly pleasing manner, and at the same time provide a useful and pretty ornament for their parlour table, will, from a perusal of the foregoing description, be enabled to do so without any difficulty. We may state that the angular size to which the transparency is magnified assimilates to that apparent on a large screen upon which a picture is projected in the usual way by means of a lantern.

PURPLE TONES AND READY-SENSITISED PAPER.

It is well-known to every practical printer that the tone of the finished print is in a great measure dependent upon the character of the negative from which it is produced. This remark is not confined to silver printing alone, as it applies equally well, though, perhaps, in a minor degree, to all other processes of photographic printing.

Even in the carbon process it might well be supposed that, as the colouring matter is an actual pigment, all prints made upon any particular sample of paper must of necessity be alike, whatever the character of the negative employed. Such, however, is not the case; for, in practice, it is found that when two prints are made upon a given sample of paper—the one from a strong and vigorous negative, clear in the shadows, and the other from a feeble one, with the shadows somewhat veiled—these two prints will be so different in tone that it is difficult to conceive they were printed on the same kind of tissue. Now, although, as we have just said, the effect exercised by the character of the negative in influencing the tone in the resulting print is well understood by practical printers, the fact does not appear to be so well known to many amateurs, who, therefore, when they are unable to obtain the tones they desire, are inclined to condemn the paper, while in point of fact it is the negative itself which is in fault.

We have had palpable proof of this from the large number of letters we have received during the past few months—and are still receiving—from correspondents complaining of the difficulty, or the impossibility, of obtaining anything beyond reddish-brown tones on the ready-sensitised paper of commerce. It must not be assumed that we are for a moment defending many samples of this article now in the market; for we have experimented with some which it was quite impossible to tone beyond the red-brown stage without obtaining mealiness, however strong the negative might be. With some samples of ready-sensitised paper—and this is one of the complaints frequently made by the tyro—a purple tint is easily obtained in the toning bath if the negative be a strong one; but it entirely disappears in the fixing, leaving the print of a dirty brown colour, often very woolly in texture, and far less purple in tone than if it had been removed from the bath at an earlier stage.

Since the idea has gained currency that purple tones in all probability will prove more permanent than brown there appears to be a greater desire to obtain them, and this it is quite impossible to do on many of the ready-sensitised papers now in the market, notwithstanding that the negatives are of a suitable character to yield such tones on ordinary paper. This we have proved ourselves by procuring, and printing from, some collodion negatives of the old school, taken some twenty years or so ago, when clear shadows and very intense high lights were the order of the day. Although the prints, on the papers tried, bronzed strongly in the shadows, still it was quite impossible with most of the samples to reach a deep rich purple tone, which remained unchanged when the print was fixed, and, at the same time, be free from mealiness. Whereas, using the same negatives, with paper sensitised by ourselves, on a plain sixty-grain solution of nitrate of silver, no difficulty was experienced in obtaining any desired tone; indeed, with the lime toning bath a cold black was reached without any indication of mealiness whatever.

It may be well to mention, however, that some of the samples of our own sensitising toned much slower than others; and those which toned the slowest, as might be expected, were those which were the most highly albumenised. It is well known that the more highly albumenised the paper—whether ready sensitised or otherwise—the greater the difficulty there always is in obtaining purple or black tones. Therefore, when these tones are desired a paper should be selected on which the surface is less highly glazed. Unfortunately, lightly-albumenised paper is rarely to be met with nowadays, as all manufacturers appear to aim at getting the highest possible gloss.

The difficulty of obtaining purple tones with more highly albumenised paper will be readily understood when we consider that if the paper itself be salted and sensitised—as in plain paper printing—the tendency of it is to print and tone to a purple or black. Albumen, on the contrary, if sensitised by itself—say on a glass plate—will print red and cannot be toned to a dark colour. Now, it is very clear that if the albumen coating on the paper be thick—as it is coagulated by the silver while being sensitised—the solution scarcely reaches the paper at all, it being chiefly confined to the albumen or its surface. Whereas, if the paper have a thinner coating of albumen, the silver solution penetrates through it and soaks more or less deeply into the paper itself. Hence, with slightly albumenised paper, the image is partly in the paper, which is prone to yield purple or black tones, and partly in the albumen, which has a tendency to red. But with a very thick coating the image, as we have already said, is formed almost entirely in the albumen; hence, at least one great difficulty in obtaining anything beyond a brown tone on very highly albumenised paper.

Apart from the difficulty of the image being so much confined to the albumen, many of the ready-sensitised papers are difficult to tone, owing to the preparation they have undergone in order to confer upon them their keeping properties. The convenience of ready-sensitised paper, however, is so great—particularly to amateurs—that, notwithstanding all its shortcomings, it will continue to be as largely employed as heretofore. Therefore, we subjoin a practica hint or two which, if taken, will enable somewhat darker tones to be obtained with greater facility on certain samples.

All ready-sensitised papers are more or less acid, and acidity, in any form, is always antagonistic to rapidity in toning. Consequently, it will always be a good plan, after the free nitrate of silver is washed out of the prints, to immerse them for a few minutes in a dilute solution of common washing soda, or, indeed, of any alkali. By this treatment the acid is effectually eliminated and the toning greatly facilitated.

It may be remembered that, some time back, we directed attention to the advantage of the paper containing a certain amount of moisture at the time it is printed. What was then said with regard to paper of home preparation applies equally well, and perhaps with greater force, to ready-sensitised paper, which, as a rule, is kept as dry as possible in order to preserve its whiteness. It will, however, be found that if the sheets be suspended in a damp atmosphere (so that the paper becomes quite limp) a short time before it is printed, it will tone more readily and be a darker tint than if it were exposed in a crisp condition. On this subject we may possibly have something to say on a future occasion.

DARK-ROOM ILLUMINATON.

As from Mr. Starnes' letter in our present number he appeared to think we criticised him unfairly in our last, we propose to point out briefly where we consider him to be wrong in his deductions, leaving it to our readers, but more especially to Mr. Starnes himself, to form a final judgment.

First, as to his statement that "it is useless to use two or more thicknesses of ruby glass, because the light which has passed through one would pass through the other unchanged, and that the action of the second thickness would be to simply cut off the power of the light, and for this purpose ground glass or white tissue paper would answer equally well." If ruby glass were a true red—that is to say, if it passed only red rays—there might be some truth in the first portion of the assertion; but, as everyone knows, the so-called "ruby glass" passes not only red rays but also orange, yellow, green, blue, and even violet, in proportion to its density, and that a sample of moderate intensity which allows a considerable amount of green to pass will, if doubled, cut off the whole, or nearly the whole, of that colour. There is no gainsaying that, and therefore the light does not pass through the second thickness "unchanged," even in colour.

We speak now entirely of the colour question. But will Mr. Starnes or Mr. Harrison, to whom he refers, assert that the superposition of layer upon layer of coloured media will not alter the original colour of the transmitted rays? If so, we think they will see cause to alter their opinions. If "stained red" glass, or the more common "pot orange" or "yellow," as it is called, be taken of light tint and several thicknesses combined, the visual colour as well as the absorption spectra will be found to alter considerably. Again: if a saturated solution of chrome alum, *made with cold water*, be viewed by transmitted light in bulk—that is to say, with a considerable layer of liquid intervening between the eye and the light—the colour will be red. But in proportion as the solution is diluted or the thickness of the layer decreased it will gradually change to bluish-green. The most remarkable instance of this change of colour, however, is shown by a sample of green sheet gelatine given to us by Mr. W. B. Woodbury. This appears to the eye in a single thickness as a pure chrome green; but as the number of thicknesses is gradually increased the transmitted light passes through a number of changes until it reaches ruby.

It cannot, therefore, be said that the light transmitted by a coloured medium (not being a pure spectrum colour) passes unchanged in colour through a second thickness of the same medium; while, so far as the loss of light from the want of transparency of the medium is concerned, our simile of the tissue paper is directly applicable. We do not intend to enter into any argument as to whether "ground glass or white tissue paper would answer equally well"—that is, equally as well as doubling the ruby glass—as that is a question more readily settled by experiment than by controversy.

With regard to the superposition of two complementary colours to form white light: Mr. Starnes is evidently labouring under a confusion of ideas which we shall attempt to remove. The late Mr. W. Spottiswoode, in his popular lectures on *Light and Colour*, used to exhibit an experiment in which two spectra were thrown in juxtaposition upon the screen by passing the electric light through a couple of prisms. By means of diaphragms the whole of the rays were then cut off, with the exception of a small portion in each spectrum representing any two complementary colours. The two circles of coloured light were then brought nearer together on the screen until they overlapped, when the colours entirely disappeared from the formation of white light.

Here we have the two complementary colours added one to the other to form white light; but, supposing we could glaze a dark-room window with two glasses of *true* complementary colours, we should have a very different state of affairs. One glass will rob the white light of all the coloured rays but its own; the second will do the same; and, as each of the two suppresses *the only* rays that are transmitted by the other, total suppression or the safety of absolute darkness ensues. Mr. Starnes would do well to study the difference between the *plus* and *minus* signs, if we may so describe the case, and then state his views on the subject of a "safe white light" produced by filtering it through media such as he suggests. To quote from Mr. Starnes' letter: "it is unfortunate that" *he* "should make such a mistake as to say that" *white light* "was produced when glass screens were used." We thank him for the attempted correction; but, after the examples we have given, he will, we hope, see that it was needless.

Now, Mr. Harrison's suggestion of the use of two lanterns glazed with different-coloured glass, and also Mr. Starnes' own idea of applying the two colours to his reflecting lamp, set up a different condition of things; for the two colours are then working in conjunction with, and not against, one another, as when superposed. Moreover, if an ordinary dark-room window be glazed with (say) blue and orange glass by covering one half with each colour, the elements of white light would be transmitted into the room instead of all light being suppressed, as would be the case if the whole window were covered with both colours.

As respects the schoolboy experiments we mentioned, and to which Mr. Starnes wishes a text-book reference: we must confess that we, like himself, have never to our recollection found the phenomena referred to in any recognised "text-book." We do, however, recollect, in our own schoolboy days, executing certain cabalistic signs and figures in certain coloured inks, which said designs appeared in different guises when viewed through glasses of different colour in consequence of the suppression of portions of the design, the whole art and mystery of this ingenious and diverting pastime having been derived from a boy's "play-book" of the day, the name, author, and existence of which have passed away long since.

As to Mr. Starnes' theories we have nothing to say, as the object of this article is not controversial, but merely to show that we have not thoughtlessly nor unjustly criticised him. If any misunderstanding should still exist in his mind as to the matter specially referred to, we shall be glad to discuss them personally or by private correspondence, unless he can show that we are wrong in our views, when he shall have every opportunity of publicity.

STARCH, GUMS, AND OTHER MOUNTANTS.

The *Moniteur Scientifique* recently had in its pages an interesting paper, treating among other things of the absorbent properties of starch, acacia gum, tragacanth, &c., in a manner that will afford some instructive matter for photographic use. Gelatine and starch in some of their many forms are, for mounting prints, perhaps, the substances most in repute, or, at anyrate, in demand, though acacia gum is often used; and tragacanth—less employed of any—possesses capabilities that have not hitherto been duly appreciated.

At the present time there are so many complaints made about the irregular expansion of albumenised paper when damp that a demand arises for a mountant that shall not cause such expansion. This want is best met by the process of dry mounting described in these pages a few months ago; for it will be noted that the irregularity quite disappears when the print is thoroughly dry. We may, in passing, observe that this dry mounting, at least in principle, is by no means the novelty that some imagine. We saw prints being mounted by a similar means nearly a score of years ago at Mr. W. B. Woodbury's establishment at Brompton. Be that as it may, the method is most excellent, and, when possible to be employed, should be chosen before any other, if only to avoid the very large percentage of loss from prints too distorted to send out—an effect which, unfortunately, is only discovered after mounting and when a mount is spoiled.

When, however, dry mounting of this kind cannot be carried out, the next best method is one where the adhesive material employed does not expand the paper after being spread upon it. Leaving out of question such substances as caoutchouc dissolved in benzole, &c., there are left practically only those aqueous solutions which are miscible with alcohol. Acacia, as representative of the gums, does not allow this, as precipitation would ensue; but gelatinous substances, typified by glue or gelatine, when dissolved in water, admit when heated so large a proportion of spirit that the small residual amount of water is found not to produce any increase of dimensions in any direction in the print. A hot solution of good glue will bear a very large quantity of methylated spirit being added to it without causing precipitation; and the method of making this mountant is to continue the gradual addition of spirit till a permanent turbidity is just on the point of being produced. When the mixture cools it becomes like a solid mass—white, cream, or pale brown, according to the colour of the gelatine.

This mounting solution has been very largely made and used, and at one time was vended as a secret preparation; but we have long since described the mode of its manufacture. We must here point out the necessity for employing a pure sample of glue if that form of gelatine be employed, as some of the coarser kinds are not to be trusted for mounting valuable photographs. We should recommend one or other of the many forms of gelatine now purchasable under the name of "gelatine" glue, being, as our readers are aware, simply another name for a coarser sort of that substance.

It is important to note one point in regard to mounting with solutions containing a large proportion of spirit, and that is, the print before being coated with the material must not be damped. If this be done the whole meaning of the process is lost sight of, and expansion of the print will follow as usual.

Many photographers, however, do not care to make use of this alcoholised glue on account of heat being required to melt it, which entails so much loss of time when a few prints only are required. Beyond that, also, there is a feeling that glue mounting requires defter manipulation; and, as dexterous mounting is a qualification which takes some time to acquire, preference is often given to other substances. A solution of "gum arabic" is often used, and it forms a very handy mounting material. Further: if for any purpose the prints need removal at some future time it is readily done when the acacia gum is used. It possesses, however, one grave disadvantage, and that is its liability to turn acid with keeping. This should lead, if not to its entire rejection, at anyrate to its most careful use; for, whatever opinions may be held as to the cause of fading, no one would suggest the safety of placing a print in constant presence of an acid substance. We may point out that when this substance is used the liability to become acid will be greatly lessened by dissolving the gum without the aid of heat. Much more time is needed to bring about the solution, but when finished the preparation is entirely different from that made when heat is employed.

Of all favourite mountants, however, we believe starch takes the lead. It is cheap, easily made, and readily used; though it will not keep long after mixing, a very small quantity only is required. Starch paste should not be used after it has once begun to change and lose its gelatinous character. Any of the forms of starch will answer, but we strongly recommend those made from maize, and sold under the name of "corn flour," &c. Being manufactured for dietetic purposes the absence of chemicals may be assumed, and the purest form of starch thus ensured. Prints mounted with some of these starches are most difficult to remove; in fact, it is almost impossible to stir them when once they are dried and rolled.

Dextrine, though made from starch, can scarcely be termed a form of starch, as its chemical character is altered. It has, however, been little recommended for mounting, perhaps on account of suspicion of chemical contamination when made by other processes than the torrefaction of starch. It should, notwithstanding, be valuable, as it is soluble in dilute alcohol. We believe, however, that there is still much to be learnt about mounting materials. A mixture that would be adhesive without trouble, require no heating before being ready for use, keep good for a long time, neither cockle the mount nor distort the print, and, finally, would be ready for use at a moment's notice, would be of great service and find a ready sale.

Such a mountant would, in all probability, require to be composed of more than one ingredient, and difficulty is here at once to be perceived. The properties of the mixture of some of these materials are not the mean of their individual qualities. For example: mixtures of some gums and starch will remain fluid on account of their viscosities being of different natures.

The following facts, however, which are embraced in the article to which we have alluded, contain the germs of much knowledge that is needed to form such a mounting material as we describe, and may well be studied by those who would experiment in that direction:—Tragacanth gum dissolved in water in the proportion of 196 grains per pint will have as much body as two and three-quarter ounces of starch or four and a-quarter ounces of dextrine. It is difficult to dissolve; but the best method is to make a stiff paste first and gradually let it down with water.

Starch paste can be mixed with tragacanth. This mixture is stiffer than either used separately. It keeps for a long time without change, and the paste is more yielding and easily spread than either substance by itself.

Gum acacia alone requires a large quantity to be mixed with water to get much body. Half-a-pound to a pint gives a free-flowing liquid scarcely thick enough for pasting photographs. The danger of using it too thin is that it is apt to penetrate the paper and render it translucent, just as a spirit paste would act.

These few data comprise, with the large amount of knowledge which is already on record about gelatine, a nucleus of facts on which we trust yet to see raised a new mountant for universal use possessing the characteristics we have described.

From an announcement in our advertising columns it will be seen that the programme of the next exhibition of the Royal Cornwall Polytechnic Society is now published. Information on the photographic department may be obtained, as usual, from Mr. William Brooks, of Reigate.—The programme of the forthcoming exhibition of the Photographic Society of Ireland is also announced elsewhere.

According to a paragraph in *La Nature*, the purity of india-rubber—an all-important point as regards its suitability for dissolving in benzole, &c., for mounting and other purposes—may be ascertained by placing it in a jar of water. If pure it will float, but if adulterated with foreign matter it will sink. Pure rubber also resists the action of all liquid acids.

A correspondent of the same journal sends an account of a curious experiment he has made, and fills a whole column in describing how he has succeeded in obtaining a phosphorescent photograph. His method is simply to place a glass coated with several layers of phosphorescent paint in the camera, and to expose in the usual manner! He further explains how the force of the image is influenced by the aperture of the lens and the brightness of the landscape, which conditions, when favourable, allow him to obtain his views in some minutes. If it failed in brightness a cure was to be found by breathing upon it. By holding it over a slightly-hot smoothing-iron the image became very brilliant. Really, we thought that the time had gone by for this sort of thing. We can imagine the disgust of an experimenter after exposing a plate (say) early in the morning at the appearance—or the want of it—of his image when he came to examine it at night. If a phosphorescent image of the kind does possess any value it would be far better to expose under a transparency, but Mr. Woodbury's method would be still better. Phosphorescent photographs, however, have never "taken."

Some of our readers may remember the excitement caused some time—perhaps twenty years—ago by the announcement that an acarus had been discovered capable of existing in and, indeed, thriving upon nitrate of silver. It has been asserted that poison is a mere question of quantity, and, as we know, nitrate of silver in small doses is sometimes administered as a medicine; but we question whether patients themselves, if permitted a voice in the matter, would not almost prefer to take their chance of a fatal termination without its use if they knew the repulsive-looking objects they would surely become after a course of silver nitrate—their faces irremediably stained of an ashen, deadly grey colour.

No one, however, to our knowledge ever suggested a strong bath of cyanide of potassium as a likely medium of existence for any organised body. But that even this deadly poison seems looked upon as a natural delicacy by one form of animal life has been found by Sir Frederick Abell, who, in speaking of barnacles off a ship's bottom, states that he placed "some of these gentry in a strong solution of cyanide of potassium, but he found it had not the slightest effect upon them!" The members of this family, however, surely succumb to the virtues of pure water, a short immersion in fresh water killing them off. Rather a hard nut for Sir Wilfred Lawson!

MM. Depière and Clouet have lately been experimenting upon the bleaching action of sunlight and the electric light. They find both lights to bleach, but that, though the action is not confined to certain rays, it is unequal. Strange to say, they find the yellow rays the least active and the red the most.

Our readers may remember that a number of scientific men are engaged in endeavouring to determine the practical units of light and electricity. Their final meeting took place on Monday last. Sir W. Thompson, Messrs. Preece, Hughes, Adams, Jenkin, Foster, Graves, Hopkinson, and Captain Abney represented England. If a unit of light of a really practical nature and not too intricate in the mode of its production be devised there will be no body of men to whom it will be of more use than to photographers. The "ten, twenty, thirty, &c., times wet plate," though to those familiar with collodion working possessing a really practical meaning, has become a mere formula — meaningless, misleading, and utterly untrustworthy—with regard to many of the plates put upon the market.

We thought that every one knew the history of the discovery of bromine by Balard, who pointed out its elementary character, being thus more acute than a well-known chemist who had isolated it previously, but failed to discern its elementary nature. Believing it to be a compound of iodine he laid it aside. This, no doubt, is the "story" referred to by Professor Thorpe in his late most interesting lecture on Wöhler, where he says—"We all know the story of the young chemist whose unscientific use of the imagination cost him the discovery of the element bromine." This sentence is referred to by a writer in the *Chemical News*, who asks for its elucidation, its explanation being simply the facts above narrated.

LIME-LIGHT EXPLOSIONS AND THEIR PREVENTION.

As I was not present at the reading of my paper, entitled *Notes on the Lime Light*, at the last meeting of the Edinburgh Photographic Society I should be obliged by your inserting the following remarks on the discussion which followed it.

In reply to Mr. J. M. Turnbull, I may say that the ether tank which I use is not covered with any coating of a non-conducting material, and I think it would be an objection if it were so. The copper sides of the vessel become very cold by the evaporation of the ether, and the heat of the lecture-room helps to restore them to a proper warmth. I am more afraid of depression of temperature than of heat in this process.

I place the ether tank on the table as near to the lantern as possible, so that I may be able to use a short connecting tube. If the tank were on the floor a longer tube would be needed, and the chance of accident by a rent would be increased, the ether vapour being absorbed by the india-rubber, and tending to make it rotten. Although the tank is above the bag no ether can syphon back into it, a reserve chamber being provided for the express purpose of preventing such a calamity; and in the latest edition of these tanks, which I think is the best, the gas does not go through the ether at all, but simply passes over its surface by a long and tortuous channel. Such being the case, it is comparatively immaterial which tap you open first, provided you open them both at the same time. But you must not open the oxygen tap and leave it with the hydrogen tap closed, or some diffusion of ether vapour backwards might gradually take place in spite of the pressure from the bag.

Mr. Turnbull does not say why it is that he has so little faith in back-pressure valves, but, if it is because they take off too much of the forward pressure of the gas, I advise him to place them for the future *upon the nozzles of the bags*, and he will find them to work better in every way than when they are attached to the jets.

Mr. G. A. Wilson states that his objection to the pumice for safety tubes is that it is apt to become pulverised and to be blown into the nozzle of the burner. I have had to complain of the same defect, and unless it can be remedied it will be fatal to its use. A friend suggests to me that *very coarse* emery powder—which, he says, is sold in commerce—might, perhaps, do as well.

Mr. Wilson's idea of a safety chamber, consisting of a common piece of cane inserted in the tubing, pleases me very much. I cut a piece an inch long and tried its effect on the pressure of the gas; the diminution amounted to about thirty per cent. In the ethoxo process a safety tube on the H nozzle of the tank would be of great service even if it were not *absolutely* perfect. In two out of three accidents of which I have heard the ethoxo gas was not actually explosive, but burnt with great fury, exactly as Mr. Wilson describes; and I can quite well imagine that under such circumstances it would stop at the cane, and give the lecturer time to turn the H tap of the tank and put it out. I hope some day to try this simple tube side by side with the pumice safety chamber, and if I obtain satisfactory results I will report accordingly.

Mr. G. R. Baker's paper on *The Lime Light.*—This paper, written by one who has a practical knowledge of his subject, will be found to contain some valuable hints. Like Mr. Baker, I have come to the conclusion that an elongated, incandescent area of lime light is better than a "spot." Mr. Lewis Wright, working with the microscope, would not perhaps agree with this, because the requirements are different. The light radiating from an incandescent area is not brought to a true focus by the condenser, and hence much of it is lost in passing through the objective of a microscope. It will pass easily, however, through a portrait objective, and a bundle of rays large enough to nearly cover the glass will be seen issuing from the front lens. For the microscope an incandescent "point" is what you have to aim at. To secure this as nearly as possible the lime light must be brought almost close up to the burner, and a strong pressure put on the bags to produce a very intense heat. The flame will then drill a circular hole on the cylinder of lime, and you must be careful to rotate it frequently, or the flame will strike off at an angle and break the condenser. Keep the oxygen tap rather fully on, so as to prevent the little cone of imperfect combustion in the centre of the flame from touching the lime and causing a black nucleus. As regards the angle of incidence of the burning gases, it should be as near a right angle as you can get without throwing a shadow on the screen.

To produce the "elongated incandescent area" you make the nozzle of the jet *straighter*, as Mr. Baker observes, about twenty-five to thirty degrees of incidence, or, as I prefer, *you remove the nozzle, bent at 45° as directed for the microscope, to a distance of a quarter of an inch from the lime;* the spot will then be less intensely heated, but it will be larger, and, according to my experience, will give quite as good a light upon the screen. The advantages will be manifold, for a rotation of the lime once in ten minutes or a-quarter of an hour will be sufficient, and the point of the burner will neither choke up nor burn away.

The O tap should not be turned on quite so fully when the jet is a-quarter of an inch from the lime, because some oxidation takes place in passing through the surrounding air. Keep the cone of imperfect combustion about an eighth of an inch long.

Mr. Baker asks what percentage of pressure is lost by passing through one of Broughton's pumice safety chambers. I should say about twenty-five per cent., so that the one hundredweight on the bag is reduced to three-quarters of a hundredweight. I have not tried these tubes with the most explosive form of oxygen and hydrogen, but it would be quite necessary to do so before making any report. The plan I follow is to take a biunial lantern, burning the ethoxo gas, and to turn on the O tap until the small interior cone of imperfect combustion in the centre of the blowpipe flame *almost* disappears. The ether vapour and oxygen are then present in the right proportions to form the most violently-explosive mixture, and you can fill any number of balloons by means of the dissolver, leaving the taps untouched.

Gas Dissolvers.—Mr. Baker's remarks under this head are useful. I have known one of the two lanterns to go quite out in dissolving, the explanation being that the screw which secured the plug had become loose in working, and the plug had shifted in consequence. If the plug were to shift it is obvious that the gases might pass round it to some extent, and this would be a source of danger.

T. Frederick Hardwich.

THE MIXING OF EMULSIONS OF DIFFERENT SENSITIVENESS.

The question of the effect produced by mixing emulsions of different sensitiveness came up at a recent meeting of the London and Provincial Photographic Association, and there was a short discussion on the subject.

The question asked was, so far as I recollect, something to this effect:—"Will the result of mixing an emulsion giving 10 on the sensitometer with another giving 20 be an emulsion giving 15 or not?"

The question is lacking in definiteness, as there is no mention of the quantities to be mixed. It is, however, to be assumed that equal quantities are intended, and probably equal quantities of silver bromide rather than equal quantities of actual emulsion. The experience I have had in mixing emulsions tends to show that the effect of mixing two emulsions containing equal quantities of silver bromide is not to get a sensitiveness which is a mean between the two, but to get somewhat greater sensitiveness.

Judging merely from hypothetical reasoning before trying the experiment, I came to the conclusion that the addition of a slow to a rapid emulsion should not decrease sensitiveness at all. I judged that, because in the mixture there were present the particles of silver bromide which went to form the more sensitive emulsion of the two, the sensitiveness should be nowise reduced, but that a thinner image would be produced, the particles of the slower emulsion not being reduced at all except in the higher lights, and these only to a moderate extent.

This I found to be a mistake, and experiments made by mixing emulsions of not very great differences of sensitiveness—say not more than four to one—brought me to the following conclusions:—

First: the particles of the more sensitive emulsion of the two require a greater amount of light to produce a developable reduction than before mixture.

Second: particles of the slower emulsion, which, with the emulsion used alone, would not be reduced at all, are reduced in the presence of the more rapid emulsion.

Thus it appears that by the mixing of equal parts of two emulsions whose sensitiveness does not differ greatly we get an emulsion more rapid than the mean of the two, and giving about as great density of the high lights and also of the details as would be got with the more rapid emulsion alone. I should say that by "mean" here is meant geometric mean, not arithmetic. The sensitiveness indicated by the arithmetic mean on the sensitometer is a geometrical mean sensitiveness. For example: supposing plates giving the figures 10, 15, and 20. Here the middle figure is the arithmetical mean of the first and third figures. The sensitiveness of the plates will, however, bear as nearly as possible the ratios of the figures 1, 4, and 16—the middle figure being here the geometrical mean of the other two. An arithmetical mean would be $8\frac{1}{2}$, and would in the case supposed be as nearly as possible represented by 18 on the sensitometer. I am inclined to think that by the mixing of equal quantities of emulsion of different sensitiveness a sensitiveness much more nearly the arithmetical than the geometrical mean is gained.

When I say that where two emulsions of different sensitiveness are mixed silver bromide of the slower emulsion is reduced which would not be reduced were the more rapid emulsion not present, it

THE LATE REV. F. F. STATHAM, M.A. F.G.S.
[For 25 years President of the South London Photographic Society.]

INK-PHOTO SPRAGUE & Co LONDON.

must be borne in mind that I have imagined the sensitiveness of the two not to vary enormously. Mr. A. Cowan gave, at the meeting mentioned, an account of an experiment made by him, in which two emulsions differing enormously in sensitiveness were mixed, with the result that an emulsion somewhat slower than the more rapid was produced, whilst a very thin image resulted, thus apparently showing that the bromide of silver of the slower emulsion had not been reduced at all, and had simply acted as so much inert matter.

To proceed from general statements to practical details: I may give a few instances in which I consider that two emulsions may be mixed with advantage.

The principal of these is where an emulsion of great sensitiveness is made by the ammonia process. All who have experimented in this direction must have discovered that an emulsion which has been made very sensitive by the use of ammonia is very transparent, requiring a very thick coating to be applied before a film through which it is not possible to see the shape of a gas flame is obtained. It is possible, however, to add to such an emulsion enough of a boiled emulsion to give considerable opacity without reducing the sensitiveness perceptibly, whilst at the same time the quality of image is improved in every way, the density being increased instead of the reverse. I think the best way of explaining the matter will be to give the actual quantities which I have used as an experiment.

An emulsion is made by the ammonia process, four hundred grains of silver nitrate going to make up from twenty to twenty-two ounces of finished material. I suppose a sensitiveness represented by 22 to 23 of the sensitometer to be reached. The emulsion will be very transparent; at anyrate, an ammonia-made emulsion of the sensitiveness named is always very thin in my hands.

A boiled emulsion is made as follows:—

A

Silver nitrate	100 grains.
Water	1 ounce.

B

Bromide of potassium	80 grains.
Gelatine (Nelson's No. 1)	15 „
Water	1 ounce

The solutions are heated and emulsified in the usual manner, and boiling is performed as long as would be considered desirable to produce a fairly-rapid plate. In my own practice I should boil till the emulsion had changed from red by transmitted light to blue, and should continue the boiling for a similar time to that which was necessary to bring about the change.

After this the emulsion is allowed to cool. When cold there is added to it fifty grains of gelatine in the dry state. This is allowed to soften. Heat is applied to mix the gelatine and sensitive silver bromide. The emulsion may now be at once added to the ammonia-made emulsion; or if the latter has been washed the boiled emulsion may be allowed to set, be washed separately, and be then added. In any case it will be seen that there is only one quarter of the less sensitive silver bromide than there is of the more sensitive. It has been added without increasing the bulk of the emulsion by nearly one quarter, whilst it will be found that the covering power has been quite doubled. The sensitiveness will not be decreased, whilst even with films half as thick denser images may be got from the mixed emulsion than from the ammonia emulsion alone.

There is another procedure occasionally adopted in the manufacture of emulsions, which practically amounts to the mixing of a slow, opaque emulsion with a rapid, transparent one. This consists in adding to an emulsion as nearly as possible before it sets for washing nearly enough silver nitrate to convert the excess of silver bromide.

I shall again give a definite example. Suppose that in the case of the first of the two emulsions which I presumed to be mixed there was used with the 400 grains of silver nitrate 320 grains of potassium bromide: this gives an excess of forty grains of potassium bromide, requiring fifty-seven grains of silver nitrate to neutralise it. Now, suppose the process of digestion with ammonia to be complete and the bulk of the gelatine to be added. We may add (say) forty grains of silver nitrate to the emulsion. On account of the presence of the large quantity of gelatine this will form, with the greater part of the excess of bromide of potassium, an exceedingly-fine emulsion, which will be very opaque.

The result of the foregoing procedure is to increase considerably the opacity of an emulsion; but whether or not the silver bromide last produced is ever actually reduced to form part of the image I cannot tell. Seeing that the last produced silver bromide must be very much less sensitive than the first produced, I doubt it. It is possible that so much inert matter might have the same effect as the silver bromide produced at the end of the process; but whether this be the case or not an increase of density of film is gained which enables the emulsion to go considerably farther than it otherwise would. The sensitiveness of the emulsion is not perceptibly decreased, whilst silver bromide, used merely to produce opacity of the plate, has this advantage—that it is dissolved away by the fixing bath.

A very good reason for the mixing of two or more emulsions is that by so doing uniformity of result is gained. It is very difficult, in working on a small scale, to make emulsions in succession which shall be each of the same sensitiveness as the one before it. It is not, however, very difficult to so work that the mean sensitiveness of any one set of three or four emulsions shall be very nearly the same as the mean sensitiveness of any others. And although the mixing of each of these two sets of three or four sets of emulsions may not give a sensitiveness which is the mean sensitiveness of the three or four, it will give the same sensitiveness in each set as in another.

Mr. A. Cowan has often recommended the mixing of several emulsions for the sake of gaining uniformity; and the practice is, I believe, adopted by many commercial dry-plate makers.

W. K. Burton.

THE LATE REV. F. F. STATHAM.

The funeral of the late Rev. F. F. Statham, whose portrait we give this week, took place on Saturday last, as announced in our last issue. The body was borne from the Rectory to St. Peter's Church (of which, not St. Mary's, as was stated last week, he was rector), where the first portion of the funeral service was performed.

The church itself was crowded in every part, and an immense assemblage thronged the approaches. After the preliminary service the funeral procession, comprising the hearse and half-a-dozen mourning coaches, accompanied by 400 of the West Surrey Rifle Volunteers and a detachment of the P Division of Police (of both of which deceased had been chaplain) proceeded to Norwood Cemetery. The line of route was thronged with sympathising parishioners and others who had known Mr. Statham. Owing to the roads in a portion of the intended line of route being under repair it was necessary to make a considerable *détour* which delayed the arrival at the cemetery by nearly two hours. On reaching there a large crowd, of probably fifteen hundred or two thousand persons, was encountered, many having been waiting for some hours. The three bands of the 4th Surrey drew up at the entrance to the cemetery, and, as the *cortége* passed in, played the "Dead March." The coffin—which was draped with the Union Jack and literally covered with wreaths and flowers, amongst which were offerings from the South London Photographic Society and the Photographic Club—was borne in a handsome open hearse, presenting a singular contrast to the usual sable surroundings of the funeral ceremony. This, accompanied by a guard of honour of the 4th W.S.R.V., was followed by the line of mourning carriages and the remainder of the volunteers, who paraded with side arms only, with the exception of the firing party.

As the procession wended its way, attended by the great crowd of mourners, across the picturesque cemetery the rain, which had been threatening for some time, commenced to fall and the aspect of things became dismal in the extreme. The contrast between the white marble of the memorial erections and the outline of the Crystal Palace, at no great distance—scarcely picked out from the dull, leaden sky—was especially noticeable, the whole surroundings being mournfully *apropos* to the occasion. The service at the grave was brief, being conducted—as was that at the church—by the Rev. S. P. H. Statham, military chaplain at Aldershot, and the Rev. Sherrard Statham, of Birmingham, sons of the deceased. The coffin, of plain oak, was lowered into the grave with deceased's bible and parade cap; and after the close of the ecclesiastical part of the service three volleys were fired over the grave by the members of the 4th Surrey.

Amongst the throng of mourners the following connected with photography were present: — Messrs. F. A. Bridge, F. York, E. Cocking, T. Sebastian Davis, John Stuart (Glasgow), J. Traill Taylor, E. W. Foxlee, A. Cowan, J. A. Harrison, W. B. Bolton, J. J. Ayling, W. Cobb, A. L. Henderson, J. Garrett, C. Darker, and F. W. Evans.

As an extended notice of the deceased gentleman's life we cannot do better than give the following abstract from the *South*

London Press, a local paper edited by an intimate friend of Mr. Statham during many years.

The Rev. Francis Freeman Statham, who died at St. Peter's Rectory, Walworth, was the third son of Edwyn Statham, of South Lambeth, and formerly of Nottingham, and was born in London on the 8th of September, in the year 1814. He was educated in various schools, but at the unusually early age of eighteen he purchased the goodwill of the Newington Grammar School, then a large and prosperous academy. During the time that Mr. Statham acted as principal the school still further increased in size and popularity, and there are many "old boys" who remember the instructor of their youth with affection and esteem. The whole object of his life, however, was not centered in training and teaching the young; for, with that earnest assiduity which has always characterised his whole career, Mr. Statham applied himself to the study of science, and at the same time by constant mental toil perfected his knowledge in divinity and mathematics so as to graduate at the University of Oxford.

At the age of nineteen Mr. Statham appeared before the public in the *rôle* of a scientific lecturer, sowing the seeds of that unvarying popularity which has always attended him in that character. His "two very interesting lectures on *Hydrostatics and Hydraulics*" were attended with so much success that in the same year (1834) he was invited to appear before an audience in the Royal Institution, Clifton, the London Mechanics' Institute, the Southwark Literary Institute, and was also engaged to give a course of six lectures on electricity at the Bristol Mechanics' Institute. It was during the fulfilment of this engagement that he became acquainted with a Miss Kington, to whom he was married in Clifton Church on June 16, 1836, and who, still living, mourns her irreparable loss; for not least amongst his many virtues must be counted his untiring affection as a husband and his unselfish devotion as a father.

Mr. Statham was ordained deacon in 1843, by the Bishop of Winchester, and, in the following year, priest by the Archbishop of Canterbury, and was appointed to the chaplaincy of the workhouse and then to the curacy of St. Peter's, Walworth. The chaplaincy of the union he retained for over thirty years, and his curacy was created an incumbent's living in the year 1848. Of the immense activity which Mr. Statham displayed in past years in the parish those who have only seen him in his later years enfeebled by much toil, mental and bodily, can never imagine. In the great cholera year (1848) Mr. Statham buried four hundred and seventy-seven parishioners who fell victims to that scourge. Walworth in those days was a village, in a comparatively open country, intersected with hideous open ditches and sewers. These by his constant agitation were covered or filled in. Schools were collected for and built, visiting societies were formed and presided over, and all the numerous duties of a parish clergyman were regularly and spiritedly performed.

That Mr. Statham's death is a calamity which will be felt beyond the radius of his parish cannot be doubted. His influence extended to many distant parts of the kingdom, for his readiness to give assistance by preaching, lecturing, or in anything in his way, was so great that there is no diocese in England in which he has not officiated or lectured. Indeed, his willingness to give voluntary and gratuitous services helped considerably to augment the mental friction and exhaustion which at last overpowered the body. For twenty-five years he was honorary chaplain to the P Division of Police, taking a service regularly every week and visiting whenever needed. He was President of the South London Photographic Society from its foundation. The chaplaincy to the 4th Volunteer Battalion Royal West Surrey Regiment has been held by him for nearly the same period; whilst the lectures he has delivered in aid of various charitable objects are simply innumerable. From this point of view alone his excessive willingness to oblige and benefit others even at his own loss renders him a remarkable man. But for many other reasons we may truthfully assert that South London possessed no greater resident. The grasp of his mind was immense—his genius indisputable. There are not many men who, besides possessing a competent knowledge of the classics, are also good mathematical scholars; but there are very few indeed who, in addition to these, can speak two or three modern languages, lecture and write upon many branches of science, history, political economy, histories and customs of many nations, ancient and modern; who can write well-reasoned and original theological essays with as much facility as they can write a leader in the paper, a prologue for a play, a libretto for a comic opera, a skit upon some public topic, an article upon photography, papers on geology and on mechanics; or compose a chant or a hymn with equal skill as they can fill in the proper scores for a brass band, or compose the music for operettas. Yet Mr. Statham did all these things, and did them well. His book, *The Message of the Spirit to the Seven Churches*, and nearly forty other published sermons, testify to his ability as a divine, while it is not difficult to find copious proof of his capability to write upon all the fore-mentioned subjects in various newspapers and other publications. Before the Geological Society, of which he was a member, he read several papers, published in *The Geologist*, as he did before the British Society upon *Applied Mechanics*. Under the name of "Sydney Vernon" he has published several musical compositions of no mean merit, and there is more than one of his operettas still produced on the platforms of various institutes who patronise entertainments after the style originated by German Reed, whilst many newspapers, comic and otherwise, contain numerous proofs of his skill in writing humorous poems and skits. Indeed, the number is so large that if it be possible to collect them they will be made into a volume and published; added to which the variety of subjects upon which he lectured was simply marvellous—in fact, any subject suggested to him as suitable—and, as we have already said, applause and approval were never wanting. His success in lecturing consisted mainly in his complete power over language and to the rich vein of humour which he possessed.

The funeral sermon was preached on Sunday evening last, the 27th ult., by the Rev. D. Moullier, rector of Holy Trinity, Newington.

Our picture is from a photograph by Mr. William Cobb, of Woolwich, and is, we believe, the latest portrait taken of the late Mr. Statham. To Mr. Cobb, and also to Messrs. Sprague and Co., we are indebted for the trouble they have taken to enable us, at very short notice, to give the portrait of our deceased friend.

THE ETHOXO-LIGHT.

In the report of the transactions of the Edinburgh Photographic Society, in your issue of the 18th ult., Mr. G. A. Wilson says that the pumice chamber, after being used or knocked about, is liable to deterioration through pulverisation of the pumice. I do not understand how this can be, unless Mr. Wilson plays shuttle-cock with it; for I have never yet had my nozzles stopped up from that cause, and I believe I have used them oftener than any other person. I, too, have used cane for the same purpose, but found it to require too much pressure to work it at its best; and if Mr. Wilson had hesitated many more minutes in his experiments with it (narrated by him at the meeting) he would have come to the same conclusion that I have—that it is not advisable to interpose any organic medium to intercept flame. I do not as yet consider my pumice chamber *perfect*, but I hope shortly to have one constructed combining the best points of the suck-back and flame-chamber combined.

With reference to the remark anent the safety of the ethoxo for dissolving: I may say that I have used it every season for five years. I have on but very few occasions used a single lantern, and I have never yet had any trouble in dissolving with it.

Another mistake Mr. Wilson has fallen into is that ordinary gas will explode. Oxygen gas, although a supporter of combustion, will neither fire nor explode; nor can hydrogen be made to do the same, unless mixed with air or oxygen.

Mr. W. M. Turnbull seems to place reliance upon the generator being jacketed. This is really a defect rather than an advantage, as it prevents the ether getting the benefit of what heat there is in the room; for during the evaporation of the ether there is a very great diminution of temperature in the generator, and this is in no way obviated by any external covering. With regard to the construction of a generator, that the ether cannot be blown back: this is what I have already done by the construction of reserve chambers, which, if the proper quantity of ether be put in, will not blow back, even if the generator be placed on its side, or upset accidentally.

Pressure is one of the best safeguards against explosions, and of this I am always careful to have plenty; also to protect all tubes and bag with forms or other available protection against stoppage by the accidental pressure of the foot. Mr. Lewis Wright's suggestion to turn on the H tap first I fully endorse, as I have by experiment found a pressure in the generator, equal to four inches water-pressure, at a temperature of sixty degrees.

W. Broughton.

THE "HAPPY MEDIUM;" OR, DARK-ROOM ILLUMINATION.

IN THREE CHAPTERS.—CHAPTER I.

Although the fervour of the discussions upon the above important subject seems to a certain extent to have cooled down during the last week or two, I feel that the matter possesses sufficient interest to the readers of this Journal to warrant the approach to it by anyone who has carefully and honestly studied the question in its various aspects, as I claim to have done. I have not only debated the question in my own mind from various points of view, but I have made a few experiments. I have given a demonstration to a practical club of photographers. I have carefully perused all the writings of the past year that I can find. I have compared notes personally with several eminently-practical men; and I have consulted medical men as to the effects of various coloured lights upon the human eye. As a matter of fact I have, in a loose way, collected so much information on the subject that my great difficulty is going to be in the promulgation in a connected and concise form of the information I have gathered from so many sources. I know that my remarks must appear to men of better-ordered minds than myself sadly disjointed; but from such I claim indulgence, and to such I submit that I shall advance in good faith, and without prejudice to any man or to any theory, my ideas and convictions on the subject which I treat here.

It is a curious fact, but it *is* a fact, that mankind insists on running into extremes; that the "happy medium"—in this case the "light medium"—is the very last mark that we ever hit. The present or late discussion on dark-room illumination is a fine example of this idiosyncracy of humanity. We have the premiss that all light is hurtful to the sensitive salt of silver over and above what passes through the lens from the object being photographed; so we have a set of men who say—"Let us work in total darkness." We have another axiom—that in order to see what we are doing we must have a certain amount of light in our developing-room. Up starts a set of men who exclaim—"Let us work in broad daylight, or as near as we can get to broad daylight, without instant and utter ruin to our plates!" But this is not all. We find some men saying—"Red light, *used as I have been using it*, hurts my eyes." These men banish red light entirely from their consideration and laboratory. Orange light offends and hurts another using it in a certain quantity and through a particular medium. He, too, abolishes orange light in every quantity and shape. But the greatest human perversity takes this form:—"Red light (or orange light) hurts and offends me; therefore it hurts and offends my neighbour. Consequently, I shall inveigh against red (or orange) light, and despise and execrate the man who pretends to prefer orange (or red) light!" I write this in all earnestness, and not merely trying to make a clever satirical epigram. I might concisely sum up the whole gist of all that has been written and spoken on the light question in a few words such as—"Use any light you like, in any manner and quantity you like, so long as you get efficiency without damage." But in order to guide tyros and others in their choice of a light much has been written, this article is being written, and probably much more will be written.

If we rightly understand our chemicals and our light, all light affects the sensitive salts used in photography; but if we are rightly to conduct our operations we must have *some* light. Certain constituents of light affect our sensitive salts less than others, so that our course is thus far indicated. We must use the least hurtful parts of light for our operations, and even of these parts we must use as little as possible consistent with power to conduct our operations. These propositions appear to me to contain the kernel of our nut. Some of the propositions can be settled scientifically and accurately; some cannot, being matters of taste dependent on our requirements, our visual powers, and our idea of the "happy medium." Given a certain "sensitive salt," science can determine what constituents of light affect the salt least and what most; but introduce a mixture of sensitive salts, a combination of light-constituents, a diversity of human eyes, and at once science, or accurate computation, is lost, and "give and take" is the order of things. Now, I have built up a fine wall which I cannot break down, but if I can manage to displace a few stones I may make a little breach through which my reader may perchance wriggle his body, and so reach the treasure within—the "happy medium."

If no light at all were required for the development of a plate this article and all others on the same subject would be superfluous; but light of some kind is required. For the preparation of gelatine plates light is not required; blind people and machinery can do the whole affair, so that I put these operations out of consideration. By no means that I know of could a blind person judge of the progress of development on a sensitive, exposed plate. But various intensities of light are required for various purposes and by various operators. One man's eyes are better than another man's; one man's eyes are better in a particular colour of light than his eyes in another colour. Already we have got an element of uncertainty. Again: where exposures have been one after another made upon similar objects in a slightly-varying quality of light, as in studio work, less careful examination of the developing plate is required than where exposures have been made on landscapes in different situations on very different objects, and during a period extending over days or even weeks. Another element of doubt—another instance of the necessity for the "happy medium."

My own work consists entirely of landscape work; my exposures are made over periods of weeks or even months, and these plates have to be developed all at one time. Therefore I shall gain credence when I say that I lean towards abundance of light for my developing-room. But I also lean towards very sensitive plates. I abhor a negative anything like fogged; so I shall again be believed when I say I use as "safe" a light as I can get. My object, then, must evidently be to find a quality of light that I can use in large quantity without danger to the purity of my negatives. And here I proceed to detail some experiments I have made, partly for my own instruction in private, but particularly in presence of a club of practical men in Edinburgh.

The weak part of all such experiments is that, though they are conclusive enough under stated conditions, they cover no other circumstances than those under which they were specially conducted; and whatever may be the result of experiments conducted by one man, trying to elucidate one question, with one material, at one time, under one set of circumstances, a totally different result might arise were all or any of these conditions altered. However, I give what really occurred in the course of my experiments with three media:—1. Glass, ruby flashed on one side only. 2. The same glass with a thin coat of matt varnish next to the light. 3. One thickness of "canary medium," as presented to the Club by Mr. A. L. Henderson, of London. The Club consists of thoroughly practical men; and when I say that there were present, among other well-known names in our ranks, Mr. J. M. Turnbull, Mr. Tunny (a photographic patriarch), Mr. Hume (chemist, microscopist, and photographer), Mr. Jamieson, Mr. Wm. Forgan, &c., it will be understood that what we did was accurately and carefully done. The lamp used was large, the sides about $12 \times 7\frac{1}{2}$ inches, the burner a good large fishtail gas burner, and the sides "glazed" with the materials named above. The plates used were Wratten's "drop-shutter" quarter-plates—a newly-opened box; the tests, tablets of Warnerke's sensitometer; and the development conducted in one dish with one dose of alkaline sulpho-pyrogallol. My idea was to test the illumination and proportionate safety of the media, and I began by handing the Chairman a railway time-table, covering consecutively two sides at a time of our lamp, and trying at what distance he could read the small print in the time-table by the light of the uncovered side of the lantern. With the clear ruby glass he could read at seven feet distance from the lamp, with ruby glass and matt varnish at four feet, and with "canary medium" at three feet. So much for illuminating powers.

We then took three of the Wratten plates, three sensitometer tablets, and three printing-frames, and exposed them (simultaneously) for precisely two minutes to the three sides of the lantern. To the ruby side we exposed No. 1 at seven inches distance, No. 2 to the ruby and ground glass at four inches, and No. 3 to the canary side at three inches. Developing all together as described above, the ruby-glass-exposed plate gave about 11 on the sensitometer, the ruby-and-matt-varnish plate about 6, and the canary 4 or 5. I speak approximately as to sensitometer numbers, because there appears some doubt as to what number ought really to be quoted in the use of such an instrument. In this experiment the canary medium had certainly the best of it, and I confess now, as I confessed then, that I was vastly surprised at the result; the "reason why" I shall shortly tell. It will be understood that I had and have no prejudice in favour of any particular medium, and all my endeavour was to make a fair comparison between the materials employed.

The fact, then, which I consider so far proved by my experiment—that this pale yellow-greenish light had the least effect upon my sensitive plate—set me thinking very seriously. In common with a great portion of photographers I had always understood that anything approaching to a pale lemon colour was a very delusive substitute for light-filters of orange or red tints, and I had also believed that a spectroscopic test of any material used for a dark-room lamp or window was a conclusive test; and here I found a material that, examined spectroscopically, utterly failed to pass as a safe medium, acting with greater safety in proportion to its illuminating powers than even a ruby glass which stood the spectrum test very much better, and also the same ruby glass with a light-diffusing material added. Considering what I had always been taught to believe concerning the action of light on sensitive salts, it is little wonder I was astonished.

I have repeated my spectroscopic examination of a number of substances and colours used for lamps and windows in the dark-room, and all my observations tend to prove that there is some great error in the theories usually laid down as to the action of the various parts of light on our plates. Today (24th April), with a student's spectroscope, by Browning, I have examined flashed and stained ruby glasses and orange papers oiled and plain, also canary medium and Mr. Debenham's combination, and certainly the spectroscopic tests have not at all been borne out by actual experiment with gelatino-bromide plates. I have only one inference to draw, namely, either the spectroscope is a false instrument, or our accepted theories as to the action of light on bromide, chloride, and iodide of silver are, if not false, at least seriously deficient in some respect. I need not say that I accept the latter alternative. The canary medium under spectroscopic examination passes all the green rays and some of the blue. Mr. Debenham's green glass and yellow paper do about the same, but cut off some of the red. The green glass alone has the latter effect. A double-flashed ruby glass allows very little except red to pass; so, too, does a stained red glass. Orange in any shape passes a considerable amount of green; and yet on trial—very careful trial—I found plates as little fogged by canary and Debenham as by any of the other media, or almost as little.

Doubtless my readers will say that for all these reasons I use canary medium or Mr. Debenham's combination for my dark-room window. Such is not the case. I tried the canary some time ago, and the green glass and yellow paper quite lately; and after going to considerable trouble and expense I undid all I had done, and replaced my ruby glass just as it was before my mind was unsettled by the late discussions. And why? Because I could not see with the yellow-green light, and because all yellow-greens are obnoxious to me. And there lies the reason why I deprecate all attempts to lay down the law on such matters for other people, and why I decline to accept for myself laws on such matters laid down by other people. But I must keep further discussion on this and other points for a future contribution to this "light" literature.

ANDREW PRINGLE.

ON LENSES.*

ASTIGMATION OR ASTIGMATISM.—If a cross be distinctly marked upon a card and focussed in the centre of the field of a lens, the two arms will be seen with equal distinctness. If now with an ordinary portrait lens the camera be swung round or tilted, so that the cross appears near the margin of the field, it will not be found possible to focus both arms of

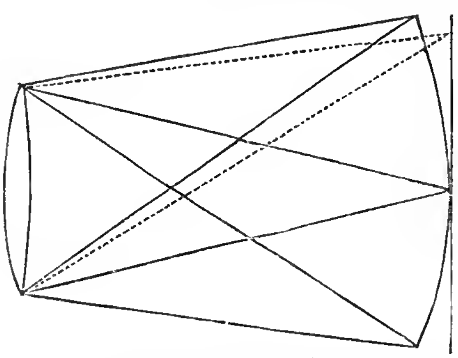
* Continued from page 261.

the cross at the same time. If that arm which is in a line with the diameter of the field be focussed the other will be wanting in sharpness. By turning the lens outwards, this other arm may be brought to a focus; but then the first one will be no longer distinct. The image of a point of light falling near the margin of the field of a lens possessing considerable astigmation, cannot be focussed sharply. On moving the lens it will be seen that the point takes the form of an oval or an approach to a short line, either in the direction of the diameter or the circumference of the field, accordingly as the lens is racked in or out. If a line happen to be in the same direction that the point is elongated, it appears sharp, but if the elongation be across the line the latter will be blurred. This characteristic is called "astigmatism" or "astigmation."

Distortion is caused by different portions of the lens, engaged in forming the various parts of an image, acting as prisms in bending aside the ray of light. Thus, with a single lens and a diaphragm at a distance from it, the axis of the ray coincident with the axis of the lens is not bent aside at all; but those rays coming from parts of the object towards the margin of the field, impinge upon portions of the lens possessing the form of a wedge or prism, and the nearer the margin the more this is the case. The images of those portions of the field are, therefore, turned aside, and, whether the stop be in front of the lens or behind it, proportionally more so the farther they are from the axis. Distortion is avoided by having an additional lens upon the other side of the diaphragm, giving a like amount of distortion, but in the contrary direction.

Curvature and Flatness of Field.—With an ordinary lens the focus of different parts of an image of equally-distant objects will be at something like the same distance from the lens, and to get them all sharp

FIG. 3.



Curvature and flatness of field.

at the same time, therefore, it would be necessary to employ, as the focussing-screen or the sensitive film, a portion of a sphere instead of a flat plate. When the oblique rays have their focus lengthened out, as shown in the dotted line, so as to fall upon a flat surface, the lens is said to have a flat field. Lenses corrected in any degree for this evil are said to be more or less flat-fielded. The great difficulty has been to get flatness of field without introducing an intolerable amount of astigmatism.

Absolute flatness of field must not be expected. The sacrifice of other good qualities in order to obtain this characteristic over any but a small portion of the centre of the plate is so great that, except with lenses where a very small diaphragm is used, it is only attempted approximately. It is, however, so valuable a quality that those lenses in which it has been made a particular point of are for most purposes to be preferred. It is, perhaps, the one quality to obtain which opticians would be justified in making greater sacrifices in other directions than they have generally been disposed to do. A lens may be examined for it in the following manner:—Focus some object sharply in the centre of the field; then swing the camera round so that the same object comes to points on the ground glass, at regularly-increasing distances of (say) one inch from the centre, and mark how much the lens has to be racked in at each distance. Now draw a straight line, and at distances upon it equal to those upon the ground glass, make uprights corresponding in length with the amount which the lens has had to be racked in at each distance, to get the best focus. Join the tops of these uprights by a line, which line will describe the curvature of field of the particular lens. This line should be compared both with the straight line from which it diverges, and with the circumference of a circle having a radius equal to the focus of the lens for the object that has been focussed. In order to reduce to an insignificant minimum any error arising from not having swung the camera accurately upon the optical centre of the lens, some distant object should be selected for focussing.

Flatness of field only implies the delineation upon a flat surface of objects at equal distances, and, therefore, even if absolutely attained, would still require, for even definition, that the various objects included should be placed in a semicircular curve round the lens, unless these objects were all so distant that the rays proceeding from them are indistinguishable from parallel ones. To delineate upon a flat field the image of a flat surface, such as a map or a newspaper, would require the marginal rays to be so much lengthened, that the field for parallel or distant rays would be actually curved the other way—that is, convex instead of concave.

By those unacquainted with the science of optics, curvature and flatness of field have often been confounded with spherical aberration and aplanatism; and, indeed, a diagram showing only the former characteristics, has actually been given by a professed teacher of the subject, in illustration of the word aplanatic.

Diffraction has been spoken of in connection with photographic optics. If it were really necessary to take it into consideration in the calculations for the construction of a photographic lens, these calculations would be even more complicated than they are at present. Fortunately this is not the case, and, as no scientific optician has admitted it as an element into such calculations, it may be dismissed.

When in January, 1839, Daguerre in France, and Fox Talbot in England, announced that they had succeeded in fixing the image of the camera, that instrument at once acquired an importance that could not otherwise have belonged to it. The lens with which it was furnished, although considered sufficient for a toy, or for occasional use to assist a draughtsman, had several characteristics which made its work as an instrument for the photographer very inferior to what a scientifically-designed instrument would give. Taking an ordinary double convex lens (say) of two inches diameter, and twelve inches focus, the following four faults had to be corrected:—1. Difference of the chemical and visual foci, necessitating an alteration or adjustment of the position of the plate, varying in amount with the distance of the object to be photographed, after each focussing. 2. Spherical aberration, in consequence of which the image was more or less confused and wanting in sharpness everywhere. 3. Curvature of the field, in consequence of which objects at equal distances, but upon different portions of the field, would be out of focus unless the plate were cup-shaped instead of flat. 4. Slowness of action.

The difference of chemical and visual foci could be corrected upon the lines already laid down. Daguerre himself, indeed, used an achromatised lens, but in England some of the earliest cameras were made for uncorrected lenses, and had graduations marked upon them for adjustment after focussing. The second mentioned fault—spherical aberration—was the most important, and the discovery of the remedy for this, involved the cure of the fourth defect, or that of slowness of action; because spherical aberration increases with the aperture of the lens—that is, with the proportion of the size of the lens to its focal length—so that a lens which was scarcely tolerable in its definition could not afford to have its rapidity increased by making it of larger aperture.

The want of a suitable lens being perceived, opticians and mathematicians in several countries set to work to try and cure the evils above-mentioned. One of these—Professor J. Petzval, of Vienna—succeeded in calculating the formula for an instrument which has always, and justly, been considered a triumph of mathematical science. So complete did it come into the world, that in more than forty years it is questionable whether any very important improvement or modification has been made upon it. This Petzval lens is the well-known portrait combination, which, with some little differences of detail amongst themselves, has been made by photographic opticians in all parts of the world. The essential and most striking characteristic of this lens is the elimination of spherical aberration, and the means by which this is achieved is, particularly, the separation of the components of the back combination. This separation allows the flint negative lens to possess so much *negative* spherical aberration as to correct the positive aberration of the whole system; and so perfectly is this accomplished, that it was possible to have the lens much larger in proportion to its focal length—quicker acting, that is—and, at the same time, give far finer definition than could be obtained with the then existing lenses, unless a very small stop had been used. The focus, at the same time, was somewhat lengthened towards the margins, so that the field, although not flat, was yet of a flatter curve, and did not for some distance on each side of the axis depart far from the flat plate.

By tolerating a certain amount of astigmatism it is possible to make the field of the lens flatter, and the amount of sacrifice that should be made of possible marginal definition to flatness of field, is a question upon which opticians have differed. I have said "possible marginal definition," meaning the definition that can be obtained towards the margin of the field if that part only be focussed; but in doing this with a lens of round field, the centre of the picture must be thrown much out of focus, or the subject to be photographed must be arranged in a deep curve. When this is done, owing to the violence of the perspective, all but the middle of the picture will appear exaggerated in size; and this effect is to be condemned, whether in the side figures of a group or, as it has sometimes been put forward in favour of a lens of round field, the advancing knees and hands of a sitting figure.

In some French portrait lenses of recent make, considerable flatness of field has been attained. The absolute definition has had to be a little sacrificed, but I think this sacrifice well worth making.

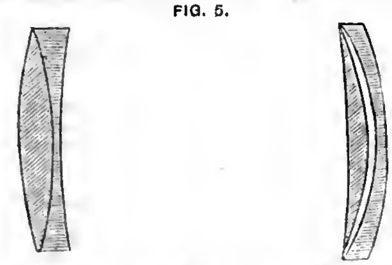
In the year 1866, the late Mr. J. H. Dallmeyer patented a variation of the Petzval lens. This variation consisted in reversing the elements of the back combination with such a modification of the curves as this change involves. The particular advantage claimed at the time for this form of lens has since been abandoned. The putting of the negative lens at the back allowed its distance from the positive element to be varied, and thus the perfection of its correction for spherical aberra-

FIG. 4.

Portrait Lens—Petzval's Original.

tion to be modified. It was stated that by altering the distance of the back lens, so as to reintroduce spherical aberration, and sacrifice definition at the focus, improved definition was obtained upon the planes not in focus. This claim—"diffusion of focus" it was called—was shown to

FIG. 5.



Portrait Lens—Dallmeyer's Modification.

be mistaken, and is no longer made. The lens, however, when employed with the elements in the position of best definition is a useful one, and some other well-known opticians have for some time past issued a series of lenses of this form. In this case, however, the back lenses are burnished together into their cell, and no shifting or alteration of their position is possible.

While on the subject of "diffusion" or "depth" of focus it may be remarked that a delusion on this point is cherished by a vast number of photographers. For this the manufacturing opticians are somewhat to blame. They have been in the habit of advertising lenses as having great "depth of focus," whereas that is a quality that, except as attained by the use of a small aperture or diaphragm involving slowness of action, does not exist at all. Still many photographers—careful, practical men, too, some of them—will tell you that they have, or have had, some particular portrait lens that will give the various parts of a sitter's head, the background behind him, and generally objects on different planes, with sharper definition than other lenses of similar aperture and focus, that have as fine or finer definition on any one plane. This is a curious case of mistaken observation; but in photography, unfortunately, mistaken observations may pass current as scientific facts.

Before passing on to the consideration of other lenses, it may be observed that some discussion has taken place as to which is entitled to be called a portrait lens. It is probable that portraits have, at some time or other, been taken by all the kinds of photographic lenses in existence. I have myself had in regular use a single lens for panel portraits and a lens of the rapid doublet, or Steinheil type, for promenades; but as the name "portrait lens" has been accepted as the distinguishing title for the Petzval intrument first described, and as the most striking characteristic of that instrument is that it will give good definition when used with an aperture of one-fourth of its focal length or even more, it would, perhaps, be best to retain the name portrait lens for a lens constructed on such principles that it may be made to work with that aperture. W. E. Debenham.

(To be continued in our next.)

RECENT PATENTS.

PATENTS APPLIED FOR.

No. 6,688.—"Cameras for Photographic Purposes." S. D. McKellen, Brown-street, Manchester.—*Dated April* 23, 1884.

No. 6,743.—"Production of Printing Surfaces by Aid of Photo-Reliefs." N. Macbeth, Bolton, Lancashire.—*Dated April* 24, 1884.

No. 6,826.—"Photographic Frames." P. J. Charles,—*Dated April* 25, 1884.

Our Editorial Table.

Practical Guide to Photography.

London: Marion & Co., Soho Square.

Messrs. Marion and Co. have published, under the above title, a useful hand-book of photography, which, without going deeply into the more abstruse branches, deals in a lucid and practical manner with the various operations connected with every department of the science. A short historical sketch is followed by a chapter on "The Application of Modern Photography," after which the working of wet and dry plates in and out of doors, printing, mounting, retouching, &c., are successively treated. Chapters on optics, on portraiture out of doors and in an ordinary room; instantaneous photography, printing-in skies, and combination printing; ferro-prussiate printing, and many other branches, deal with special subjects, and will prove useful to the novice. The work, consisting of upwards of two hundred pages, is handsomely got up and eminently practical.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
May 5	West Riding of Yorkshire	Godwin-street, Bradford.
„ 6	Sheffield	Freemasons' Hall, Surrey-street.
„ 6	Halifax	*Courier* Office, Regent-street.
„ 6	Bolton Club	The Studio, Chancery-lane.
„ 6	Glossop Dale	Glossop Coffee Palace, High-street.
„ 7	Benevolent	181, Aldersgate-street.
„ 7	Edinburgh	Hall, 5, St. Andrew-square.
„ 7	North Staffordshire	Town Hall, Hanley.
„ 7	Photographic Club	Anderton's Hotel, Fleet-street.
„ 8	Manchester	Mechanics' Institution.
„ 8	London and Provincial	Masons' Hall, Basinghall-street.
„ 9	Ireland	Royal College of Science, Dublin.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society, held on the 24th ult., the chair was taken by Mr. A. Cowan.

Mr. A. Mackie, referring to the lecture *On Lenses* given at the previous meeting, inquired what would be the effect, on the achromatising of a lens, of separating its elements—the crown and the flint—for any distance, or of having them in contact, but not cemented.

Mr. W. E. Debenham replied that altering the distances of the elements of a lens would to some extent alter its achromaticity, but much more so its correction for spherical aberration. Using the front elements of a portrait lens in contact, instead of being cemented, would not affect the achromaticity. There were advantages in the use of cement, as there was less loss from reflections, and, particularly, there was freedom from a deposit of dust, or of a film from exposure to the atmosphere. He had had a telescope of Dollond's, the image given by which appeared flat and misty. The objective was burnished into its cell, but upon turning away the brass rim, so as to be able to separate and clean the elements—there were three, a flint between two crowns—it gave a beautiful image. Lenses having uncemented internal surfaces ought never to be burnished in, but always set in screwed cells, so that they could be got at when required.

Mr. A. Haddon remarked that the glasses of telescope objectives were often set a certain distance apart. No doubt this was done with a view to more perfect correction of the spherical rather than the chromatic aberration. He then raised the question whether screwing a lens tightly into its mount would permanently deform the glass.

Mr. Debenham considered that with such a perfectly-elastic substance as glass permanent deformation would not result, but that it would return to its original form when the pressure was removed.

Mr. Haddon said that that was his view, but his reason for asking the question was that an optician had given as the reason for the defective working of an instrument which had been returned to him that the lens was permanently deformed from having been screwed down too tightly.

The Chairman remarked that whilst on the subject of lenses he would suggest that a table should be published giving the speed upon the uniform standard of diaphragms of various sizes with regard to lenses of different focal lengths. Perhaps Mr. Burton would undertake this.

Mr. W. K. Burton had already prepared such a table, giving the increase of diameter of diaphragm by the $\frac{1}{16}$ of an inch, and of focal length by half inches.

The Chairman then handed round a book and box for carrying sensitive plates. This will be found described in our last issue in the report of the meeting of the Photographic Society of Great Britain.

A question was read—Will an emulsion giving twenty on the sensitometer, if mixed with one of a lower number, give a mean between the two?

The Chairman believed that they would get the speed of the quicker. If there were much difference in the rapidity of the components—say ten or twenty times—the slower one would be unacted upon, and, as so much inert matter, would fix out, leaving the image thin. When they were nearly of the same speed the slower emulsion would be acted upon in the high lights, to which it would add force.

Mr. Burton knew of one commercial manufacturer whose practice it was to mix two emulsions—one a rapid one, prepared with ammonia, and giving a thin image; the other a stout-bodied one of about one-half the speed, prepared by boiling.

Mr. W. M. Ashman showed a sample of a bright lemon-coloured material for dark-room illumination, called "golden medium." Two or three thicknesses of this and two of green oiled silk, such as is sold at chemists' for surgical purposes, gave a light that was at once safe, sufficient, and pleasant.

Mr. Mackie said a few days since he had fitted the same material round a candle for developing purposes. He was at first afraid of the light, as it seemed too bright. However, he found that he continued development under the light for ten minutes without getting any veil or deposit upon a sensitive plate.

Mr. Hart had used a candle and ordinary orange paper, such as is used for collodion dark rooms. With plates giving twenty-four on the sensitometer the results were beautifully clear.

Mr. A. L. Henderson had the day previous substituted canary medium and yellow glass for the two ruby glasses that he had previously employed in his dark room. He found that with two minutes' exposure to his new light he only got a tenth part of the image that thirty seconds' exposure to the two rubies had given.

Mr. Barker thought that much depended upon the system of development. He had found that red light neutralised the effect of any white light that might be present. If a little ray of white light came sideways upon the plate whilst close to the ruby window the light of the latter was sufficient to prevent the white light from fogging the plate, as it would do if there were no red light to counteract it.

Mr. Debenham considered that this was a case of mistaken observation.

Mr. Burton said that we must either doubt our knowledge of the laws of nature or the accuracy of Mr. Barker's observation.

Mr. Haddon remarked that red light was not perfectly safe, and white light was not safe. The addition of the one to the other was not to be expected to produce a safe mixture.

Mr. Barker said that in his dark room, lighted by ruby glass, he could, when placing a plate of ruby glass over the developing dish, see the negative through the glass. In white light the ruby glass prevented his seeing the negative through it. Why was this?

Mr. Debenham replied that in a red light red objects appeared light like white. In his former dark room the red sides of pill boxes looked almost as light as the white tops. Red glass in such a case would not be very much more obstructive than white glass. In white light the eyes would be so filled by its superior power of illumination that they would not perceive clearly the light coming through the ruby glass—which light must pass it twice, once to illuminate the plate and then from the plate to the observer.

Mr. Henderson said that rapid plates would appear fogged in a ruby light when they were not so in reality, but would fix out clear. This was due to the fact that the more sensitive plates were composed of the green bromide of silver, which in a red light looked dark.

A discussion then took place as to the stage at which white light might be admitted to a dark room in which collodion was worked.

Mr. Henderson maintained that if it were intended to redevelope the plate white light must not be allowed to fall upon the plate even after thorough washing. Mr. Burton and Mr. J. Stuart, of Glasgow, took the opposite view.

As to the lighting of the dark room,

Mr. Stuart now used only yellow paper for all operations, including coating.

The Chairman referred to the death of the Rev. F. F. Statham, President of the South London Photographic Society, and stated, for the information of those who might wish to attend, the time and place of the funeral. On the motion of Mr. W. Ayres, seconded by Mr. Henderson, a letter of condolence was ordered to be written.

EDINBURGH PHOTOGRAPHIC SOCIETY.

"Round the World with a Camera" formed the subject of the Society's third lantern exhibition, which took place on Thursday, the 17th ultimo, in Queen-street Hall.

Mr. Andrew Pringle, who lately returned from a tour round the world, delivered the lecture, which was of a more than usually interesting character, as Mr. Pringle spoke from the results of his own experience. The views exhibited were derived from negatives taken by Mr. Pringle in the varied countries through which he travelled.

As the transparencies were of a very high order, the views, illustrating so many lands, were put on the screen in the most effective manner. The frequent applause of the audience sufficiently testified to their complete satisfaction.

A vote of thanks was awarded to Mr. Pringle for his lecture and admirable illustrations.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

The ordinary meeting of this Society was held at the Free Library, on Thursday, the 24th ultimo,—Dr. Kenyon, President, in the chair.

The minutes of the March meeting were read and confirmed, and Mr. C. Harris was elected a member.

The Chairman announced the donation of two lantern slides for the library, and eight prints of views near Settle for the album, from Mr. Watts. He (the Chairman) stated that with reference to a passage in his introductory address suggesting the desirability of a dark slide made with the shutter to open inside the camera—in place of the usual drawn-out shutter, which was too familiar in commerce—he had received a letter from Mr. S. Sidey, of London, stating that he had constructed two such slides about three years ago, never having seen or heard of one before; he had used them ever since, and offered to send one for the Society to examine. The Chairman gladly accepted the offer, and had the pleasure of exhibiting the slide. The mechanism, it would be observed, was beautifully simple and most ingenious. A slide of this kind would be most useful in instantaneous work, and wherever it was desirable to have the camera as inconspicuous as possible. The shutter exhibited was lighter and more compact than the ordinary form. Its use presented less leverage to the wind and less chance of admission of light during exposure. The plate was uncovered far more easily than by drawing a shutter. A rigid camera might be carried ready focussed, and with this slide exposure could be readily effected without anyone knowing what was going on. He (the Chairman) proposed a cordial vote of thanks to Mr. Sidey for his kindness in sending this interesting exhibit.

Mr. J. Thomson (21, High Park-street, Liverpool) exhibited and explained a new stand of his invention. The main features of this new stand consisted of stays for the purpose of steadying a large camera, and a very ingenious compass-swing arrangement for instantaneous work at sea, enabling pictures to be taken when the rolling and pitching of the vessel would otherwise render photography impossible.

Mr. H. N. Atkins recounted his last bank-holiday experience, when he found an excellent substitute for a focussing-glass in a film of gelatine which had had some milk added to it before it had set.

The Rev. H. J. Palmer corroborated Mr. Atkins' experience, and said that five years ago he had read a paper in that room recommending the gelatine-milk film as a substitute for ground glass.

Mr. Cornish exhibited a new stand of startling novelty. When in use it was rigid and strong, and when not in use it could easily be stowed away in the pocket. Each leg was composed of a ribbon of brass, which was rolled and extended on the principle of a paper spill-lighter. In answer to numerous questions, Mr. Cornish stated that it took from five to ten minutes to put up; its cost was 25s. It was admirably adapted for cyclist-photographers. Messrs. Newton and Co. were the agents for its sale.

The Chairman showed and described a new camera by Hare, which contained several novel features, and had been made especially for the tricycle.

Mr. J. H. Ellerbeck opened the discussion upon the subject appointed for the evening, namely, *The Best Mode of Developing Instantaneous Negatives.* He thought that among the essentials for success in this department of photography were slow development and the use of less pyro. than usual.

Mr. R. Crowe said that there were three classes of instantaneous subjects:—1. Open sea pictures with but little contrast. 2. Street views. 3. Lake scenes, and subjects with deep shadows. His formula for instantaneous work was one ounce of ammonia to two ounces of water, with sixty grains of bromide of potassium. For pictures in class 1 he would use a double quantity of pyro. and double bromide, in order to increase the contrasts. For class 2 three grains of pyro. to the ounce, and the usual proportion of bromide. For class 3 less pyro. than usual, care being taken not to force development and so produce fog.

The Chairman asked Mr. Crowe the lens and aperture with which he usually worked.

Mr. Crowe replied that he used a Steinheil lens of eight and a-half inches focus, and an aperture of $\frac{f}{}$.

Mr. W. H. Kirkby asked for further detail as to development.

Mr. Crowe said that the plate should be placed in pyro. solution first, and then the ammonia and bromide added twenty drops at once, and as soon as discolouration took place developing should be stopped.

Mr. Ellerbeck recommended keeping bromide and ammonium solution in separate bottles. By using bromide and pyro. first, and then adding ammonia, there would be greater likelihood of clean pictures.

Mr. Kirkby preferred to begin developing with plain pyro., and then to add ammonium and bromide.

The Rev. H. J. Palmer invariably gave a preliminary soaking in very weak solution of bromide of potassium.

Mr. Watts, on the other hand, strongly advocated first soaking in water with a few drops of ammonium, and then adding pyro. and bromide.

The Hon. Secretary suggested that as the discussion was an important one it should be deferred to the May meeting, and be opened by Mr. Watts.

Mr. Ellerbeck showed some prints from negatives recently taken at Hawarden.

The Rev. H. J. Palmer produced an excellent developing lamp made from a Chinese lantern, and rendered non-actinic by Thomas's ruby varnish.

After the usual votes of thanks to the exhibitors had been accorded the meeting was adjourned.

Correspondence.

Special Meeting of the Photographic Society of France.

An extraordinary and special meeting of the Photographic Society of France was held on Friday last, the 25th ult., in order that M. Audra might fully develope and demonstrate his plan of making gelatino-bromide of silver emulsions.

I may call it an "extraordinary meeting," as the idea is an innovation, it being the first time that the Society has thought fit to convoke its members for such an object. The crowd of members and friends present afforded a proof that this innovation should be repeated, or that the gelatino-bromide of silver process is in appearance more simple than in reality, and therefore numbers came to seek for information.

M. Audra is well known to the readers of The British Journal of Photography as an enlightened and intelligent amateur—in fact, one of the many to whom we owe the present advanced state of photography. I will endeavour to repeat his demonstration as clearly as possible—not that there is anything new in his formula or secret "dodges" in his manipulation, but because there is a simplicity in his manner of working which I myself have never before seen, and which I am certain will draw many adepts into this interesting field of our art-science.

M. Audra had before him on the table only a very few objects—those, in fact, indispensable for the demonstration. He began his lecture by saying that the system he recommended for emulsion making was simple in the extreme, at the same time that it did not give the palm to any other either in rapidity or perfection of results, it being the fruit of three years of incessant study and experiment.

The object this evening (he said) is to obtain a silver salt incorporated with gelatine, and that in the form of an emulsion. To obtain this result I introduce into a glass bottle holding about a pint—

Gelatine (Nelson's No. 1)	4 parts,
Distilled water	200 ,,
Ammonium bromide	20 ,,

This bottle is now placed in a kettle and the water warmed sufficiently to dissolve the contents. When the gelatine is dissolved the bottle is taken out and allowed to cool down. The following solution is then poured in:—

Water	50 parts.
Ammonia	15 ,,
Alcohol	50 ,,

I now dissolve in a glass beaker—

Distilled water	100 parts.
Silver nitrate	30 ,,

When the silver nitrate is thoroughly dissolved I put a glass funnel into the neck of the bottle containing the aqueous solution of bromide. This I give a whisk round, set the recipient upon the table, and pour the silver solution into the funnel without any precaution whatever, and that in full gaslight. I whisk it round once or twice. The silver bromide can now be seen to be of a bright ruby colour, and it will remain so for an hour or two. The emulsion in this state is to be kept twenty-four hours to ripen (without heat).

I will suppose the twenty-four hours to have passed away. I now weigh out twenty parts of hard gelatine, which, being slightly moistened, I put into the bottle and stir it well with a glass rod. If any silver bromide has been precipitated this gelatine will act as a mop and break it up. I now put the bottle into cold water, and raise the temperature until the gelatine is dissolved. The silver bromide has now a bright blue colour, and has gained its maximum of rapidity. I then pour out the emulsion into a porcelain tray and leave it to set. Generally in the morning it is hard enough to be cut up to be washed.

M. Audra then took a tray containing a jelly of gelatino-bromide of silver, and with a silver spoon he cut it into small square pieces ready to be forced through his canvas in order to wash away all soluble salts. He informed the members that up to this point all the manipulations can be carried on in white light and without any fear of fogging the emulsion, as the excess of ammonium bromide sufficed to prevent the action of light upon the emulsion.

I had here the privilege of putting several questions to M. Audra on the deoxidising influence of bichromate of potash, which he recommended to be used. His reply was that he had found no necessity to use the bichromate of potash, as his experiments had convinced him that the free bromide in the emulsion permitted the use of white light in the manipulation up to washing, and that with impunity.

Here are two excellent things which M. Audra has taught us:—1. That an emulsion need not be shaken or stirred to death by complicated apparatus.—2. That white light may be let into the dark room with impunity during the mixing or formation of the silver bromide, and to the great comfort and convenience of the manfacturer. Can this be depended upon? Let us see by a simple rule of three how much free bromide M. Audra has in his emulsion.

The equivalent of nitrate of silver being 170, that of bromide of ammonium 98, we state the problem as follows:—As 170 : 98 :: 30 : 17·3. Therefore, as M. Audra employs twenty parts of bromide of ammonium he has but 2·7 parts of free bromide in his emulsion. In my ordinary work I use more than this, and as soon as an emulsion is made it is my custom to pour a band upon a glass plate and expose half of it to gaslight in order to detect fog. When a dense black is obtained and the white remains pure it is set aside as good; if a sign of fog show itself, more bichromate is immediately added to cure it. I lay stress upon these facts in order that some discretion may be used, and to prevent, if possible, a beginner from making an emulsion in full sunlight. I am myself convinced that so small a quantity of free bromide cannot render the emulsion insensitive to white light in excess. This digression explained, we will return to the lecturer.

M. Audra, in reply to a question as to the addition of iodide, informed the members that he preferred pure bromide; but, if iodide be used, it should not be in greater quantity than one-fiftieth of the bromide employed. It can be added to the jelly about one hour after the emulsion is made.

M. Audra then put the small pieces of gelatine into a piece of canvas, and squeezed it through under water. This he did three times. When thoroughly washed he added thirty parts of swelled gelatine, dissolved by a gentle heat, filtered, and showed how to coat plates. He expressed an opinion that excessive filtering was not necessary. He himself only filtered through medical cotton—a kind of cotton which, if put into a glass of water, will sink to the bottom immediately.

As soon as the plates prepared by M. Audra were set he put them into a kind of square box devoid of top and bottom. Each box contained one dozen plates, and so made that they fit one upon the other, and so form a kind of chimney. He said that the drying was slow, but devoid of drying-marks, &c. He rubbed the plates over with a two-per-cent. solution of silicate of potash before preparing them. This chemical permitted the emulsion to run over it similar to collodion. No glass rod was used, and frilling was unknown.

M. Audra was highly applauded, and a desire was manifested that this interesting demonstration would be succeeded by others. A hope was expressed that the next demonstration would be given by Mr. A. L. Henderson, whose appearance is eagerly looked for by all lovers of photography. E. Stebbing, *Prof.*

25, *Rue des Apennins, Paris, April* 29, 1884.

LONG-FOCUS LENSES.

To the Editors.

Gentlemen,—This subject has recently been treated in your columns with special reference to portraits. Perhaps a few remarks on the use of a telescope object-glass as a photographic lens of long focus may prove interesting.

I have adapted the object-glass of a three-inch telescope of the cheap form, so largely sold for about £5. Its focal length is forty-four inches, and its form plano-convex. I have mounted it in a cell, with a fixed diaphragm 2·3 inches in diameter placed four inches in front of the lens, the plane surface of the latter being in front next the diaphragm. I use this lens with a 12 × 10 camera with the aid of a light pyramidal wooden tube, the large open end of which fits over the front frame of the camera (the sliding front having been removed), and is secured behind it by brass "buttons." The flange for the lens is screwed on to a block filling the small (truncated) end of the pyramid. Near the front end of the latter a U-shaped stirrup of brass is fixed on the under side of the tube, and has a tapped hole in the centre of it. This is to support the long, overhanging tube, thus:—The 12 × 10 camera is mounted on its tripod, the pyramid and lens fixed, and the object focussed. A small tripod is then brought up under the stirrup, and fastened to it by its own screw, which works in the tapped hole mentioned above. The camera is thus supported on six legs, and is extremely rigid, both in high winds and under the shock of a drop-shutter.

It will be seen that the ratio of aperture to focus is $\frac{1}{19}$. This stop gives sharp marginal definition on a 12 × 10 plate, and would cover much larger plates with smaller stops, or if, as in portraits, microscopic definition were not required at the edges. I have taken very good portraits in a room with ordinary side light with fifteen to twenty seconds' exposure. The depth of focus is very satisfactory. For landscapes of the "instantaneous" class, a drop-shutter giving $\frac{1}{14}$th of a second effective exposure suffices.

There are several uses, besides that of taking large portraits, for which a lens of this abnormally-long focus is available. There are numerous views which can only be taken from a point so distant that a negative taken with an ordinary lens would have to be enlarged. I have also used it for taking instantaneous views of children, &c., from my window. Of course it is quite necessary to be unobserved in such cases, otherwise the figures immediately range themselves in a perfectly-straight line and stare at the camera. With my lens not only can figures be taken of a good size at a considerable distance—a five-feet figure fifty yards off comes out one and a-half inch high—but the angle of view is so small that the camera can be placed far within the room and quite out of sight.

Shipping is another subject where it is very often desirable to obtain distant objects on a larger scale than is ordinarily practicable. I have recently been instructed to take a view embracing a very small angle from a given position at sea. Having moored a vessel on the required station, I was enabled with the 44-inch lens to take a very good view of the required bit of coast, although the motion of the vessel was considerable. The conditions were trying for a lens of such long focus, as an angular motion of the vessel of only one minute during exposure would cause the image of a fixed object on the plate to move about $\frac{1}{80}$th of an inch; but by dropping the shutter at the moment when the vessel was stationary at the top or bottom of a pitch I have reduced the width of blur to much less than this—perhaps $\frac{1}{500}$th of an inch. The lens seems to answer equally well reversed; that is, with the stop behind, the plane face being, of course, still towards the stop. The angle is too small for any trace of distortion, either barrel or pincushion, to be visible.

In conclusion: I would direct attention to the very small cost at which such a lens may be fitted up. A suitable object-glass costs about 50s., but one may often be procured from the telescope-maker slightly chipped, so as not to be available for a new telescope, but practically as good for photography. The cost of this would probably be about one pound. The mount and the extension of the camera need not cost more than another pound, and the latter is very useful for enlarging purposes. It might be made portable with a little more trouble.—I am, yours, &c.,

April 28, 1884. R. F. W.

THE ADJUSTABLE SKY-SHADE.

To the Editors.

Gentlemen,—In a footnote which you append to Dr. Nicol's article in the last number of the Journal (April 25th) on my sky-shade, you say you "are a little in doubt as to who was really the first of those *whose claims to the paternity*" of shades on this principle "are before the world."

This conveys the impression that I am among the number of those who make this claim; and, as there is nothing more repugnant to me than claiming merit belonging to another, I will esteem it a favour if you will refer to the number of your Journal for November 9th, 1883, in which Mr. Norman Macbeth's article, descriptive of my shade, appeared, and where, by my request, he very fully states the sources from which I got the suggestion to have been your Journal for November 5th, 1875, and your ALMANAC for 1876. In the former the Rev. Canon Beechy described what he called a "split sky-shade," and in the latter Mr. Baynham Jones wrought out the idea more fully. Both of these contain the suggestion or "generic idea" of mine, and they were fully acknowledged.

All that I claim is that, while fully admitting my indebtedness to these gentlemen for the merit of the suggestion, I have put the application of it into a much more practicable form; and a glance at their diagrams in the two communications above quoted, and to your number for November 9th, 1883, in which mine is given, will, I think, sufficiently show this. Had you referred to the article describing mine, your footnote, if given at all, would, I believe, have been differently expressed.—I am, yours, &c.,

89, West Regent Street, Glasgow, April 29, 1884. JOHN PARKER.

[Since writing the footnote to which Mr. Parker refers, and which was not intended to convey anything approaching to an insinuation that he had made, or was capable of making, a false claim to the invention of the sky-shade, we are now able to give its early history. The shade, which was for a considerable period on exhibition at this office—not nineteen, as we inadvertently put it, but fourteen, years ago—was invented by Mr. W. H. Price, and at page 24 of our issue for January 21st., 1870, it will be found described, together with an engraving showing its formation. But Mr. Price, although a genuine inventor, was not the *first* to invent this shade; for, upon the publication of the article just referred to, it then transpired that it had been not only invented but patented in 1862 by Mr. J. Mann, of Bruce Castle Academy, who illustrated his specification by drawings, one of which was similar to that by which Mr. Price's subsequent invention, and the subsequent independent inventions of several other gentlemen, were illustrated.—EDS.]

ENAMELS.

To the EDITORS.

GENTLEMEN,—In answer to Mr. F. Dugon: why does he make excuses and call them difficulties? As he is anxious to take up the gauntlet, allow me to make it worth his while by increasing the stakes fivefold—*yourselves* as referees.

I am sure I shall not be alone in thanking "B. F." for his very interesting information. Whatever Mr. F. Dugon's abilities may be, it is well his relationship and position should be known.

But why a complaint from Mr. A. L. Henderson? He seems to take to himself a cause for displaying his strong feeling towards me. What can I have said to sting *him!* Mr. Henderson would do well to read my original statement carefully, and expound it wisely to Mr. Dugon. If the Editors endorse "B. F.'s" invitation, I will with pleasure give a practical article on the enamel process as worked by myself.—I am, yours, &c.,

Rembrandt Studio, Redhill, April 28, 1884. J. BERRYMAN.

[It will afford us pleasure to receive the "practical article" proposed by Mr. Berryman.—EDS.]

To the EDITORS.

GENTLEMEN,—Your correspondent "B. F.," writing on *Photo-Enamels*, "thinks it is scarcely ingenuous, being a relative of, and assistant to, a well-known skilful photo-enameller, for me," &c. I beg to state that I am certainly in the employ of the photo-enameller referred to, but am not assistant to him in his capacity of photo-enameller, my occupation being entirely different, so that the "high vantage ground occupied by Mr. F. Dugon in this connection," mentioned in the Editors' remark, does not apply. I knew nothing whatever of the enamel process until last November, when I witnessed a demonstration, which was afterwards repeated at the London and Provincial Photographic Association.

After perusing the above I think your readers will agree with me that I am perfectly justified in attributing any knowledge I possess to the fact of my having witnessed the said demonstration.—I am, yours, &c.,

April 29, 1884. F. DUGON.

[With the publication of the above here ends the matter, so far as its polemic aspects are concerned.—EDS.]

GELATINE NEGATIVES.

To the EDITORS.

GENTLEMEN,—If you think the matter of sufficient importance you might allow me to correct a small error into which "Free Lance" has fallen as to remarks made by me at one of our society meetings.

In the first place: I do not think that "Free Lance" should "tilt" at remarks unless he has been furnished with a *full* report of what had been said on the subject. Matters reported "verbatim" are fair "game" for him, but not surely the short reports of meetings held, which often contain no more than a mere indication of what was the subject in hand.

I never said that "every negative had to be intensified;" on the contrary, I pointed out that if the action of the ammonia were continued long enough the colour of the negative seemed to be changed without adding to the apparent density at all, and that in my opinion detail too transparent, or of bad printing quality, was brought up to its proper power by this proceeding without in the least over-burdening the high lights. Of course this is only my opinion. If "Free Lance" considers the gelatine negative all that could be desired, so much the better for him. I hold another opinion.

Now and again, when the subject is entirely suitable, gelatine produces admirable work (after its own style); but I confess that I am sick of the great bulk of gelatine work, and think it a rare treat to come upon a photograph taken in the old days of wet plates. "Free Lance" considers that "gelatino-bromide would not be worth having if every negative had to be intensified." This, of course, is a mere figure of speech, as no doubt "Free Lance," like the rest of us, would not grudge the extra work were he assured that his work was improved thereby.—I am, yours, &c.,

Dundee, April 28, 1884. J. K. TULLOCH, M.B.

THE NEW DEVELOPER.

To the EDITORS.

GENTLEMEN,—I have tried the new developer, described in an editorial article of your last issue, and got very good results. In one instance development was prolonged over three hours, but no stain; nor was there any frilling, although I often experience this from the same make of plates when development is at all prolonged.

I anxiously await further results, and am sanguine enough to hope that at last a developer is forthcoming that will allow the much-desired latitude in exposure.—I am, yours, &c., J. BATE.

April 29, 1884.

PHOTOGRAPHIC SOCIETY OF IRELAND.

To the EDITORS.

GENTLEMEN,—In the report of the meeting of the above Society held on the 18th inst., the name of Mr. G. Pim, who exhibited specimens of Willesden paper and drew attention to the various uses this paper may be put to for dishes, trays, &c., was omitted. I would be obliged by your noting this correction.—I am yours, &c., CHAS. W. WATSON,

Asst. Hon. Secretary.

Dublin, April 28, 1884.

ACTINISM AND WAVE-LENGTHS.

To the EDITORS.

GENTLEMEN,—Referring to your foot-note to my article in last week's issue, you state that your columns are kept open for the purpose of discussing matters of practical photographic interest. If you did not think my articles were such why did you publish them?

As to my statement—"that it is useless to use two or more thicknesses of ruby glass, because the light which had passed through one would pass through the other unchanged, and that the action of the second thickness would be to simply cut off the power of the light, and for this purpose ground glass or white tissue paper would answer equally well"—it is most singular that in the interesting article by Mr. W. H. Harrison on the next page he expresses the same idea in nearly the same words. He there says:—"Under no circumstances should two coloured screens of the same material be used in the window of one lantern. The first coloured screen has filtered out all the actinic rays it had the power to absorb, so a second one of the same material can do little more by its colour; consequently its presence, practically speaking, but darkens the room, and has little influence but that of injuring the eyesight of the operator." Your readers will see that Mr. Harrison's experiments fully corroborate my statement, or, rather, what you are pleased to term "one of my illogical arguments."

As to the superposition of any two colours which produce white light: you say the safety would be undoubted, if safety can be the necessary accompaniment of absolute darkness. How can any two colours (supposing, as I stated, that they could be obtained pure) *producing white light* produce absolute darkness? It is unfortunate that you should make such a mistake as to say that absolute darkness was produced when glass screens were used. For instance, if you take a piece of so-called "cathedral green" of a yellowish-green tint and put it in front of one sheet of ruby glass absolute darkness is not produced; in fact the light passing through them is brighter than that passing through two thicknesses of ruby glass. But there are other ways of using the two colours. I thought of applying the idea to my reflecting lamp; and it is a strange coincidence that in Mr. Harrison's article he proposes to use two lanterns for the same purpose. I still contend if we can obtain pure colours that the white light produced by the superposition of red and yellowish-green would be the safest for photographic purposes, because (if I may be allowed to quote one more authority, namely, Mr. Lewis Wright, in his work on *Light*, published in 1882) "we may have a white light undistinguishable by the eye from any other white light, which will not, on prismatic analysis, yield more than two colours." And of the visible spectrum the two colours I proposed, which have the longest wave-length of any two which do produce white light, must be the best for photographic purposes.

I have read (and, perhaps, carefully studied) several acknowledged text-books on *Light* and *Colour*, and have never seen any mention of the fact that characters written in red ink on white paper, when viewed through glass of the same colour, are invisible, or any experiments of a similar kind which you say were familiar to every schoolboy of the past generation. I should feel obliged if you would say in what text-book it is mentioned, as the only experiment I ever remember seeing, at all bearing on the subject, was one mentioned by Prof. Tyndall, who said that Mr. Woodbury discovered that on looking through a piece of blue glass at green leaves in sunshine the light which came from the body of the leaves was crimson. This was probably due to the chlorophyll in the leaves.

As to my theories:—1. That there are two opposing forces in light, namely, that which produces the long wave-length or heat power *versus* that force producing the greatest actinic action.—2. The action of light on a film, namely, the bursting of the cells of the gelatine through the expansion or other action of the particles of silver bromide when acted on by light.—3. That light in passing through coloured glass or other medium is brought to one wave-length or rate of vibration, instead of all colours but the one being absorbed or annihilated: I can leave these for the present, knowing, as I do, that they have started new trains of thought in the minds of several of our leading experimentalists.

In a conversation, a short time since, with a gentleman who was selected a few years ago as one of the Cantor lecturers on photography at the Society of Arts (so I suppose we may consider him an authority), he said there was probably a great deal in my theory of the action of light on a film, as it would explain several difficulties, such as the effect of friction on a plate, the action of bichromate of potassium on an exposed plate, &c.; and we went into the question as to whether the microscope could not be used for further experiments on the subject. Only this morning I received a very sympathetic and encouraging letter from one of the old members of the Photographic Club, who had seen your foot note to my article.—I am, yours, &c., HERBERT S. STARNES.

April 28, 1884.

[As Mr. Starnes' article formed a chapter in an established discussion, it was not our place to decide that he was in the wrong; hence the appearance of his article. We have a right, however, to differ from him, and to declare our points of difference, which we did. A further explanation will be found in an editorial article on page 275.—EDS.]

Notes and Queries.

"AJAX" writes:—"With reference to 'S. T. W.'s' query in last week's Journal, I mean that the cake of emulsion which will be found at the bottom of the vessel (containing the methylated spirit into which the emulsion is poured to eliminate the salts) should, only for keeping to any future time, be placed in the glycerine, alcohol, and thymol."

"Do you know how the famous Pellet paper is prepared? If you do, will you give me the information? I refer to the paper by which, when copying from an architect's drawing, blue lines are produced upon white paper, and a specimen of which class of work I enclose.—Yours, &c., ARCHITECT."——In reply: The formula by which M. Pellet prepared his paper originally was as follows:—

Oxalic acid	154 grains.
Perchloride of iron	308 ,,
Water	7 ounces.

Those who have tried this process say that the quality of the drawings is improved by mixing a little gelatine with the above sensitising solution. We have not heard of M. Pellet having modified or altered this formula.

I NOTICE that nearly all the good landscape or architectural photographs that it has been my privilege to see were taken, or have the effect of having been taken, in bright sunshine. Is it necessary always, to obtain this effect, that there should be actual sunshine, and may fair results be obtained in actual shade? Presuming that a village street runs direct east and west, the principal houses being on the north side, what should be a suitable time to photograph, and what are the rules for obtaining the best effects in street photography? Could you not favour your inexperienced readers with a series of articles on outdoor photography? We shall have to pay for learning, but you may abridge the cost.—B. B."——In reply: To obtain a photograph of the village street that shall combine softness with boldness of effect, as regards light and shade, let the exposure be made when the sun is partially shaded by light clouds.

S. BARRY inquires if we can furnish him with a means of preparing an extremely fusible alloy in the composition of which there is no mercury. ——In reply: We are aware of one that was discovered a few years ago, and which will melt at a temperature below that requisite to boil alcohol. It is, so far as we know, the most fusible metallic compound without mercury that has been published up to the present time. Melt together—

Bismuth	14 parts.
Lead	8 ,,
Tin	6 ,,
Cadmium	2 ,,

To test its great solubility, place a few lumps of this alloy in a test tube, and pour in sufficient alcohol to more than cover it. Then hold it over the flame of a spirit lamp, and the alloy will be seen to fuse and remain at the bottom as a molten mass, while, as yet, the alcohol has not commenced to boil.

THE REV. FRANCIS JOHNSTON says:—"After reading your article on *Polarised Light* I attempted to adapt a Nicol prism to my camera lens, but found it quite useless for all but axial rays. This is, doubtless, owing to some shortcoming in the prism employed; for I have heard of, although I have never seen, prisms capable of transmitting an oblique ray, and which might, therefore, be entitled to be designated 'wide-angle prisms.' A friend who is at present residing with me speaks of the existence of a fluid Nicol prism, by which it is possible to transmit a much wider angle of light than can be done by means of one formed of calcite; but none of our local opticians seem to know anything concerning either its construction or capabilities. Can you throw any light upon this matter? The great advantages of a fluid polarising prism will be obvious to any one who has given the subject consideration."——In reply: The only prism which at all answers the description here given is one devised by M. Jamin, of Paris. It consists of a cylindrical vessel—such as a tube of brass—having glass ends, and filled with bisulphide of carbon, a thin slice of Iceland spar being placed obliquely in the fluid. This is the only fluid polarising prism of which we are aware, and we have no doubt of its capability of transmitting a wide angle of light. But this can also be effected by means of a large solid prism of spar—not wide, be it understood, in the same sense as that in which we speak of an angle of view of a landscape, but as applied to polarisation of light.

G. G. B. says:—"I had a wide-angle doublet, by a late London maker, bequeathed to me, and upon examining it I find that it does not include a wide angle, but, on the contrary, a very narrow one. The back lens is tolerably close to the rotating diaphragms, but the front lens is three times the distance of the other from it. Is there not something wrong here?"——In reply: Of course there *is* something wrong. It will be found that upon unscrewing the front lens a wide ring, the same diameter as the mount, interposes between the lens and the mount. Unscrew this and lay it aside, as it has nothing to do with the objective when used in its complete form. It is only when the front lens is to be used alone as a single landscape combination that the ring in question—the width of which varies from half-an-inch to an inch according to the dimensions of the lens—is to be employed, its function consisting in keeping the lens at a greater distance from the diaphragm than when it is used as an element in the wide-angle doublet.

"GENTLEMEN,—It has always been said that carbon photographs were durable, and that, while there was every probability of silver prints fading with more or less rapidity, photographs in carbon were beyond suspicion. In the face of this I have most positively to assert that a print of this kind in my possession has faded, or, more correctly, that its whites have become discoloured. I have the most ample means of verifying this; for when the print was placed in a frame a piece of white paper, upon which was written a brief announcement respecting the individual (deceased), of whom it was a portrait, was of precisely the same degree of purity as the whites of the portrait. This paper is still white, but the whites of the photograph have become greatly deteriorated. This being so—and that it is the case is palpable to all who examine it—it is evident that carbon photographs must be dethroned and removed from the position which has been erroneously accorded to them.—THOMAS BLACK."——In reply: Our reverend friend is perhaps not aware that the evil of which he complains has been recognised for many years. It arises (or *arose*, seeing it is now a thing of the past) from a certain peculiarity in the manufacture of the paper itself, and has nothing whatever to do with the kind of photograph which happened to be printed upon a sample of such manufacture. The paper itself would have become discoloured even although no photograph, whether in carbon or silver, had been printed upon it; but when representations were made to the papermakers they adopted such precautions as ensured the eradication of the evil. We are justified in saying that, if the final transfer paper for carbon printing be obtained from a responsible firm acquainted with the requirements of the process, not the slightest suspicion need attach to the permanence of the prints.

Y. Z. says:—"In making enlargements on wet collodion by means strictly analogous to the now nearly-forgotten photo-crayon system of the late Mr. Oliver Sarony, although I get, in nearly every instance, the class of tone at which I aim I cannot get rid of a certain heaviness in the lights. Not only does a species of haze cover the highest lights, but there is a want of delicacy in the half-tones. This appearance is not observed when examining the enlargement as a transparency, but it is painfully apparent as soon as the photograph receives its paper backing. It would be considered a special favour if you would give me a few hints as to the cause of this appearance."——In reply: The collodion employed is unsuitable. In this class of work special caution must be taken to secure cleanness throughout, with the most absolute transparence in the high lights. In not one case in a hundred can this be accomplished when using negative collodion. The best way of employing ordinary negative collodion for this purpose is to reduce the proportion of salting material present by adding at least one-fourth of its volume of plain collodion. Then dilute this by the addition of a mixture of equal parts of ether and alcohol, the precise quantity of this diluent having to be determined by the thickness of the collodion. Sufficient tincture of iodine (iodine dissolved in alcohol) must now be added until it is of a deep sherry colour. The collodion is then fit for use, but the strength of the silver bath must be reduced in a proportionate degree. Make use of a pyrogallic acid developer containing a fair proportion of citric and acetic acid, and if ordinary care have been taken to prevent light from obtaining access to the plate the result will be a perfect enlargement—pure in the whites, and transparent not merely in the delicate half-tones, but in the deep shadows. We are pleased to find that this convenient and effective method of producing enlargements is practised by at least one of our readers.

I will exchange a good photographic studio, show-case, balustrade, pedestal, and other accessories for a cottage piano of good make.—Address, L. W. Green, 18, Dennett's-road, Peckham, S.E.

I have several large oleographs (*Devotion*, and others larger), handsomely framed, which I will exchange for anything useful in photography.—Address, W. Slater, 282, Albany-road, Camberwell.

Wanted, two good interior and exterior backgrounds—Seavey's preferred; also imitation rock-work. To exchange, a new gem camera, with nine lenses.—Address, G. P. Abraham, Photographer, Keswick.

Wanted, a symmetrical or rapid doublet, in exchange for an extremely portable 11 × 6 landscape camera, by Meagher, stereo. arrangement, carriers, two single slides, &c.—Address, H. C., 3, The Grove, Vauxhall Bridge, S.W.

I have for exchange a large oil paint box, fitted complete, by Windsor and Newton, which cost £5 5s., and hardly used; also, electric bell, by the British Insulite Company. Offers requested.—Address, F. S. Lyddon, 2, Oakland Villas, Redland, Bristol.

My 5D being too heavy for outdoor camera, I will exchange it for a 12 × 10 rapid symmetrical or size larger: cash adjustment. What offers for a splendid hand-pushing van for plates 15 × 12?—Address, John Hodge, 31, Union-street, Stonehouse, Devon.

I will exchange whole-plate portrait lens by Jamin and Darlot, which will take 12 × 10 views, with centre glass, and Dallmeyer's No. 2B patent *carte* lens. Wanted, Dallmeyer's or Ross's 12 × 10 patent group lens.—Address, 17, Sneyd-street, Tunstall, Staffordshire.

I will exchange a Watson and Son's whole-plate universal studio camera, in perfect condition, with all recent improvements, including the double-swing back, for a tourist's dry-plate camera, about half-plate size, with three backs.—Address, Thomas Coan, 93, Caledonian-road, King's Cross, N.

Photographic studio, 18 × 9 feet, with dark-room and printing-room attached, two washing troughs, oilcloth on floor, backgrounds, and accessories, in exchange for astronomical observatory. Photograph and scale tracing for twelve stamps.—Address, W. I. C., 22, Victoria Crescent, Eccles, Manchester.

I will exchange Dr. Liesegang's *Manual of the Carbon Process*, Abney's *Photography with Emulsions*, and Lake Price's *Photographic Manipulation*, for other books. Wanted, Wake's *Manual of Colouring*, Chadwick's *Magic Lantern*, and Lewis Wright's *Light*.—Address, W. J., 2, York-street, Covent-garden, London, W.C.

What offers for large porcelain dish, 14 × 12, depth two inches; ditto large bath, to take 10 × 8 plates; quarter-plate box, to hold six dozen and six plates; small victoria camera, repeating back slide; and three slips of cottage scenery, 7 × 3 feet? Wanted, a half-plate lens or a pair of stereo. lens, or offers.—Address, S. Sidey, 419, Kingsland-road, E.

I will exchange an excellent camera and lens, all complete and in good condition, takes portraits or views 9 × 7, 8½ × 6½, and smaller sizes, with five carriers, honestly worth £6, for a short-focus for groups 10 × 8 (must be good) interior or exterior backgrounds, or serviceable head-rest, &c.—Address, Principal, Berlin Photographic Company, 160, Victoria-road, Aldershot.

I will exchange a complete set of photographic apparatus, comprising a best Spanish mahogany quarter-plate camera, first-class portrait lens, tripod stand, and all necessary chemicals and apparatus, for a bicycle forty-eight or fifty inches; also negatives of Indian scenery, seventeen splendid 10 × 8 plates, in strong plate box, for anything useful.—Address, B. Bentley, 21, Chatterton-road, Highbury, N.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

Photographs Registered.—

James Hargreaves, Union-street, Dalton-in-Furness.—*Two Photographs of His Grace the late Duke of Buccleuch.*

W. G.—Evidently you are employing a gelatine that is not suitable. Try a different sample.

Ignoramus.—Either paper will answer quite well for such small sizes as you name. For larger sizes perhaps that known as "thick Saxe" will prove more convenient.

A. N.—The machine is a copy of Eastman's, which has previously been described in our columns. Copies of Mr. Eastman's specification may be obtained at the Patent Office.

Wm. Otway.—The idea is by no means novel. A series of similar pictures were published many years ago; but, if we remember rightly, they met with but little commercial success.

Viotti Krommer.—The water must be very peculiar to act as you describe. We never heard of such a complaint before. Why not employ rain water on every occasion, and thus avoid all difficulty?

S. J. Winn.—1. Yes.—2. Doubtless no fraud was intended. It was clearly an error. Write to the firm, and they will certainly rectify it.—3. The fault of the varnish, as you surmise.—4. Not that we are aware of.

R. A.—Kindly repeat your query and we shall be pleased to assist you. As you did not enclose name and address your previous communication, according to our usual custom, was consigned to the waste-paper basket.

R. Arnold.—For the early history of photography you cannot do better than procure a copy of Hunt's *Photography*. It has been out of print for many years, but copies may often be met with on second-hand bookstalls.

M. A. (Cambs.).—Opinions differ very much as to which is the better—dark slide, or a changing-box. Some photographers use both—the changing-box when they take a large number of plates into the field, and dark slides if they only take half-a-dozen or fewer. If you only require to take three or four plates out, with a changing-box your equipment is as cumbersome as if you took a dozen.

Eugene.—There is no objection to your having plants in the studio, provided they are so placed that they do not interfere with the lighting of the sitters. The perfume from them will certainly have no injurious action on the plates.

G. P. C.—Twenty to thirty grains of gum dammar dissolved in each ounce of benzole will make a good transparent varnish which will dry without heat. It will do very well for glass positives, but is hardly durable enough for negatives.

Somerset.—It is doubtful if the photographer be entitled to use the royal arms unless he has some further right than that you mention. We fancy if you were to employ them you would incur a penalty of twenty pounds. So far as we can judge from so small a picture, the lens appears to be a fairly good one.

B. B. Benton.—From what you say we imagine there is no fault with the japan itself, but that you have failed to use it properly for your tin developing dishes. You appear to have omitted an importont operation, namely, "stoving;" that is, keeping the work hot in a japanner's oven for some length after the japan was applied. Hence the cause of failure.

J. Acres.—The lens is a decided "swindle." The mount is nicely got up, but the glasses are simply plain lenses—spectacle eyes, in fact. The lens is quite worthless for photographic purposes. Doubtless, if you apply at the address given, and where you sent the remittance, you will find the vendor is unknown. We return the lens per parcels post, as requested.

Inquirer.—The cause of your failure is, doubtless, due to having too little body in the picture. The transparency should be very intense before it is toned, and the toning should be very complete. Possibly, as you send the enamels to a china works to be burnt-in, they have been over-fired. Much less heat is required for enamels than for china. No glaze is necessary, but you must use soft enamels.

J. T. Houlden.—The fogging which "always occurs in the same part of the plate" is due to light in the camera—possibly reflected from some portion of the lens mount. Take the camera into a strong light and focus the image. Then remove the ground glass (keeping the head covered with the focussing-cloth) and carefully examine the interior of the camera and lens. In all probability the source of the evil will be at once discovered.

E. G.—A dark green baize of fine texture will answer the purpose very well, and is not likely to fade if the fabric be of good quality. Take care that the colour is not a bright one, for two reasons: a very brilliant colour will detract from the pictures; and very bright colours, as a rule, are more liable to fade by the action of light than those which are less brilliant. Our correspondent, at the conclusion of his communication, says:—"I have found a saturated solution of sulphate of iron and a saturated solution of citric acid—say one ounce of iron solution and a few drops of citric solution added—a capital thing to reduce over-density in gelatine negatives. If the negative be too dense when taken out of the fixing-bath I put it into the above solution without washing, and the density is soon reduced."

Received.—A. Conan Doyle; W. H. Harrison; C. G.; *Picture-Making by Photography*, by H. P. Robinson.

ON THE DEATH OF THE REV. F. F. STATHAM, M.A., LATE PRESIDENT OF THE SOUTH LONDON PHOTOGRAPHIC SOCIETY.

Only removed, transplanted to a higher sphere
And more congenial climes, he lives triumphant there.
The flickering lamp too early brought the gloom of night;
But, trimmed afresh, it sheds a more refulgent light.
We mourn his loss, affections strengthened year by year,
And vain the effort to suppress the rising tear.
His smiles were like the genial warmth of early spring;
No evil thought himself—sanctioned no evil thing.
Strained eulogy is needed not his worth to prove—
His every act was kind and fraught with Christian love.
Keen sympathies, refined, through his whole nature ran;
Say what a man should be—he was in truth that man.

William Cobb, Woolwich.

Photographic Club.—At the forthcoming meeting of this Club, at Anderton's Hotel, Fleet-street, on Wednesday next, the 7th inst., the subject for discussion will be—*On the Colour of Negatives as Affecting the Positive Prints.*

Photographic Bankruptcy.—The first meeting of the creditors of Robert Banks, photographer, who carried on business in Manchester and Blackpool, was held in Manchester on Tuesday last, before the official receiver, Mr. C. J. Ditt. Owing to a technicality in the new Bankruptcy Act only four of the creditors had legally conformed with the rules. It was stated that two of the bankrupt's houses were morgaged for £1,179, and it was believed that, if the property were sold, no more than this sum would be realised by the sale. There was also a sum of £220 deposited for photographs which were not supplied, but, in the opinion of the receiver, it was not probable that much trouble would be caused by these small creditors. The net deficiency of the bankrupt was £289 9s. 5d., and this sum could be realised by a sale of the business effects. A trustee and committee of inspection having been appointed, the meeting terminated.

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IODIDE OF SILVER IN EMULSION.

Mr. W. K. Burton's article in our last number, on *The Mixing of Emulsions of Different Sensitiveness*, suggested one or two points for consideration in connection with the use of iodide of silver in gelatine emulsion. Iodide of silver is commonly supposed to be unacted upon by the alkaline developer, and, therefore, its function in emulsion is held to be a purely mechanical one. The first part of this proposition has, however, been proved to be a fallacy, as iodide of silver has been found to be reducible by a powerfully-alkaline pyro. solution, though it is practically unacted upon by the developer of the ordinary strength employed for bromide of silver. Such being the case, it would seem that in an ordinary emulsion film containing both bromide and iodide of silver, the latter, being beyond the reach of the normal developer, would play a purely mechanical part in giving density to the film, and, by isolating the particles of bromide, preventing halation, as pointed out by Captain Abney.

This would appear to be the case if we accept it as a fact that under these conditions the iodide does really remain unreduced. But is it so? Some three or four years ago, during the period when the question of iodide in emulsions was undergoing discussion, we found that in an emulsion containing iodide made in the usual manner by mixing the soluble haloids with the gelatine before sensitising, the small trace of iodide employed did suffer reduction under the ordinary developer. This we attributed to the possible formation of a compound—a bromo-iodide of silver—in which the iodide became more susceptible of reduction. From the difference in the behaviour as regards sensitiveness and other properties of a bromo-iodide emulsion, made by mixing separately prepared bromide and iodide, we judged that this combination did not occur under such circumstances, though we gave no special attention to the matter at that time.

Mr. Burton's paper and our remarks thereon in our last number, however, brought the subject back with renewed interest, inasmuch as it seemed more than probable that the same action which causes the reduction of unexposed particles of bromide when in contact with exposed particles might also secure the reduction by an ordinary developer of silver iodide when in contact with exposed bromide.

In order to test the question a bromo-iodide emulsion was prepared containing iodide in far larger proportion than is customary. The bromide and iodide of silver were emulsified separately, each emulsion containing twenty grains of silver nitrate to the ounce, converted respectively into bromide and iodide. These were mixed in equal proportions. No account was taken of the sensitiveness of the mixture, as our only object was to discover whether and under what conditions the iodide of silver contributed to the formation of the developed image. Plates were coated with the mixed emulsion and also with each of the separate ones, so that we had plain bromide, bromo-iodide, and plain iodide films for comparison.

The first experiments, made by exposing the plates in the camera, were fruitless, owing to the wide difference in the sensitiveness of the three films. The plain iodide, in fact, refused, as we anticipated, to give any image at all; while it was impossible to tell how much of the difference between the remaining two was due to difference of exposure, and how much to difference of constitution. In fact, we found it necessary to relinquish the attempt at comparison in this manner.

Next, a bromo-iodide film was exposed behind a cardboard mask for a few seconds to weak diffused light, then developed unti apparently no further reduction would take place, and the image of the opening on the mask was clearly visible at the back of the plate. One half of the film was immersed in the hypo. bath until thoroughly fixed, when an examination of the fixed and unfixed portions of the developed image showed that the latter was decidedly the denser of the two.

This experiment proved of little real value; for it assumed as its starting-point that the whole of the reducible haloid, both bromide and iodide, had suffered reduction under the combined action of light and development. This assumption is by no means proved, and the loss of density in the fixed portion of the image was as likely to be due to the removal of some unreduced *bromide* as to unreduced iodide.

Another plate was exposed and developed in the same manner, and after thorough washing and "aluming" one half was cautiously treated with dilute nitric acid, without fixing. This slowly removed the reduced silver forming the image, but leaving a considerable amount of opalescence, which might consist of iodide or bromide or both. Treated with dilute ammonia the residue proved to consist of both iodide and bromide, but the results were so far incomplete and inconclusive.

The last experiment, however, left no doubt. A plate was exposed, developed, washed, and "alumed" as before. One end of the plate was then immersed to one-third of its length in dilute nitric acid until the developed image was removed. After again washing the opposite end of the plate was immersed in dilute ammonia to remove the unreduced silver bromide. We had now a plate showing three bands, the centre of which represented the original film before exposure as well as the image after development. One end represents the original film in juxtaposition with the residue of unreduced silver haloid left by the nitric acid; while the third portion represents the original film and the developed image with the whole of the bromide removed. A single glance suffices to show that the iodide of silver has been almost entirely reduced; for, on comparing the unexposed portion of the ammonia-treated end with the exposed portion of the acid-treated end of the plate, the former is found to be many times denser. In other words, the residue of exposed and unreduced haloids (both iodide and bromide) is far less opalescent than the residue of unexposed iodide. A drop of ammonia placed in the centre of that portion of the image from which the silver has been dissolved shows that a portion of the residue is bromide of silver, and that, therefore, the maximum action of light and development has not been attained. If such maximum can be attained it seems reasonable to suppose, therefore, that, in the presence of exposed silver bromide, silver iodide suffers total reduction under a developer of ordinary strength.

The establishment of the fact that silver iodide is not, as many suppose, so much inert matter in emulsion has an important bearing on the question of the sensitiveness of bromo-iodide emulsion. Many still cling pertinaciously to the idea that iodide necessarily slows an emulsion, and that the acme of sensitiveness is unattainable in the presence of iodide. Our own opinion, long since expressed, is quite the reverse; and it is corroborated by the fact that some of the most rapid commercial plates in the market, as well as some of the most rapid of private manufacture ever made, contain iodide.

SULPHITE OF SODA AS A DEVELOPER.

A fortnight ago we brought before our readers an account of a number of experiments we had been making with the above salt, showing that in combination with pyro. it aided development so as to be capable of entirely taking the place of ammonia. We also explained that when added to a carbonate of soda developer it greatly heightened the sluggish action of the latter; and, further, that in none of the trials we made did the sulphite either act as a restrainer or cause the negatives to exhibit a trace of green fog, the last two accusations having been freely made against it at one time or another.

We have since then made a very large number of experiments with sulphite as a developer, which in every way confirm our previous results, and shed, at the same time, much new light of an interesting nature upon the action of that salt. The experiments we last detailed were with comparatively weak solutions of the sulphite, four grains being made to take the place of one minim of strong ammonia solution. The time required for development being an hour and a-half, it was evident that, to obtain a practical success, this must be considerably reduced. We, therefore, tried gradually increasing quantities of sulphite, till at last we employed a solution almost approaching saturation. Not to detail every step of our investigation we may say that with such a solution (twenty-five per cent., to speak accurately) we were able to take a satisfactory negative with from fifteen to twenty minutes' development.

Having arrived at this stage, the next step was to make comparative trials with ordinary ammonia and bromide pyro. developers, so as to obtain the ratio of speed and other data.

Developing two plates which had received identical exposures side by side, we found that the ordinary developer gave an image apparently about ten per cent. more exposed than the sulphite developer. We then tried the effect of a restrainer, and this made a very great difference in the effect. So small a quantity as one grain of bromide of potassium to nine grains of pyro. "slowed" the plate to a very large extent, necessitating an exposure three or four times as great as when not used. A quarter of a grain to the same quantity of pyro. reduced this slowing effect to a more workable degree, and gave a negative of first-rate quality, though with increased exposure still being necessitated.

So far we had thus extracted the best value out of the new developer that could be obtained without any aid from other developing agents, and our next step was to see what the effect would be with the addition of ammonia in various proportions to the sulphite developer, our previously detailed experiments showing the result gained with carbonate of soda. We gave identical exposures to two plates, and to ensure the trustworthiness of our results in this series we developed these trial solutions side by side with the developer with whose action we were quite familiar. (To avoid repetition we may state that all the experiments were made with the pyro. of a strength of two grains to the ounce; and when we speak of a pair of plates we refer to plates having received exactly similar exposures). The sulphite solution was of the same strength throughout, an ounce by measure contained a-quarter of an ounce of sulphite. The "ammonia-bromide" solution contained half as much bromide as ammonia. We will term it "normal" when the ammonia added was half the weight of the pyro. In making such experiments we prefer to stop down our lens, so as to lengthen the time sufficiently to enable us to make exposures that would not vary more than one or two per cent.

A pair of plates were developed — one with pyro. in solution of sulphite, the other with ammonia bromide in water, one-third normal strength. Here the sulphite developer was unmistakably the quicker, and to find the rates we gave increasing exposures to different sets of plates; but when the sulphite-developed plate received only half that given to the plate developed in the other solution it was apparently far more exposed. We did not see the utility of proceeding further with this stage of the trials; we should, however, estimate that with the foregoing solutions the sulphite developer would require only a fourth or fifth of the exposure needed for the weak ammonia bromide.

We then tried the effect of adding ammonia to the sulphite, and we found a distinct gain in rapidity for the mixed developer. A pair of plates were developed with normal ammonia bromide in water for one, and in sulphite solution for the other. There was a clear gain of about ten per cent. in favour of the sulphite. When the strength of the ammonia bromide was doubled, which was the proportion we found best for the particular plates we were employing, the gain was still equally perceptible.

At this point we leave the matter in our readers' hands. To sum up our results: they clearly show that sulphite of soda solution and pyro. with no additions, though capable of producing negatives of great excellence, possess no advantages over the ordinary pyro. developer, and are inferior to it as regards the time required to complete a negative; but that such development can be performed satisfactorily is a fact well worthy of being placed on record, as, *a priori*, it would not be considered probable.

Finally: the verdict as to the effect of sulphite of soda in the developer, apart from its developing properties, was foreshadowed by us a fortnight ago in the trials we made with carbonate of soda. The experiments we have completed have involved the expenditure of considerable time; but they emphatically show that sulphite of soda, so far from being a retarder of development, or even of the process of development, has the very opposite effect. It is an accelerator, it does not produce green fog, and, in case of emergency, is capable, when added to pyro. solution, of developing the image without help or addition.

INCONGRUITIES IN SCENIC BACKGROUNDS.

It was, doubtless, owing to the lateness of the hour that the subject of scenic backgrounds to portraits was not treated by Mr. Norman Macbeth during his instructive lecture at the meeting of the South London Photographic Society last week; and when, in the course of a brief discussion which followed, a member endeavoured to get the opinion of the able lecturer on this subject, by inquiring as to the principles by which artists are guided in determining the position of the horizon line in the scenic background of a portrait, there were probably other things which may have prevented the scope of the query being observed.

But the misapprehension as to the question elicited from Mr. Macbeth one piece of information of interest, namely, that in painting a figure the artist adopts a shifting point of sight—one which shall always be immediately in front of the particular portion of the figure which he is at the time painting or drawing. For example: when painting the boots or feet of the subject be would bring his canvas down opposite that portion of the figure, and gradually raise it as he proceeded upwards (or *vice versâ*, as the case may be), until when the head was reached—if the subject were a tall, standing figure and the painter deficient, as some painters are, in longitudinal proportions—the artist would have to mount a platform or obtain the elevation afforded by a pair of steps, in order to complete his drawing under uniform circumstances.

Photographers, however, cannot resort to this method of securing parallelism, and it would be carrying conventionalism too far did they attempt to do so. The only thing left for them is to strike a line somewhere between the offensiveness of the realism resulting from an abrupt perspective caused by having the point of sight too near the subject, and the practical impossibility of a point of sight placed at infinity so as to secure parallelism of lines. Such a compromise is possible by placing the standing figure at a distance of not under thirty feet from the camera; and, if adopted, it would prevent young ladies from denouncing photographers for having represented them with feet of monstrous dimensions when the peculiarities of the pose necessitate the feet being visible.

This adoption of different points of sight in one picture explains what some photographers have designated the unreality and impossibility of one of Raffaelle's cartoons, *The Transfiguration*, which is intended to illustrate scenes that are transpiring simultaneously at the top of a "high" mountain and at its base. The whole of the details of the scene at the base indicate the point of sight as being very close to the actors grouped in the scene; and, from such point of sight, although it is quite possible the mountain top might also have been seen, yet it is barely probable. Hence for the transfiguration scene itself the point of sight has been raised to nearly the mountain summit; and, not only so, but it is brought much nearer to the figures there depicted. But photography, being a realistic art, must eschew the conventional tricks of the painter, and this brings us back to the scenic background.

It was stated by a speaker, at the termination of Mr. Macbeth's lecture, that several photographers who had justly the reputation of being eminent in their profession, especially as regards the lighting and posing of the figure or figures forming a picture, possessed so little knowledge of perspective, and those laws which determined the adjustment of a scenic background to the figure, that the horizon in such ground, which should in most cases be on a level with the head of a sitter, was in many instances so ignorantly or recklessly placed as to be no higher than the hips or even the knees, implying that the camera was brought down to that level when taking the portrait.

Now, as in nature the horizon in a landscape is opposite to the eyes, or point of sight, so should it be in the photographer's studio, in which the horizontal line of the scenic background ought to be placed as nearly as practicable on the same level with the lens. This would render impossible the perpetration of incongruities of the nature hinted at; and, although slight departures were made from this rule, still there would be nothing in the resulting picture to greatly shock the sensibilities of an educated observer. Even a superficial knowledge of perspective and its applications would be much better than none at all.

A scenic background should never have a horizon line of a pronounced character, and when such indefiniteness happily prevails it may, without interfering with the head of the portrait, be brought up to its level; and whereas we are most familiar with the faces of our friends when viewed from a point approximately of the same height, so ought the photograph, in order to be a good and easily-recognised likeness, also be taken from that altitude, whence it follows that the horizon line of the scenic background will also be on the line of the head, assuming such a background to have been employed.

But truth in nature is not apparently greatly outraged if we take a slight liberty with realism, and lower the background six or eight inches from the point dictated by strict accuracy. This slight degree of pandering to conventionalism does no harm, while it may be the means of withdrawing from the immediate surrounding of the head a horizontal line which would be a serious interference. While no background painter possessing proper skill would allow a well-determined line to cross the scene in the vicinity of the head, yet, unfortunately, such do exist.

We are not here contending for the display of taste in backgrounds, otherwise we would say that the scene should be only faintly suggestive instead of being depicted with full, pronounced detail; but we do contend that photographers themselves should make an aim at being at least approximatively accurate in the selection and placing of the background, so as to avoid the incongruity of seeing in the photograph two entirely distinct perspectives. Go to nature for a few minutes, and when you and your friend are walking in a field stop for a moment and examine the relation between the horizon and the friend, when the former will be found on a level with the head of the latter.

A USEFUL APPLICATION OF THE BITUMEN PROCESS.

The practical hint about to be given is one that may prove of value to professional photographers for producing, by very simple means, a copper plate from which the design or imprint on their mounts may be obtained. Many photographers are capable of making a tasteful and original design for the back of their mounts, but find when they come to have it engraved of several different sizes, it becomes a somewhat expensive matter, particularly if the design be of an elaborate description; hence they frequently have to be content with the stock, and sometimes hackneyed, patterns of the mount manufacturers. If the design be simply written direct upon the stone the cost would certainly be less, but the result is never so good as when transferred from an engraved copper plate.

By the method about to be described any photographer of ordinary intelligence may produce his own printing plates—either for his mounts, billheads, or address cards, and without any previous knowledge whatever of engraving — at a cost (however elaborate the design may be) but little exceeding that of the copper plates themselves. The process is simply a photo-etching one.

In the first place, the design and lettering must be drawn or written on a sheet of smooth cardboard, and from this a negative is made. The best plan is to make the design on a larger scale than is required for the plate—say on a royal or imperial board. The advantage in proceeding in this way is twofold:—First, the drawing need not be quite so neatly done, for when it is reduced any trifling defects will be less noticeable than if it were made the same size as required for the plate. Second, when the design is on a larger scale it may be reduced in copying to any size that may afterwards be required, so that one drawing will suffice for several different sizes. From the large design a negative is now made. This should be fully exposed, so that considerable vigour may be obtained in the development without risk of clogging up the finer details, which would be the case if it were at all under-exposed. The negative may be produced by any process; but it is essential that the lines be clear, transparent, and as free from fog and veiling as possible.

Now, if we were to employ our negative direct for producing the etched plate, we should get just the reverse of what is required. Therefore, from the negative we must take a transparency. This must be very strong, the lines being as black as they can well be made, while the other portions are as free as possible from veiling. This quality it is impossible to obtain unless the negative, in the first instance, be tolerably strong. If the transparency be made by camera printing the negative may be taken somewhat larger than the largest size plate required; then from it any number of smaller sizes may be obtained at will. Thus one negative will serve for any size of transparency.

A suitable transparency having been obtained, the next thing is to produce from it the copper printing plate. Copper plates of different sizes may be obtained from any establishment which supplies printers' materials. Possibly, however, if the plate have been long in stock its surface may be somewhat tarnished. In that case it must be repolished with wash leather and a little precipitated chalk moistened with methylated spirit or benzole. In all cases it is a good plan to subject the plate to this treatment, so as to ensure its freedom from all traces of greasy matter left in the polishing. The plate is now attached to a pneumatic plate-holder, and a dilute solution of bitumen in benzole is poured on and drained off in the same manner as collodion and dried. With regard to the strength of the solution little can be said, as different samples of bitumen vary considerably in their characteristics; but, as a rough guide, we may mention that it should be of such a strength that, when dried on the copper, it should only be sufficient to communicate a slightly-brown tint to the metal.

The transparency (which should previously be rubbed over with a little French chalk as a safeguard against the bitumen adhering to it while printing) is placed in a pressure-frame with the bitumenised plate upon it, and then exposed to light. Strong sunlight is the best; three or four hours will generally be required. In diffused daylight as much as two or three days may be necessary, as the bitumen process is an exceedingly slow one. When the print is deemed to be sufficiently deep the plate is removed from the frame and placed in a dish of turpentine, to dissolve the bitumen where the opaque portions of the transparency has protected it from the action of light, leaving the copper bare. With some samples of bitumen, however, turpentine alone will not dissolve it; hence, if it be found after the lapse of a few minutes, that the bitumen is not being dissolved, a little benzole must be added, bearing in mind that too much of this will dissolve the whole of the film, even where the light has acted. When the copper has been rendered bare in the lines the plate is rinsed in clear turpentine and then dried.

The plate should now be carefully examined, and if the design show any imperfections it should be cleaned off with benzole and a new one produced. Full and complete working details of the bitumen process, which is given here only in outline, will be found on pp. 595 and 607 of our volume for 1882, to which the reader will do well to refer before commencing operations.

The photographic portion of the work being completed, the back and all those parts of the plate—except, of course, the lines—which are not protected with the bitumen are painted over with Brunswick black. The plate is then immersed in a dish of the etching fluid. The one we prefer is a strong solution of the perchloride of iron; but professional etchers, as a rule, use dilute nitric acid—one part of acid to two of water—the bubbles of gas, when this agent is employed, being removed by gently rubbing the surface of the plate over with a feather. When it is judged that the design is bitten in sufficiently deep the plate is washed and dried and then closely examined. If the lines are not considered deep enough the plate is replaced in the fluid, and the etching continued. If there be much very fine detail in the design it is sometimes advisable, before re-immersing the plate, to paint such portions (where it occurs) over with Brunswick black, so as to protect them from further action, as it is not desirable that the finer lines should be so deep as the bolder ones.

When sufficient depth is attained the plate must be thoroughly washed with water to remove all traces of the etching agent. Finally, the bitumen is cleaned off with benzole, and the plate is then ready either for printing from direct, or for producing impressions to be transferred to stone and afterwards printed from lithographically.

It is not often that the photographer is likely to injure himself by accidentally splashing nitric acid upon his skin, though when collodion was more used than it is at present this was by no means infrequent. Still, the acid is employed, and a method of preventing any ill effect from such an accident will be useful to know. A writer in the *Chemical News* states that he recently met with such a disaster, the acid going on to his face. Copious effusion with cold water, followed by the application of ammonia, potash, lime in water, &c., were tried, and without effect. Considering the action of the acid to be an intensified process of oxidation, he applied a weak solution of sulphurous acid, so that the nitric acid might spend its energy upon oxidising it. The result was marvellous. The blisters were reduced in a few minutes, the irritation removed, and in an incredibly short space of time the wound healed.

We have been making a calculation as to the amount of metal required for the aggregate amount of type that has been employed during the last twenty years to "set up" in various periodicals announcements of the discovery of photographing in colours. Three lions from Trafalgar-square and a griffin could be cast from them, and still leave some to spare. The turn for the repetition of the perennial story has come round again, so *The Times* informed us last week that "an engineer at Versailles claims to have discovered the art of taking photographs in colours; or, in other words, of reproducing the colours of the body or landscape photographed."

The Bodleian Library, among its treasures, holds the Hope collection of engraved portraits, numbering some two hundred and ten thousand, and it is taking steps to increase the number largely. The librarian has issued a notice asking for the presentation of interesting objects, which he classifies under four headings, the last being directed to authors, inviting them to present the library with their photographs and engraved portraits, and to add on the back their full names and any other particulars. By "authors" the librarian understands composers of printed books, pamphlets, magazine articles, maps, and music, his design being to form and perpetuate a portrait gallery of literature.

In these days, when almost every other man is, or claims to be, an "author," the mass of portraits which would accumulate if the appeal were fully responded to is appalling to think of; hence the recommendation we had almost penned may be left unwritten. It was to the effect that the librarian should add to his notice the word "permanent" before photographs.

By-the-way, the engravers are making use of one of poor Rejlander's pictures—the new edition of Lord Tennyson's works, to be published the first of next month, being illustrated by a portrait engraved by Mr. G. J. Stoddart from a photograph taken by the late Mr. O. G. Rejlander.

Are we to have a new Copyright Bill at last or not? Mr. Hastings introduced one again last week, and on Wednesday it passed the the first reading in the House of Commons. We have not yet received a printed copy, but we understand that in its main features it resembles that introduced last session.

Last year's Bill has, however, been carefully revised, and the celebrated suit of the Stereoscopic Company—in which, as our readers may remember, the Company lost its case through a successful contention being raised that the "author" of the registered picture was not Mr. Nottage—has been the cause of certain modifications and additions being made, in order to prevent future disputes as to "who is the author of a photograph." Mr. McLaren introduced a short Bill last session to meet this point, but it was dropped at an early stage.

Most of our readers have heard of the Jablochkoff candle—one of the earliest departures of a novel character in modern electric light. The inventor, from whom it derives its name, has recently devised a remarkable kind of battery in which metallic sodium in thin plates takes the place of zinc or other similar element. When not in use the sodium is covered with a hydrocarbon to prevent oxidation. A company has been formed in Paris to work this sodium battery, which is stated to possess by far the highest electro-motive force of any battery known.

We have often alluded to the useful department for the examination and verification of scientific instruments at Kew—an establishment whose scope of usefulness is still unknown to a large majority; though, when it is borne in mind that for a trifling fee a thermometer, for example, can be examined and its performance given to fractions of a degree upon every degree of its scale, the wonder is that it is not taken advantage of to a far greater extent. Though a photographer in some delicate operations should always be provided with a thermometric instrument to be depended upon, it is rare that he is called upon to undertake operations where the utmost exactitude in time-keeping is required. It may, however, be interesting to learn that he can now send even his watch to Kew, and for a sum varying from five shillings and sixpence to one pound, according to the class desired, have his watch examined and a certificate of its rate given to him.

The Liverpool Astronomical Society—the only similar Society out of London—has done good work in photography, as our pages have shown. Our learned contributor, the Rev. S. J. Perry, F.R.S., whose article on astronomical photography at Stoneyhurst Observatory, which we gave to our readers a few months ago, was found of such great interest, has testified to the same fact. In a lecture he recently gave before the Liverpool Astronomical Society upon *Sun Spots*, he recommended attention being given to a branch of the science but little pursued—the photographing of "faculæ and rice grains," as certain peculiar appearances upon the face of the sun are termed. By that means, he said, it was very probable the nature of sun spots might be discovered. If the Society attempted it and succeeded as well as they had done in some of the stellar photographs he had seen, he "would venture to say their sun pictures would be second to none in the world."

We do not often hear of the magnesium light nowadays, except in connection with sensitometer experiments. Its comparatively high price has made its use a luxury, or even a curiosity, rather than a necessity. And now that the electric light has made such progress it is doubtful whether magnesium, even if provided at a much lower rate, would take a leading place in photographic operations. But experimenters are still at work, and often have we been promised marvellous reductions in the price of the metal, which is mainly governed by that of sodium—the chief factor in its economic production. A process for the production of magnesium by electrolytic agency has been patented, and, as a test of its capability, Dr. Fröhlich lately brought before the Berlin Academy of Sciences a large lump of metal made under the patent. The mode of manipulation is to fuse chloride of magnesium, and to decompose it by the electric current while in a state of fusion.

PHOTOGRAPHY AT A FANCY DRESS BALL.

One of the latest novelties in connection with the practice of photography, and one which a few years ago would have been regarded as an imaginative dip into Utopia, is the system which has prevailed during recent years of photographing the guests at balls during the course of the proceedings, thus saving the trouble involved in the necessity for specially dressing for a visit to the photographer. The introduction of artificial light into the photographer's studio in a measure did away with the need for a special "dress rehearsal," as the person was thus enabled to call at the photographic studio on his or her way to the ball itself, and, at the expense of a few minutes' delay, secure the desired picture. Even this slight amount of trouble deterred many from securing such representations of themselves in costumes removed from those of everyday use, the opportunities for which, especially in the case of fancy dress and masked balls, are of sufficiently rare occurrence to render them noteworthy incidents in social life.

It remained for the late Signor Lombardi to solve the difficult problem of how to induce the ball-going public to become ready and remunerative clients of the photographer. His happy conception of taking the studio to the sitter, instead of trying to entice the sitter to the studio, was from the first a success both photographically and, we should say, financially. By means of the luxograph apparatus—which, by its simplicity, does away with the costly and cumbrous appliances required for the electric light—Signor Lombardi, assisted by Mr. Alder, the patentee of the luxograph, some five years ago made the first successful experiment in establishing a photographic studio, if not in the ball-room, at least in an adjoining apartment or ante-room. The measure of success may be calculated when it is stated that something like a hundred and fifty negatives were taken on that occasion. The electric light has since been used in a similar manner in Paris on the occasion of a *fête*, and subsequently in London the famous Cromwell House "*posés plastiques*," and the recent fancy ball of the Savage Club in the Albert Hall, have been so treated. But it is only the simplicity and portability of their apparatus which enables the Luxograph Company to make a special feature of this class of business.

Curious to see what progress they had made in the course of five years in the establishment of a smoothly-working system, we seized the opportunity of dropping into the "photographic room" during the progress of a private fancy-dress ball at one of the large West End halls, having previously called to inquire whether photography was to form part of the evening's programme. At 5 p.m. we found Mr. Alder superintending the commencement of the erection of the needful apparatus.

This consists, as many of our readers are aware, of an immense reflector lined with silvered glass, by which the light is thrown upon the sitter. This, with its pedestal, stands some eight or ten feet high, so that it is not the most comfortable of pieces of apparatus to move about. In the centre of the back of this reflector is a large lantern glazed with blue or violet glass, in which the compound that produces the light is burned. The products of combustion are of a most poisonous and suffocating character, and must, therefore, be led away into the open air. This is easily effected by means of a few lengths of sheet-iron stove pipe passing from the lantern to the upper part of one of the windows opened just sufficiently to allow the tube to pass out into the open air. In wet or windy weather the open window is protected by nailing over it a thick cloth or canvas.

So perfect is the system that less than an hour suffices, in a strange place, to erect the apparatus and make all the needful arrangements; and during the whole of the "subsequent proceedings" the clients remain in happy ignorance of the fact that they are only divided by a thin screen from the highly-poisonous and almost unbreathable smoke produced by the combustion of the pyrotechnic compound. The apparatus itself travels comfortably by rail, the particular one whose erection we have witnessed having traversed a good many miles of country in its time. As we leave to prepare for the evening, Mr. Alder informs us "it will only be a small ball; one hundred and eighty are down for supper, and that is about the number of sitters we reckon to secure on big occasions."

Later on, about ten o'clock, we leave the brilliantly-lighted ball-room, with its bright colours and ever-changing forms, and find our way to the quieter and less brilliantly-lighted apartment devoted to photography. We are warned as we enter, by the soft blue light that fitfully illuminates the centre of the room, which is hidden from us by the background, that an exposure is being made. We wait until it dies out, when from behind the background emerges a fairy form gorgeous in white satin and hair powder, and representing—goodness only knows what! She is followed in rapid succession by three or four cavaliers in court costumes of much similarity in style but diversity of detail. Then follow a heterogeneous collection of characters of more or less (some principally the latter) gorgeousness—from the bejewelled Indian prince, the Spanish *danseuse*, the coquettish *cantinière*, in her smart dress, tasselled boots, and (let us whisper it) immense "dress improver," to the typical barrister in wig, gown, and check pants, the gentleman in the canon's uniform (which somebody irreverently describes as that of a "Somerset House porter)," and, lowest of all, the young man who turns up in his last season's lawn tennis costume. We looked on as each took his or her turn, and could not help remarking how most of them entered into the spirit of their respective characters. The supercilious *nonchalance* of the courtier raised a desire to kick the individual who in everyday life was probably a stockjobber. The spanish *danseuse* appeared anxious to favour the small audience with a gratuitous performance on the tambourine during the exposure; while our *cantinière*, when persuaded that she would not be able to keep still long enough in the act of delivering a military salute, became content to devote her attention to the exhibition to the best advantage of her top-boots and dress improver.

The light for focussing was derived from a line of gas jets surmounting the reflector, the operation of capping the lens being unnecessary, as, except when the pyrotechnic mixture is burning, there is no light sufficiently powerful to affect the plate. The exposures are measured by the quantity of the burning compound, and seemed to average from twelve to fifteen seconds with a lens somewhat stopped down. By a division of labour the work proceeded smoothly and rapidly. One to arrange the subject, one to manage the light, a third to change the plates and take the names and addresses, formed the complete staff. The subject having been posed and focussed, a signal is given and the sound of a "vesuvian" striking is heard. This dropped into the dish of burning compound, the door of the lantern is closed and the exposure commences. No plates are developed on the spot, as, from a perfect acquaintance with the value of the light, errors in exposure are rare. "Have you many failures from any cause?" we asked. "We had one at our last ball," was the reply. "It is impossible to always to detect a move, but if we see unsteadiness or have reason to suspect actual movement we repeat the exposure; otherwise we trust to the first plate."

We learnt subsequently that at this "small" ball (there were about a couple of hundred dancers) between fifty and sixty cabinet pictures were taken, two only of which were spoilt by movement of the sitter. We concluded that, while this system is an undoubted convenience to the sitter for the reasons already stated, it may be made a most remunerative one to the photographer; and it is to us surprising that it has not become more popular than it is at present.

NOTES ON THE COMPOSITION OF A PICTURE.

By Norman Macbeth, R.S.A.

[An abstract of a communication to the South London Photographic Society.]

On entering on the subject which I have taken in hand, I wish it to be understood that a great portion of what I shall have to say will be of so desultory a nature that I expect more profit may be gained from the answers to questions put than from what I now bring before you.

Art is that power by which we manifest our individuality. Every man has his own way of treating a subject, and it is of great importance that he have a proper field in which to define his ideas; therefore the first thing under consideration in art is "the field of view"—that is to say, the space in which we are to exercise our minds.

Perhaps you have never asked yourself the question—"Why is it that pictures are oblong and not square?" We have the precedent of the square form in sculpture and in Roman architecture, but this is generally where the centre forms a special feature of design. In illustrations which are an evidence of expression and thought, however, the oblong, either vertical or horizontal, is always adopted. The reason of this is that we must have *variety* in all that we do by way of illustration. The difference between length and breadth affords this variety. As an example of the necessity for variety I show a square divided into four by two lines. A conspicuous object placed at the crossing of these lines is central; there is, therefore, no variety.

The best proportion between the length and breadth of a picture is got by taking the two sides of a square, the diagonal of which forms the length of the base. This proportion can be most beautifully filled. My own studio is built on these proportions, namely, thirty-five feet long and twenty-five feet broad. Having got the field of view, it is important to see how we should subdivide it to some purpose.

If we divide such a space equally into three portions—first vertically, then horizontally—we shall find that each intersection of a horizontal line with a vertical line gives a point where an object of interest may be placed. The same rule holds good if we divide into five, or with any odd number. But, if we divide with even, we land ourselves in the same difficulty mentioned in connection with the square: we lack variety. Attention should never be drawn towards the centre of a picture if possible, but rather away from the centre. Thus, if we are making the divisions into five parts, an object at one of the outer intersections will be more expressive than one more central. It is, further, to be noticed that if we choose as a point of interest on one side of our picture the intersections of any two certain lines we must not use the corresponding intersections on the opposite side, but another. It is easy to apply these principles to the camera by drawing lines on the ground glass, when the striking objects may be made to fall on the intersections of them. The principle which I have brought before you is very old. I first saw it in Howard's *Sketcher's Manual*, which I would strongly commend as the best book I know on the subject; but I fear it is now out of print.

In using the camera it is important to fix a good base line. This should be at least twelve paces from the point of view. There is a tendency with many photographers to bring the base line too near the camera by tilting the latter forward. Of course much in this matter depends upon the height of the camera. Thus, the view may be taken from the average height of a standing figure or of a sitting figure. If we take in portions of foreground too near us these appear too large in proportion to those in the distance. The base line may subtend an angle of 60° to the camera. More should not be included, as the eye cannot take in more without going beyond the sphere of its axis. As already explained, the centre of the picture should not be in the centre of the plate. To take, for example, a street view: it is a mistake to make the two sides of the street occupy equal parts of the plate. If the two sides of a picture are alike all interest ceases. It is necessary to distinguish between the "centre of the view" and the "vanishing point," the latter of which may be entirely out of the picture. [These matters were made very plain by the diagrams illustrating them.]

We now come to the question of the horizontal line of a picture. If we divide our field of view into three equal parts by two horizontal lines, either of these may be used as the horizontal line of our picture. It is a mistake to have the horizontal line in the centre, dividing the picture into two equal parts, as there is thereby a division of interest. Where the view is low, as in a sea view, the horizon line should be the lower of the two lines mentioned. When the view is high, as in mountain scenes, the upper line should be chosen. In the first case, room is left for the composition of clouds; in the second, for sufficient foreground, trees, and mountains.

In connection with sky composition, I need scarcely point out to you the benefits to be derived from double printing; but I would say a word in favour of the sky-shade for use when the clouds happen at the time to compose well with the landscape. I had the pleasure of bringing before the photographic world, some time ago, a sky-shade invented by Mr. J. Parker, of Glasgow. I find the best times of day for getting skies to be the afternoon and evening. Before I used the sky-shade I could not get the foreground sufficiently exposed at the same time as the sky, but now I can easily.

One of the charms of the works of the greatest artists is that the principles that I have enunciated can be clearly traced, and that they yet do not force themselves on one's view. The principles that I have given you are easy. The whole thing depends on the application; but, adhering to the principles, there is ample means for producing variety. It is true that these principles are by many artists not known. Still even many follow them as it were intuitively, being brought up with examples containing them.

In coming to speak of figure subjects, I should advise those of you who have not read it to get Burnett's book *On Composition*, which I can strongly recommend. He points out in what different forms a figure subject may be brought out—never square, but in a diamond, round, serpentine, or diagonal form.

When portraiture was first practised by photographers there was a tendency to place the head in the centre of the picture, leaving a great gap above or to the side. The following method will be found useful in deciding the position which the head should occupy:—For an "English head" let the distance between the top of the head and the top of the picture be a quarter-head length; for the "common head" size a half-head length; for the "kit-kat," where the hands are shown, three-quarters of a head length; for a "half-length" portrait a whole-head length.

Let me, in conclusion, commend to your notice Mr. H. P. Robinson's new book, in which there is much that is most excellent. I am only sorry that he has not shown more examples, less writing and more illustration, especially pointing out what to avoid, as well as what to pursue. [Mr. Macbeth very fully showed this by many diagrams which he had before his audience. He also exhibited a great many engravings taken from the works of the best painters during the last hundred years, most of which are to be found in South Kensington and the National Gallery. Mr. Macbeth strongly recommended all photographers to visit the exhibitions of the season, and make the composition of a picture their special study. Any novice can easily acquire the development of a plate, when he will find himself at sea in the management and direction of the camera.]

RAPID *VERSUS* SLOW DEVELOPMENT.

[A communication to the Bristol and West of England Amateur Photographic Association.]

The advocates of rapid development invariably object to slow development—first, on account of the extra time required; and, secondly, on the ground that developing slowly causes a discolouration of the gelatine film. Now, as to the little extra time required: this surely should be no objection to the amateur, who works for the love of the art. A few minutes more or less spent on each picture certainly should form no objection. I readily admit that a very protracted development may cause slight discolouration, but cannot consider this as any serious drawback, because such discolouration may readily be removed by a short immersion in the alum and citric acid solution; moreover, the advantages of developing slowly are so great that they would far outweigh the disadvantage of a slight staining of the film, even supposing such stain to be permanent and not removable.

A slow development undoubtedly gives a greater range of gradation between the high lights and deepest shadows, and as we have in nature an infinite number of gradations, it follows that a slow development will give a better and truer rendering of a subject than a rapid one.

In order to develope slowly, three courses are open to us: we may use a large proportion of bromide or a small proportion of ammonia, or may add the ammonia gradually, adding it by successive small doses until the desired amount of density and detail are obtained. This latter is the method I invariably adopt, and consider it gives by far the most satisfactory results, as it enables us to have entire control over the development, to avoid fog, obtain brilliancy combined with delicacy and softness, and, most important of all, enables us to correct errors of exposure.

In the instructions issued by most manufacturers of gelatine plates we are told to add certain quantities of pyro., bromide, and ammonia; then, if the picture flash out and show signs of over-exposure, we are directed to apply more bromide, or, in other words, when the picture is half spoilt, we are to do what we can to prevent its total loss.

I cannot help thinking that this method of proceeding is totally wrong, as it is building up a picture on an imperfect foundation; for, when once a trace of fog has made its appearance, it is impossible to successfully carry the development further without adding to the fog to a greater or less extent. But by slow development, even if a plate have been exposed five times longer than necessary, it is possible to produce a negative without the slightest trace of fog, and, moreover, without any loss of brilliancy—in, fact, equal in every respect to one which has received only the normal exposure.

Now, as an ounce of practice is worth a pound of theory, I propose to expose three plates under a transparency, to one of which I will give five seconds' exposure, to the second fifty seconds', and to the third one hundred seconds', or ten and twenty times the correct exposure.

I can admit that the professional photographer, working in the study with the light under control, may so accurately time his exposures that there may be no necessity for such careful and cautious development; but with amateurs who, like myself, practise upon all classes of subjects and under all conditions of light, errors of exposure must occur. Still, if we observe the rule of always giving a full exposure and developing slowly, not a single plate should be lost.

In addition to the absolute certainty of thus working, the results obtained are certainly superior to those by rapid development, having the pluck and brilliancy characteristic of a good wet plate.

Next as to formula for developer. I usually keep two stock solutions:—

No. 1.

Pyrogallic acid	1	ounce.
Bromide of ammonium	½	„
Citric acid	80	grains.
Water	8	ounces.

No. 2.

Ammonia	1	ounce.
Water	7	ounces.

To develope a half-plate: take four ounces of water, to which is added one drachm of No. 1; immerse the plate in this solution, and allow it to soak for a moment or two. Next measure out one drachm of the No. 2 solution, one-fourth or a-quarter drachm of which is poured into a measure and mixed with the pyro. solution in which the plate has been soaking. This solution is again poured upon the plate, and if sufficiently exposed the higher lights will slowly appear, but without much density. A second quarter drachm of ammonia is now added as before. With this addition the more brilliant half-tones will make their appearance, and the higher lights gain a little additional density. The third quarter drachm of ammonia is then added, when the details and faint half-tones will gain in force. The remaining portion of ammonia being added, the faintest half-tones will be brought out and the high lights have gained the full density, the resulting picture being, as far as development is concerned, all that could be desired. In the event of considerable over-exposure, the first or second addition of ammonia may be sufficient to fully develope the picture and give full density—in which case, of course, no further addition should be made.

I do not attach any importance to the formula I have given; any good standard formula may be used. The one great point of importance, however, is to commence with a small portion of the ammonia, adding it by successive small doses until the desired result is obtained. E. Brightman.

TRANSATLANTIC JOTTINGS.

The great interest with which the recent discussions on dark-room illumination have been followed in this country has been echoed in America, and society after society has taken up the question and discussed it in all its bearings. The Photographic Section of the American Institute, the Association of Operative Photographers of New York, the Chicago Photographic Association, and the Amateur Photographic Club of the same city have all in turn had before them the question of the best and safest light to use in the dark room. Most of them object to, or decry the use of, ruby glass, and the advantages of a screen or screens of a green hue in combination with one of red have been well set forth, though no striking decision has been come to by any of them.

One of the best things of the month, however, in connection with societies is an account in the *Photographic Times* (New York) of "A New Photographic Society." The preliminary meeting was held in Chicago, and was composed of about forty professional photographers. The Chairman briefly explained the objects of the meeting, and, when one of the assembled photographers asked if they were to understand the object of the new society was to advance the price of photographs, he replied in the affirmative. One member explained and apologised for having done pictures for three dollars a dozen, and recommended that others besides those present should be called upon to join the movement. Everyone seems to have promised to further the objects of the society, and it was arranged that the public should be taken into their confidence, and a notification advertised in two leading papers to the effect that good cabinets cannot be done at three dollars a dozen, the said notification to be signed by as many photographers as possible. It is evident from the discussion that not only are cabinets made at the low price named, but that the public are still further enticed by the presentation of chromos., panels, &c.

We reserve for the last the mention of one of the most amusingly-impudent letters we have ever read. A Mr. Hartley, instead of attending the meeting, wrote a letter giving his views in regard to their present movement, as he was the cause, he stated, of their meeting together. He explained how *he* came to do cheap work—of course, because others did it first; and how he, therefore, "swore that I would compel every gallery in Chicago to reduce their prices, which I acknowledge I have done." He further writes:—"I now wish to state that you can do nothing to advance the price so long as I say it shall not be advanced. * * * You have not the courage and backbone to advance the price on your own responsibility. * * * So the best thing you can now do is to adjourn the meeting, go home, and give your patrons more panels!" The Chicago photographers are evidently going to have nice times.

Society matters still: there appears to be no amateur photographic society in New York, and, in consequence, it is intended to start one, a notice being given to the *Photographic Times* to the effect that a meeting was to take place towards the end of March.

Another instalment of a neatly-illustrated paper, by C. A. Needham, on *Picturesque Photography*, appears in the March number of the same journal, and contains much readable matter and sundry good illustrations. We confess, however, to a slight feeling of bewilderment at seeing the description of two sketches of a cross with foliage twined round it. In the first picture the cross stands upright, but in the second it is thrown down and partly buried in the ground. The upright cross is an example of "rigid symmetry," and the second—the fallen cross—the same design "beautified by destroying its rigid symmetry, but preserving its *equilibrium*." True enough, perhaps, in one sense of the word, but inaptly chosen as a verbal illustration.

There must be something in the American climate inimical to the working of carbon processes, for we have more than once had to chronicle failures where success might have been anticipated. The climate is dry and the temperature at times excessive—two conditions either of which might be advantageous alone, but when conjoined are calculated to place considerable difficulties in the way of the beginner. At a recent meeting of the Photographic Section of the American Institute a letter was read from a gentleman in Malone, New York, describing his troubles with transparencies by the carbon process. He had made beautiful pictures for both windows and lantern slides, but after a few months they began to crack, and now be has not one of them left of presentable appearance. Mr. Mason (Secretary) said his experience had been similar. It should be known by these experimenters that if the plates had been carefully coated with gelatine and chrome alum before squeegeeing the tissue on to them the transparencies should have been able to withstand a very considerable amount of rough usage without giving way in any form. We have seen transparencies so treated subjected to every variety of temperature and of moisture without showing the slightest tendency to crack or peel.

Mr. Falk, whose remarkable photograph of a stage scene was noticed by us some time ago—a photograph of stage setting and actors in the "Russian Honeymoon"—has a long note in *Anthony's Bulletin* respecting his priority in the first successful attempt to obtain a photograph of the stage of a theatre with the actors upon it, some doubt having been cast by an art journal upon his claim to be the first. Some misconception seems to have arisen, founded upon the sequence of sentences in an article in the *Mittheilungen* treating upon this interesting photograph. The editor of the latter journal, however, clearly shows that he did not in any way call in question Mr. Falk's being the first to achieve the feat.

American photographers have not much to learn from their British brethren; but when we read that, at a meeting of the Association of Operative Photographers of New York, Mr. Buehler said that he still mainly uses wet plates, except when he has a very lively baby or a dog to take, we think there is every probability that he will at some future time take a leaf out of the British book and turn wholly to dry plates. The public now will have quick pictures. As to pyro. or oxalate: that will find its own level. We cannot avoid thinking that the professional verdict on this side of the water is almost wholly for pyro.

We do not believe that the following picture, extracted from a correspondent of *Anthony's Bulletin*, will be considered to represent the character of English dry plates, however it may depict the sins of which American plate-makers may be guilty:—"It is dirt everywhere. Not so bad now as it was some time ago. They are improving; but yet there is room. Probably a bubble will appear across the eye either in plate or film, or a long hair from some man's whiskers; then a lump of hard gelatine on one ear. Sometimes transparent veins run right across the features or dress. . . . . The emulsion is not filtered clean, or the bottom ones of the batch are coated—dirt and all. Some of the plates in the same box are clean. Why are they not all so? Today I had a plate spoiled on account of its not fitting the holder, and the next plate was too small. On the next plate the packing had dropped down across the middle of the film and showed itself in the development. All these things could be improved upon by a little careful manipulating."

THE "HAPPY MEDIUM;" OR, DARK-ROOM ILLUMINATION.

IN THREE CHAPTERS.—CHAPTER II.

In my last communication on this subject I related an experiment by which I had proved to myself that canary medium was as safe a light filter as a singly-flashed ruby glass, and I also stated that having had the four square feet of my dark-room window fitted with Mr. W. E. Debenham's green "cathedral" glass, and having found the light therefrom not only unpleasant, but for me insufficient, I returned to my old plan of yellow glass and double-flashed ruby glass—both clear. My experiments also showed how much the addition of a diffusing element to a clear red glass enhanced the safety of the red glass. On this diffusing character of ground glass, matt varnish, and the grain of paper I place the highest importance. The spectrum of a glass is not altered in character by such diffusion, but it is considerably dimmed in power.

With my ruby glass *au naturel* the small print could be read at seven feet distance; the addition of a very thin coat of matt varnish so dimmed the illumination that the print could not be read beyond four feet. According to the law of the intensity of light this gives the effect of the extinguishing power of the matt varnish at a high figure, the intensity of light transmitted by clear ruby being as forty-nine to sixteen of the varnished glass at equal distances. This simply means that the diffusion of the ground surface or grain of the paper amounts to so much opacity. I think it is the diffusion produced by the thickness and grain of the canary medium that gives its surprising safety, for to me it is surprising.

Mr. Debenham's glass, too, is not ordinary transparent glass, but glass of the translucent kind seen in church windows and other places where people are not intended to look out, and where the light has to be diffused so as not to shine too strongly on the worshippers' or auditors' faces or into their eyes. In greenhouses nearly the same kind of glass may be found, the object being, as before, diffusion of light and the prevention of strong rays of direct sunlight impinging on the plants. I cannot see why Mr. Debenham uses *green* glass in particular. I may be wrong, but I think any other equally diffusing glass would be as safe, and I am certain any other kind of glass would be more pleasant to me. When I ordered the glass for Mr. Debenham's combination I got three samples sent. Of these, wishing to give the matter the most satisfactory trial, I chose the darkest green. This may account for my not seeing well, my window facing the north. As I said before, I have a dislike to anything having a tint bordering upon green, and of all the tints of green I dislike most the yellow tints. Probably hand in hand with dislike goes weakness of vision in the antipathetic colour of light. This brings me to another view of the subject in hand, and a very important view—the effect of the colours on the eye.

A considerable number of gentlemen assume—without reason, as I contend—that a red light for the dark room is more hurtful to the eye than a yellow or yellowish-green light. Even if these gentlemen are correct with regard to their own particular eyes, they have no right to apply the rule to the eyes of other people. In a subdued light of any kind the pupil of the eye dilates, the supply of blood to the retinal vessels diminishes, and on a sudden access of bright light the pupil suddenly contracts to regulate the supply of light in response to a reflex stimulus; a rush of blood to the vessels takes place, and there is no wonder if disagreeable sensations arise. This, I maintain, arises not from the colour of the dimmer light, but from its scarcity and the subsequent sudden access. Nothing hurts my eyes more than the sudden turning up of a gas in a previously-dark room. Let anyone try turning a gas jet quickly up and down, about twenty times per minute, watching the light all the time. I give a quotation from the letter of a brother of mine—a physician in London—who has paid some attention to the study of the eye. He had evidently misunderstood my own theory on the matter; but that is of little consequence so long as we arrive at his. The excerpt is from a private letter to me, and thus, possibly, not so carefully worded as it might have been had he known it was to appear in these august columns. It will be seen that his conclusion does not entirely coincide with mine; but my object is to get at the truth and not to nurse a pet argument on a diet of falsity. Here beginneth the extract:—

"About photographic light: pure yellow light is in itself more directly irritating to the retina than any other. The shades are irritating in proportion as they approach yellow. I know an artist of educated visional sensibility who says that certain colours, especially 'reds,' pain him, and there is no doubt it is so. I tested him, and there was always yellow present. I don't think the thermic properties associated with red light can in any way influence the retina, which is liable to far greater changes of temperature without appreciable impairment. So far as the colour of the light goes I am with you. [My proposition to him was: Red light does no more harm to the eye than any other light under similar circumstances.—A. P.] But I can't agree that contraction of the pupil, on coming into bright light, can of itself cause dimness of vision. On the contrary, its effect would be to limit the field of vision, but not improbably to give increased detail within that field. I would suggest the following theory, viz.: that the retina in the dark room, being comparatively passive, receives comparatively little blood; that when over-stimulated by the sudden flood of white light a corresponding excessive 'rush of blood' to the retinal vessels occurs; that the blurred images are counterparts of the buzzings heard in the ears when congested; and we know that in feverish persons with congested retina the images are blurred just as they are in anæmic brain conditions when the balance of the circulation is deranged in the other direction. N.B.—The parts of the brain for the action of the pupil and for the regulation of the retinal blood supply are totally distinct."

In a supplementary letter on the same subject my brother, who had meanwhile consulted a professional specialist (Mr. Marcus Gunn) as to the matter of his previous letter, wrote to me as follows:—

"The thermic properties of light are destroyed by passage through the liquid 'media' of the eye, viz., aqueous and vitreous humours. On the whole, my views accord with your own that the eye disturbance will be proportional to the difference between the light of day and the 'dimness' of the dark room. There is a very great opening for idiosyncratic difference both as regards mere sensitiveness and sensibility to certain qualities of coloured light."

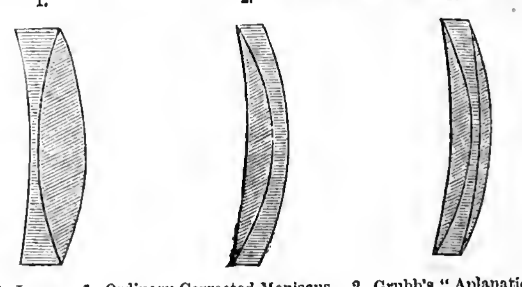
Now I am not too proud to confess that these letters, more especially when backed by an authority of Mr. Gunn's calibre, gave me very great pleasure. I had arrived at certain conclusions, and spoken them boldly and publicly, before I noticed the remarks of Dr. G. A. Herschell in your issue of November 23rd, 1883. Reading the article by Dr. Herschell I got what I may call a "facer" at first, but barring his statement as to the peculiar dangers of red light, which I do not find his own arguments to bear out, I failed to see that his article helped us out of our trouble. He condemned red light certainly, but he condemned dim light of other kinds almost as completely; and, considering that we must for plate-manipulation modify our light in some way, I fear he left us just where we were. He does not recommend any light in particular, so that the gist of his remarks is—"Give up photography or run the risk of damaging your eyes." I admit at once—who does not?—that it would be better if we could work in daylight, but we cannot; and our business is to find a light suitable for our work and as little damaging to our eyes as possible.

All the discussions before learned societies of late, all the changes made and expense incurred in the lighting of dark rooms, have hung on the assertion that red light is more injurious to the eyes than other lights, or on a one-sided and vicarious statement that yellowish light is the most pleasant to work by. I for one am now satisfied that my own original ideas were correct—not only that I prefer a red to a yellow light, but that my red is less hurtful than the vaunted yellows. I wish for my own sake I had thoroughly worked out and investigated these matters long ago, and I regret that I did not sooner give my opinions to the readers of this Journal; but I feel that late as I am in the field—"Better late than never." Even since I wrote the first "copy" for these pages evidence has been pouring in and experiments have multiplied, so that what I meant at first to be an article in one chapter has swollen to two chapters, and as I can take no more space at present I must even add a third. ANDREW PRINGLE.

ON LENSES.*

Of single lenses there are three distinctly-marked varieties. The first is the ordinary corrected meniscus. This is the well-known single landscape lens. The two faults in it are, that a small diaphragm is necessary in order to correct its spherical aberration and give good definition, and that it gives distortion. To correct to a certain extent the first of these evils, Mr. T. Grubb, in 1857, introduced what he called his aplanatic lens. It is not aplanatic, but the method of correction he

1. 2. 3.

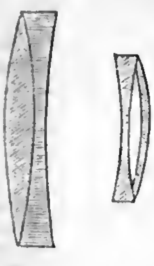


Single Lenses—1. Ordinary Corrected Meniscus.—2. Grubb's "Aplanatic."—3. Dallmeyer's Single Lens.

* Continued from page 283.

employed—placing the negative lens at the convex side—mitigated spherical aberration to such an extent that he thought it entitled to be called "aplanatic" in comparison with the ordinary single lens. It may, therefore, be worked with a larger opening. The panel portraits now shown were, with one exception, taken with this instrument. Dallmeyer's single lens consisted, like some of Dollond's telescope objectives, of a negative lens between two positive ones; but the curves are, of course, quite different, being calculated for marginal definition and flatness of field.

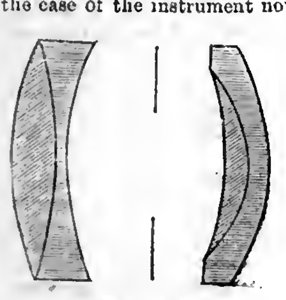
The so-called "orthoscopic lens," introduced in 1857, was constructed from calculations made by Petzval at the same time that he was engaged upon the portrait lens. The front part is identical with that of the portrait lens; but the back consists of a dispersing lens, so that the whole instrument is longer in focus than the front part alone. It was a curious misnomer to call it "orthoscopic," seeing that it necessarily gives distortion, although, from the diaphragm being at the back, this distortion is in the contrary direction from that given by the single lens. There were some good points about the instrument, and it is quite possible that if it had been introduced since the advent of the rapid gelatino-bromide process, it would have found more favour, especially for large portraits, than it has done. I should not be at all surprised to see it or something modelled upon it come into use. Sufficient care was not always taken to make the correction for actinic rays perfect. In one that I possessed it was necessary to shift the camera back nearly half-an-inch, but when this was done a very good portrait might, in a quick light, be taken even with collodion.



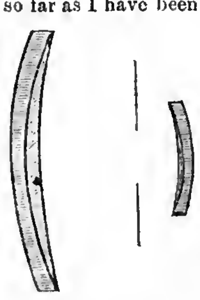
Petzval's Orthoscope.

Triplet lenses were introduced in two ways. One was as an instrument for obtaining architectural views without distortion; and another was an adaptation, to the portrait lens, of a concave glass in the place of the diaphragm for the purpose of lengthening the focus and flattening the field. Slater, in 1858 I think, made instruments of this kind for sale. As an occasional expedient a similar device had long previously been employed. Derogy made many of such instruments, one of which is on the table. Triplets have now been generally superseded by doublets.

To obviate the distortion caused by the single lens many double combinations have been devised. In these, the diaphragm being placed between the lenses, the distortion caused by one lens is counteracted by distortion in the contrary direction produced by the other lens. The first of these to come into any general use was the globe lens of Harrison, brought out in 1860. This supplied such a much-felt want—that of a lens of wide-angle without distortion—that it was much used; but the exact globe form was found to favour the formation of a patch of reflected light in the picture called a "flare" spot. Some five years later Ross introduced a lens which achieved great popularity, and was really so useful an instrument that it deserves some special mention. The front lens was a meniscus corrected in the usual manner, but the back lens had, like the Grubb single lens, the negative lens outwards. A description of a doublet with a back lens of this character, made by A. Ross, was published as long ago as 1846. The instrument had a wide angle of light; but this could be made even wider by setting the lenses a little closer together, as has been done in the case of the instrument now shown, and this, so far as I have been able to ascertain, without in any way injuring its definition. The great angle of light admitted permits of the lens being used even for tall buildings by raising the camera front without tilting the back, and I think it is to be regretted that it is no longer manufactured. They appear to be well appreciated, as I notice that when any are in the hands of the dealers they are marked at good prices. Dallmeyer's wide-angle rectilinear is a doublet which, constructed on different principles, works very similarly.

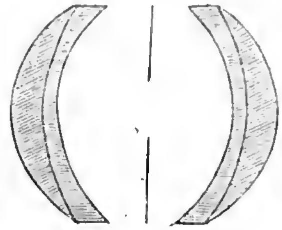


Ross's Doublet.



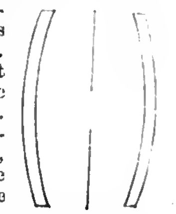
Dallmeyer's Wide-angle Rectilinear.

Busch's pantoscope is a lens partaking of some of the characteristics of the three last-mentioned lenses. It has a very wide angle, and is a very useful instrument. It differs from the globe lens in that the exterior surfaces do not form part of one sphere. I have not found "flare" when using it. A lens that I have not had the opportunity of examining is a doublet by Morrison, of New York. An excellent judge, however, Mr. J. Traill Taylor, gives a favourable account of it. The striking peculiarity of this instrument is that one of the elements, the back one, is single, all the correction being performed by a flint in the front combination. Some eighteen or twenty years since I constructed an experimental lens, the front of which was a single meniscus and the back was an objective out of an opera-glass, altered by having the flat side ground concave. This lens gave an enormously-wide field, but required the use of a very small diaphragm.



Busch's Pantoscope.

Before proceeding to the consideration of the more modern doublets it is worth while to notice two which I believe have gone out of manufacture. These are the periskop of Steinheil and the Zentmayer lens. Their particular interest consists in the fact that, being constructed of uncorrected crown lenses only, something similiar to them can easily be improvised. Steinheil's periskop consisted of two similar meniscus crown lenses placed near with a small diaphragm between them. After focussing, the camera back had to be brought nearer to the lens by $\frac{1}{40}$ of the focal distance. The field was very flat and the angle included large. Zentmayer's lens was constructed on similar principles, but was furnished with two diaphragms, the larger of which was to be used for "convenience of light" in focussing, and the smaller one for the exposure. It was introduced as a lens not requiring correction, although made of one medium crown glass only; but this paradox was only apparent, not real.



Steinheil's Periscope.

On looking at the diagram of spherical aberration *(fig. 2)* [page 264], it will be seen that the general approximate focus of a lens possessing this characteristic, when used with large aperture is shorter than the focus of the same instrument when used with a small diaphragm. Zentmayer's lens had great spherical aberration, and it was, therefore, only necessary to make the focussing and exposure diaphragms of such sizes as to alter the focus in the same proportion as the chemical focus was shorter than the optical one. I have here a lens that I had constructed some years previous to the Zentmayer being brought out, when I was desirous of photographing subjects occupying a wider angle than I could get with the lenses then to be purchased. The radii are about as six for the convex and seven for the concave surfaces, and the distance of the lenses apart as four. If the lenses are of large diameter in proportion to the focus an enormous angle of view can be obtained.

This is the lens which within the last week your Secretary, Mr. J. J. Briginshaw, has had for the purpose of photographing a tall building in the city which he could not with an ordinary lens do, on account of there not being space to retire with the camera. He has brought the negative with him, and you will be able to judge of the occasional usefulness of such an instrument. The camera was used level, and the front much raised. From the point opposite to the lens five inches can be measured to the corner of the plate. This gives a circle of ten inches. The focus of the lens is about three and a-half inches. The back was not altered after focussing, the correction, as with Zentmayer's lens, being made by the insertion of the diaphragm.

W. E. Debenham.

(To be concluded in our next.)

A FEW REMARKS ON THE USE OF IODISED BROMIDE OF SILVER EMULSION IN THE ESTABLISHMENT OF HERR KROH.

Professional photographers often make the not unfounded complaint that, when working with bromide of silver emulsions and ammonia silver oxide, the high lights and delicate shades are wanting in the clear parts; and even though these may be present in many cases in the negative, it seems to be difficult to get them to come out in the print. This is a fault against which many experimentalists have already tried to protect themselves by incorporating iodide of silver with the bromide of silver emulsion. In Herr Kroh's studio we have made the most various experiments, using various proportions of iodine and of bromine, as in the collodion process; that is, ascribing to the presence of the bromide of silver the highest sensitiveness to dark rays (that is to say, to details in the shadows), and the opposite to iodide of silver sensitiveness to the bright rays of light (that is to say, for the intensity of the light). Certain advantages were attributed in the collodion process to such different strengths of iodising. After many fruitless experiments we succeeded (as the pictures shown at the meeting of the Photographic Society of Vienna, on the 3rd October last, bear witness), with the formula here given, in getting modulation, brilliancy in the whites, and depths and shadows rich in details, combined with great sensibility.

Place in a retort of two litres' capacity—

Bromide of ammonium	24 grammes.
Bromide of potassium....................	24 ,,
Iodide of potassium........................	5 ,,

Dissolve these salts in 500 c.c. of water, then add eighty grammes of hard gelatine, and leave it to soften for a quarter of an hour. Meanwhile dissolve in a separate vessel sixty grammes of nitrate of silver in 500 c.c. of water, and in the usual way, as recommended by Dr. Eder, add ammonia until the brown precipitate which forms at first is redissolved; that is to say, until the silver solution has become clear again. Now place the flask containing the gelatine solution in a water bath at 55° to 60° C., and leave it there until the gelatine is completely dissolved; then add the ammoniacal silver solution to it, a small portion at a time, meanwhile stirring vigorously and continuously (otherwise the bromide of silver would be apt to be thrown down instead of remaining in suspension). Finally, digest the mixture for three-quarters of an hour at about 50° to 55° C., shaking at short intervals and pouring a trial plate every quarter of an hour, in order to examine it at the light and to observe whether the emulsion has been converted into the yellowish-green modification. When a sample has passed into that condition the digestion may be regarded as ended; the emulsion is poured into a cup to stiffen, squeezed through canvas, washed in eight to ten changes of water in the course of two hours, and the nodules, after being placed in a bag, hung up to drain over night. Next morning place the drained nodules in a beaker in order to melt them, adding 250 c.c. water, which was omitted during the preparation, in order to facilitate the washing, as well as in order to be able to reduce the quantity of water to be added in case the emulsion should have absorbed much water during the washing. This can easily be computed, and the excess of water absorbed during the washing can be deducted from the quantity of the final addition of water.

Those who wish for still more powerful negatives may make the following addition before filtering:—One gramme of sublimated iodine is dissolved with iodide of potassium in ten c.c. of water; about eight drops of this solution are added in order to make the emulsion work more powerfully. For reproductions, line drawings, and plans this addition may be doubled or trebled according as one wishes to have more or less dense negatives. CH. SCOLIK.

—*Photo. Correspondenz.*

THE DEVELOPING-ROOM LIGHT OF THE FUTURE.

ONE omission in my last communication might lead to some fogging of plates. The size of the developing-room was not stated, and the remarks about no top to the candle-illuminated cardboard lamp being necessary applied only to those used in large rooms. A lamp without a top in the little developing dens—once, if not now, common in England—would probably lead to fogging, if but a short distance intervened between the candle flame and the ceiling and closely adjacent four walls. In small rooms a bit of yellow or green or white paper should be laid on the top of the lamp, and care taken so to fold it on the top of the lamp nearest the developing dish that its lower surface cannot reflect light down on the dish. It may be so torn as to leave a rather large hole on the top part of the lamp away from the developing dish, so as to permit the escape of the last products of combustion.

Among coloured single-layered screens of whatever material made there is not one in a hundred or one in a thousand which will give in its purity but one of the seven primary colours of the spectrum. The late Professor Allen Miller's large range of experiments prove this. A summary of these experiments is published in some of the earlier editions of his great work on "Chemistry"—perhaps the most valuable book of reference on chemistry extant, next to the larger works of Gmelin and Watts. I prefer the old editions of Miller to the new, though the latter are more scientifically arranged, so as to form almost a new work. The editors would have done better to have put what they had to say in a separate book of their own, instead of bringing out a hybrid work under the name of the great departed.

As it is unlikely that the best lamp of the future will possess but a single-layer screen, spectroscopic examinations of a limited number of single screens only are likely to be of little practical value. Two bad single screens superimposed are indeed often likely to make one of the best double screens obtainable; that is to say, the two layers may separately let plenty of fogging light through, but the one may have just the power of cutting off the rays which do mischief through the other, and the two superimposed may let more useful light through than any screen in which attention has been directed only to the power of actinic absorption of a single sheet. Hence the value of the power, when it can be obtained, of selection from many green and yellow samples of oil silk. With twenty varieties of colour of those silks on a polychromatic negative an experiment can be tried at one blow on 400 superimposed pairs, on a single half-plate, at a cost of but a few pence, and the best pairs ascertained. Then the *auxiliary* power of the spectroscope could be brought in to find out the defects of the best pair (which defects, however, would probably be of little practical importance), and then a third oil silk layer with scarcely any colour at all in it might be found, but which would just cut off the few feeble rays theoretically mischievous. Probably no screen is the best which permits the shape of the flame to be seen through it, and perhaps but two thicknesses of oil silk would let it be seen. Then more layers of other varieties of green and yellow could be added. Thus layer upon layer of new colours could be laid on—each layer also introducing more of the Starnes' lamp principle—at the same time that the variations in colour empirically narrowed down the escaping light more and more to a pure colour of the spectrum, preferably green *plus* a little yellow deterioration. Probably the best light will be that in which enough layers of coloured films are laid on to prevent the shape of the flame being seen through the composite screen and no more. Of course the papers or silks must not be gummed together where the light shines through them—a very dangerous thing to do in the case of papers especially. A man who thinks he can improve his paper screen by rendering it more transparent, by gum or otherwise, usually labours under a fatal error. W. H. HARRISON.

Lucerne, April 26, 1884.

FOREIGN NOTES AND NEWS.

A COLOSSAL ALBUM.—THE LATEST PARISIAN NOVELTY.—A CHECK TO PORCELAIN PAINTING.—HERR GIESSE ON PHOTOGRAPHIC PORTRAITURE IN AN ORDINARY ROOM.—PAPIN'S DIGESTER AS AN EMULSIONISER.—THE ACTION OF LIGHT UPON FERROUS OXALATE.

ACCORDING to the *Archiv* a large album is at present lying in the shop of Herr Collin, court bookbinder, Berlin. It is to be presented to Herr Henry Villard by the German guests present at the opening of the Northern Pacific Railway, and contains their portraits in boudoir size.

It is now the correct thing for a Parisian dame to have her photograph taken at home. *Une dame du haut ton* who has made up her mind to be taken sends a telegram to some photographer who makes a speciality of this branch of the business, and, *presto!* the thing is done. Consequently, fashionable people no longer tell their servants to say "not at home" when a bore calls, but prefer to say—"Madam begs you to excuse her; she cannot see anyone, as she is having her photograph taken!"

Herr Giess, in the *Archiv*, makes a few remarks respecting photographing in rooms. He uses a large wall mirror (about five feet high) as a reflector to help to lighten the shadows. The first time he used it he simply leant it against a table, the result being that the rays of light thrown by it were projected upwards instead of in the opposite direction, thus causing the shadows under the chin, the nose, and round the eyes of the sitter to disappear, or, at anyrate, to be too much modified. He then got a carpenter to make a frame for it set upon casters, which allowed him to move the mirror backwards and forwards or to place it at any angle desired. With a portrait lens, a three-inch stop, and moderately-quick dry plates, when using the mirror he gave an exposure of from fifteen to twenty seconds in an ordinary room. An energetically-working pyrogallic acid developer was found most suitable.

The painters on porcelain in the Thüringian Forest have, it is said, received a severe check. The *Photographische Gesellschaft* in Berlin, which has acquired the right of publishing copies of the paintings of many celebrated masters, have lately seized in one small Rhöneland town a number of copies upon porcelain and the steel plates from which they were copied, as infringing their rights; and a Berlin firm which sold unauthorised reproductions in oil colours of some copyright pictures has been condemned to pay a fine of 100,000 marks—say £40,000 or £50,000.

According to Graeter, in the *Photo. Correspondenz*, the length of time that gelatine emulsion has to be cooked may be shortened by using a Papin's digester. If the vapour pressure in it be equal to four atmospheres the temperature will be about 140° C., and then cooking for a quarter of an hour should be as effective as cooking for an hour at ordinary atmospheric pressure. At such a temperature soft gelatine would be destroyed.

In the *Comptes Rendus* M. Lemoine relates that he has taken mixtures of oxalic acid and chloride of iron in solutions of various concentration and of different quantitative proportions, exposed them to sunlight always in films of the same height and thickness for the same length of time, and observed the decomposition by measuring the carbonic acid evolved. The rapidity of the decomposition (the intensity of the light not being taken into account) is at first almost constant, and continues so until about one-half of the mixture is decomposed; afterwards it decreases. It is, however, greater if the oxalic acid and the chloride of iron solutions have each been previously and separately exposed to light for a considerable time. The decomposition also proceeds more rapidly when the solutions are dilute, or when they contain an excess of oxalic acid. The latter then only acts as a diluent. On the other hand, the decomposition is retarded when the mixture contains excess of chloride of iron, as that absorbs the rays of light.

RECENT PATENTS.

PATENTS APPLIED FOR.

No. 7,190.—"Production of Coloured Photographs." J. WETTER; communicated by L. Forquignon.—*Dated May* 3, 1884.

No. 7,201.—"Photographic Cameras." T. SAMUELS, Monken Hadley, Middlesex.—*Dated May* 3, 1884.

Our Editorial Table.

PICTURE-MAKING BY PHOTOGRAPHY. By H. P. ROBINSON.
London: PIPER AND CARTER.

THIS latest work from the pen of Mr. H. P. Robinson will be welcomed by all who are interested in the production of artistic effects, containing, as it does, the experiences of one who may be accepted as the English representative of art-photography. The author's aim may be described in his own words from the preface:—

"I fear that a great deal more will be found concerning my own personality and productions than a modest writer would willingly admit; but this cannot easily be avoided. The nature of the information to be conveyed and the lessons to be inculcated demand that I should teach the results of my own experience, and suggest that the pictures which have been the outcome of that experience would be the most suitable illustrations. It will be evident that pictures which have been actually produced by photography will better show the peculiarities and limitations of the art than any other method of illustration."

And so Mr. Robinson proceeds to discuss in a chatty way the different branches of his subject, not even overlooking the matters of "Gelatine Plates and their Uses," and "Our Tools." In the chapters which deal with the selection and treatment of subjects and the introduction of figures into the picture, anecdotes are told of the manner in which many of his best-known works were conceived, reproductions of such works being introduced as illustrations. The work contains four full-page illustrations, by Sprague and Co.'s "ink-photo." process, of some of Mr. Robinson's best-known and most recent successes, besides a large number of woodcuts taken from other of his works as they happen to serve his purpose. The book should be in the hands of every photographer.

PHŒNIX INSTANTANEOUS SHUTTER.
Leeds: REYNOLDS AND BRANSON.

WE had occasion to notice this shutter some twelve months ago, but it comes before us now, if not in a new form, at least with modifications which so alter its working that it is practically a new shutter. It still consists of the two essential parts—the rising flap and the drop; but, in place of the adjustable spring which actuated the flap in the older form, we have now a weighted lever adjustable to any variation of exposure, from (say) a-quarter of a second to (in combination with the rubber band on the "drop") any degree of rapidity.

The alteration is in many respects an undoubted improvement. Springs are at best unreliable elements in any compound; but the simplicity of the weighted arm now substituted is beyond cavil, and its efficiency equals its simplicity. Its adjustability within certain bounds is also an important feature. The alteration in the motive power of the flap portion of the shutter does not interfere with its use for slow exposures; and an arrangement is provided by means of which the drop shutter is kept out of action while the flap is manipulated alone to give exposures of any duration.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
May 13	Great Britain	5A, Pall Mall East.
" 13	Bolton Club	The Studio, Chancery-lane.
" 13	Newcastle-on-Tyne	College of Physical Science.
" 14	Bury (Annual Meeting)	Temperance Hall.
" 14	Photographic Club	Anderton's Hotel, Fleet-street.
" 15	London and Provincial	Masons' Hall, Basinghall-street.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

THE usual monthly meeting of this Society was held on Thursday, the 1st inst., at the rooms of the Society of Arts, John-street, Adelphi,—Mr. Edwin Cocking in the chair.

The CHAIRMAN said:—It is my most painful duty to take the chair on this first meeting of the Society after the lamented death of our President, whose loss we all so deeply deplore. For twenty-five years this Society has existed under one President, and during those long years we have not only entertained feelings of deep respect for him but, I may say, love. I think it will be admitted that that feeling arose from one great characteristic of our late President, which was that of genial, warm-hearted sympathy. He was a man who was animated with the spirit of kindness, which smoothed down angularities, and brought to light the latent good in every one. After listening to his remarks we felt that our tone of mind had been elevated; and, besides the brighter view of things which his words inspired, we felt grateful and our hearts warmed towards the man who, with such unflagging interest, had presided over this Society ever since its formation.

Mr. F. A. BRIDGE:—It was thought that before the meeting took a formal character it would be well that we make known that it is our desire to send a letter of condolence to the relatives of our late President. As a matter of strict etiquette we ought tonight to have appointed a Chairman to read the minutes of the last meeting, and that being done should have adjourned; but we had in our hearts the thought of our late President, and remembered that with him duty was always the first consideration. Besides this, it happens that Mr. Macbeth is in London at present, but cannot be here in a month's time, and so we decided that the meeting should proceed. Had we occupied the whole evening in proposing and seconding a vote of condolence to the relatives of Mr. Statham we could have done no justice to our late President. In the *South London Press* there is a *résumé* of the life of Mr. Statham which I would commend to your notice. I think the relatives of such a man have much to be proud of, and that even we who have met him here have also the same feeling. I would have the meeting rise, as it were, to authorise me to send a letter of condolence to our late President's family.

The minutes of the previous meeting having been read and approved,

Mr. NORMAN MACBETH, R.S.A., was called upon to read his paper, entitled *Notes on the Composition of a Picture*. [See page .] Mr. Macbeth proceeded to say:—I would take this opportunity of expressing how deeply I sympathise with you in the peculiar circumstances in which you are placed. I certainly miss very much tonight the presence of your late President. Although I had no personal interview with him, I may say that I knew him through your Hon. Secretary. I know that in such small efforts as I have made for you he took a deep interest, and that his acknowledgments were most gratefully received by me.

Mr. Macbeth having concluded his paper, showed a number of photographs and sketches as illustrations of his remarks.

A vote of thanks having been carried by acclamation,

The CHAIRMAN said he hoped some questions would be asked.

In reply to a question, asked by a Member, with regard to the proper ratio to exist between focal lengths and size of plate in photography,

Mr. MACBETH said that the question being a purely optical one he would not take it up. He would say, however, that he had a strong predilection for the single lens.

Mr. E. W. FOXLEE asked what distance there should be between the lens and the sitter in taking a portrait.

Mr. MACBETH said that the distance should be considerable. He hoped to get a lens which would permit of his using the whole thirty-five feet length of his studio. It would be a single lens.

Mr. J. TRAILL TAYLOR observed that the perspective given by a lens did not depend on its form but on its focal length merely.

Mr. F. YORK said it was important first to fix the point of view, then to use whatever lens took in the necessary angle. It was common to recommend a focal length slightly greater than the length of the picture. He thought that a focal length equal to the diagonal of the plate would give good results, but they might use much greater focal lengths. Nevertheless, the use of wide angles was at times unavoidable.

Mr. MACBETH thought the photographer should not commit a breach of truth merely for the sake of convenience.

Mr. BRIDGE remarked that this was a matter more easily managed by painters than by photographers.

Mr. TAYLOR said that he would like to hear Mr. Macbeth's opinion on the correct position of the horizontal line in the case of portraiture. It should, theoretically, be at least as high as the eye of the observer; but at times it was lowered to within twelve or fourteen inches of the ground.

Mr. MACBETH had found it necessary, in painting figures in the studio, to take the different portions from different points of view, the head being taken from a high point of view, and the lower portions from a lower point of view.

Mr. HARRISON said that the *proportions* of a figure varied no way with the focal length of the lens used, so long as the point of view remained fixed. The size only varied.

The CHAIRMAN remarked how great a benefit it would be to members could they have an opportunity of going out for practical work with such a man as Mr. Macbeth. He asked for a formal vote of thanks to Mr. Macbeth, besides the informal one which had already been passed.

Mr. MACBETH felt flattered by the reception his remarks had met with. He looked with no jealous eye on photographers, and thought that painters in general were ceasing to do so. It only remained for photographers, whilst adhering to the principles which he had laid down, to display their individuality, for which there was ample scope. He hoped it would not be the last time he might be present at a meeting of the South London Photographic Society.

It was mentioned that Mr. C. R. Pancoast, of the Photographic Society of Philadelphia, was present, and that gentleman being called upon, thanked the meeting for the welcome which had been given to him. He had been travelling in India, and had taken a number of negatives of the exhibits at the exhibition there. He hoped to send prints of them to the South London Photographic Society.

The meeting was then adjourned.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AT the meeting of this Society, held on the 1st instant, the chair was occupied by Mr. W. E. Debenham.

The subject of diffraction in connection with photographic optics being mentioned.

Mr. A. Haddon said it could only be noticeable when extremely small diaphragms were used. The pinhole used instead of a lens by Mr. A. L. Henderson to produce the photographs which had been shown at a previous meeting had not been small enough to produce any perceptible amount of diffraction, and the diaphragms used by photographers were always much larger than that pinhole.

Mr. J. Cadett remarked that Professor Stokes had stated that if the diaphragm were in the optical centre of the lens there would be no diffraction, however small it might be.

The Chairman said that when a pinhole was made in any substance the hole took the form of a short tube. The effect of light reflected from the sides of such a tube might have been mistaken for that of diffraction.

Mr. F. W. Hart remarked that it was sometimes desired to back a negative in part with a semi-transparent substance, and *papier minéral* and matt varnish were used for that purpose. Instead of scraping away the matt varnish from those parts of the negative that were required to print more strongly, the varnish might be rendered transparent in those places by letting the vapour of ether fall upon it, a soft edge instead of a sudden one being produced. He illustrated this, and explained that it was better not to use a very strong ether for the purpose, or, if such were used, to mix some alcohol with it.

Mr. J. Barker inquired whether anyone had succeeded in producing a thoroughly-good matt varnish by using the published formulæ. He had not been able to make it as good as that which was sold.

Mr. Hart said that a formula for matt varnish was of no more use than a formula for collodion. It was necessary to take into consideration the different characteristics of the various samples of material that were employed.

Mr. Barker remarked that, notwithstanding the remarks in the photographic journals, he was still of opinion he was right in stating that with lenses of equal focus and size of diaphragm, the lens of large diameter would be the quicker. He also held that some lenses possessed much more depth of focus than others, aperture and focus being equal. On mentioning this to a neighbouring photographer that photographer confirmed his opinion, and gave him the *carte* which was now shown in support of his theory. It would be seen that the figures and background were sharper than it was usual to get both together.

In reply to Mr. Barker,

The Chairman showed on the black board that with lenses of the same focus and size of diaphragm, increasing the diameter of the lens would have no effect on the illumination of the centre of the picture. Towards the margin it would have an effect, unless the smaller lens were placed nearer to the diaphragm, when, again, the results would be equal for speed. As to the idea that the particular lens of which the work was shown, possessed any depth of focus more than was due to the size of its stop, the claim only showed the necessity there was for showing how groundless was such an idea, although so commonly entertained. The specimen photograph produced, to be of any value as evidence, should have been accompanied by information as to the size of the diaphragm and the length of focus of the lens; and it would be more conclusive to have taken another photograph from the same spot with another lens not supposed to possess the same characteristics.

Mr. J. Cadett could see nothing in the photograph produced by Mr. Barker to lead him to infer anything remarkable in the lens with which it had been taken.

THE POSTAL PHOTOGRAPHICAL SOCIETY.

A committee was held on Monday last, the 5th inst., at the Chambers of the Honorary Treasurer, 3, Plowden-buildings, Temple.

After the minutes of the previous meeting had been read and confirmed, the following gentlemen, provisionally admitted since last meeting, were declared duly elected:—Messrs. Chas. B. Stones, Brighton; George Smith, Dudley; John Kinder, Epsom; John A. Fothergill, Darlington; G. Percival Smith, Tunbridge Wells; E. Openshaw, Manchester; and C. W. Kingdom, Cirencester.

The prints sent in for Competition IV. were inspected, and the Committee decided that the value of the prizes should be as follows:—Class I. First prize, £1 1s.; second prize, entrance fees, 10s. 6d. Class II. First prize, £1 1s.; second prize, entrance fees, 12s. 0d. Class III. Prize of 10s. 6d. Class IV. Prize of £1 3s. (donation by Mr. Ticehurst).

The two first classes will be found to contain some very good work; the two latter, however, are but poorly represented so far as quantity is concerned. The Committee did not, therefore, feel justified in giving second prizes.

The next competition was fixed for the 1st of July next, in the following subjects:—Class I., landscape (including architecture); Class II., portraits—groups or figures; Class III., interior.

It was decided that three competitions per annum should be held in the future, pictures to be sent in by the 1st of July, the 1st of October, and the 1st of May, the subjects to be announced at the general meeting in June.

As in each album now issued there is a small competition (in accordance with Dr. Day's motion at the last meeting), it was resolved, on the motion of Mr. Pocock, that henceforth no greater number of prints from the same member shall be inserted in any one album than would fill three pages thereof, and that a separate noting slip for each such quantity should be filled up by the member. [This would be twelve quarter-plate, six half-plate, or three whole-plate pictures.]

The voting book, having been sent to all the members, was next considered; and the Committee found the result of the voting to be:—1st. That the competitions be continued as at present.—2nd. That the annual subscription to the Society be raised to 7s. 6d.—3rd. That an entrance fee of 1s. 6d. to the competitions should be continued.

Particulars of the amount subscribed by the members towards a testimonial for the late Hon. Secretary were given by the Hon. Treasurer, who was authorised to order a Rouch's $8\frac{1}{2} \times 6\frac{1}{2}$ camera, Dallmeyer's W.A. lens and tripod, to be presented to Mr. H. H. Cunningham, B.A., in the name of the Society.

The question of secretaryship was for the present postponed, Mr. Baylis stating he was prepared to discharge the duties connected therewith until the general meeting in June.

The meeting was then adjourned.

BRISTOL AND WEST OF ENGLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

The ordinary monthly meeting of this Society was held at the Association's Studio, on Wednesday, the 23rd ult.,—Colonel Playfair, Vice-President, in the chair. After the usual preliminaries,

The Chairman called upon Mr. E. Brightman to read his paper on *Rapid* versus *Slow Development*. [See page 294.]

The Chairman said that Mr. Brightman, having exposed two plates of similar sensitiveness—one for eight seconds and the other for eighty seconds—and developed both with successful results, had demonstrated that, so far as these experiments were concerned, slow development possessed decided advantages. He should like to have seen compared the development of two negatives correctly exposed—one by slow and the other by quicker development.

Mr. Brightman said that he should very probably bring such examples at a future meeting, and he thought the results would prove the superiority of the former mode.

The Chairman asked Mr. Brightman if he followed exactly the same practice with regard to under-exposed negatives.

Mr. Brightman replied that he did exactly, always using the same quantity of pyro.

The Chairman said that that appeared to him to quite oppose the usually-accepted law.

Mr. Daniel said that probably the effect produced was that of obtaining full detail at an earlier stage of the development, so that such detail was really worked up before the pyro. was sufficiently acted upon by the ammonia to produce much density in the high lights.

Mr. Tribe had generally considered that in developing an under-exposed negative it was desirable to lessen the amount of pyro.

After some further discussion, the next and first excursion meeting of the session was fixed for Saturday, the 17th inst.

A cordial vote of thanks, on the motion of the Chairman, was unanimously passed to Mr. Brightman for his interesting paper; after which the meeting was adjourned.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

The annual business meeting of the session was held in the Religious Institution Rooms, on Thursday, the 24th ult.,—Councillor Robertson presiding.

The minutes of the last meeting were read and confirmed. The office-bearers for the ensuing session were then elected and were as follows:—*President:* Councillor Robertson.—*Vice-Presidents:* Messrs. Robert Dodd and John Parker.—*Treasurer:* Mr. Geo. Bell.—*Interim Secretary:* Mr. J. Craig Annan.—*Council:* Messrs. J. Craig Annan, Wm. Lang, Jun., George Mason, James McGhie, J. Y. McLellan, and J. M. Skinner.

It was then arranged that an outdoor meeting should take place, and Cadzow Forest (the home of the Duke of Hamilton's famous white cattle) was suggested as the place, Friday, the 6th June, being the date. The arrangement of details was left to the Council and Mr. Falconer.

Some business of a private nature followed, and at the close of the meeting Mr. Falconer showed a number of very good lantern and stereoscopic transparencies and also a sky-shade. This was something like the upper half of a diaphragm, which was composed of slips of card, and which could be pushed up or down to the approximate shape of the sky-line. It was inserted in a slip in the front of the lens during the greater part of the exposure, and removed just before replacing the cap.

The meeting was closed with the customary votes of thanks.

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION.

The eighth and last monthly meeting of this Society for the session was held in Lamb's Hotel on Thursday, the 1st instant,—Mr. J. Geddes occupying the chair. After the routine business had been disposed of,

Mr. Jno. Robertson read a paper on *Dark-Room Illumination.* Until lately he had scrupulously obeyed the injunctions accompanying dry plates and had worked in ruby light. As the result of some experiments, however, he had entirely discarded ruby and fitted up his dark-room window with two thicknesses of cathedral glass with a double sheet of orange tissue between. The illumination of his dark room was now all that could be desired, and he had never enjoyed such a perfect immunity from fog since the adoption of this light. The result was so satisfactory that he was fitting up the same light in his coating-room.

A hearty vote of thanks was awarded to Mr. Robertson.

One new member was admitted.

Mr. Walker, Broughty Ferry, kindly sent a collection of prints taken about 1856, which excited much interest; and the fact that in very few of them were signs of fading to be detected testified to the carefulness of the manipulation.

On the motion of the Chairman a vote of thanks was passed to Mr. Walker, and the meeting was adjourned.

PHOTOGRAPHIC SOCIETY OF VIENNA.

This Society met on the 4th March,—Dr. E. Hornig in the chair. The minutes of the previous meeting having been read and several new members admitted, the report of the Vienna Photographic Assistants' Society was read, and a subsidy voted to it, to be placed to the credit of the sick and superannuation fund.

The Voigtländer medals, awarded at a previous meeting to Lieutenant David and Herr Fokstein, were presented.

A number of instantaneous studies of landscapes, clouds, and plants, from Java, Borneo, and Sumatra, by an amateur, were shown by Herr Kramer, and a variety of other pictures, including lichtdrucks, were shown by other members. The Chairman showed some specimens of retouching from the studio of Herr Fernande.

Herr Haack called attention to the imperfect action of the springs which push up the candle in certain kinds of dark-room lanterns, and suggested remedies.

The question-box was found to contain two papers. In the first a member who had bought Kroh's rapid process inquired how he could dissolve gelatine in dilute alcohol, as that was a necessary part of the process.

Herr Scolik replied that the gelatine should be treated with strong acetic acid before the application of the alcohol.

The second paper asked what precautions were required in enamelling a picture so as not to wipe off the printing from the mount.

Herr Wrabetz said that the only precaution was to allow the varnish present in the ink, used as a cementing and transferring medium, to become dry before removing the mount.

The meeting was shortly after adjourned.

Correspondence.

May Meeting of the Photographic Society of France.—M. Audra's Experiments on Emulsion Made Before the Society.—MM. Thury and Amey's Instantaneous Shutter.—Communications by M. Scola.—On Residues.—A Photomicroscope.—M. Vidal on Ceramic Ornamentation by Photography.—Natural Colours Produced by Photography: Another "Canard."—The Late J. B. Dumas and the Rev. F. F. Statham.—A New Editor for Photographic Publications.—M. Liebert's Treatise on Carbon Printing.

The usual monthly meeting of the Photographic Society of France was held on Friday last, the 2nd instant,—M. Peligot in the chair.

M. Audra presented three proofs on glass made with the emulsion he manufactured in full gaslight the previous Friday evening. Not only had the cut-up and unwashed emulsion been made in full gaslight, but it had stood on the table upon which it was made until five o'clock the following day, thus being exposed to white light for several hours. The exterior had a grey appearance, but on being broken up he found it to be white in the interior. Nevertheless, being fearful, he doctored it by adding a solution of bichromate of potash and washed it thoroughly. The emulsion was free from fog, but he could not obtain intensity, and a good deal of rapidity had also been lost. These experiments were intended to show that emulsions, even though they may have been exposed to light during their manufacture, were not to be considered as spoiled; but altogether it appeared that the less white light they were exposed to the better.

I presented to my colleagues a double-action, rapid shutter, manufactured by MM. Thury and Amey, of Geneva, intended for binocular stereoscopic lenses, which is the first of that kind produced by them. The action of this shutter is well known to all. It consists of two strips of thin brass having each a round hole in the centre, and in order to make the exposure they slide one over the other in opposite directions. The centre of the lens is opened first, and then the hole becomes larger and larger until the full aperture is attained. The hole then diminishes in size until it is completely closed, and that in the centre of the lens. MM. Thury and Amey have chosen a circular hole, which resembles what is called in England the "eclipse" shutter, but constructed in a more elaborate manner. By means of a brake, which can be regulated by a screw, any rapidity can be obtained, from the $\frac{1}{200}$th part of a second to an exposure of two seconds. This brake was very much criticised by some members, and, in my opinion, not without good reason; for when the brake was fully put on the closing was obtained by fits or starts. I consider we have no need of a rapid shutter to give us an exposure of two seconds; that can be done watch in hand. What we require is a perfect instrument giving a true exposure from a fraction of a second (say one-half) to the $\frac{1}{200}$th part of a second, graduated correctly and not liable to vary or get out of order. Such an instrument is still to be constructed, and would secure a legitimate success for the designer. The lens of MM. Thury and Amey is placed in the centre of the lens, and for this reason the drum of the lens is to be cut in two, which is a great objection to many amateurs. This position is the most natural and logical for a rapid shutter, as the maximum of rapidity can thus be attained without difficulty, whatever may be the shape of the opening chosen. There is the choice of a circular hole (as in the "eclipse)," of a lozenge form, or that of a slit. The latter I adopted for my shutter, finding it better than either of the other two. Alas! the maker into whose hands I gave my patent, although an excellent clockmaker, built up an apparatus sufficiently strong and heavy for a steam engine, and thus neutralised all my efforts towards a perfect instrument.

M. Scola read a paper on the difference of rapidity in gelatino-bromide of silver plates having a brilliant or a matt surface. So far as I could glean, matt surfaces allow the reagents to penetrate more easily, and therefore the image comes out more rapidly, but at the end no difference whatever will be found. In order to cure Coignet's "pits," or eliminate grease from gelatine, M. Scola proposes to wash the gelatine in benzoline; for grease is only upon the surface and not in the midst, and very easy to dissolve by that system. M. Scola then discoursed about the best means to reduce residues. He gave the history of the electric battery composed of silver chloride, and counselled emulsion makers, if perchance an emulsion were lost, to make electric cells with the silver bromide, which would be a great saving of time and money. Electric bells could be established all about the premises and kept at a high degree of efficiency, and, at the same time, residues would be reduced ready for the refiner.

The Chairman said he was afraid that this system was not suited to the means of every photographer. He had been asked for a simple and efficient way to reduce residues. He counselled amateurs and others to dilute the residues with a large quantity of water, acidulate it with a little hydrochloric acid, and throw in a few scraps of zinc.

I informed the Chairman that I had formerly employed that system, but was obliged to abandon it, as I found that all the silver bromide was not reduced, because the nascent hydrogen very rapidly reduced the silver bromide in juxtaposition, and then the action was stopped in a great measure. Instead of sending metallic silver to the refiners a great part of it was unreduced bromide of silver, which was found to be a sheer loss. I found the best plan was to dissolve out of the gelatine films, emulsions, and plates all the silver iodides and bromides by hyposulphite of soda. When the hypo. solution is saturated the silver is precipitated by a solution of pentasulphide of potassium. By this system I can obtain a better result than by any other method.

M. Bardy exhibited a very fine microscope made by M. Duboscq. This instrument can be converted into a camera for photomicrographic pictures with the greatest ease. A conical tube is placed upon the top over the eyepiece, bearing not a ground glass but a very finely-polished one, divided into squares by diamond cuts. When the object has been finely focussed and the chemical focus of the lens (if any) allowed for, the glass is taken out and replaced by a dark slide containing the sensitive surface.

M. Vidal made a communication on ceramic productions. He regretted that photography was not sufficiently employed in the decoration of chinaware, and exhibited coloured proofs such as are used at Limoges. These prints are upon gummed paper, and resemble those coloured pictures which so amuse children and are known by the name of "*décalcomanie*," the only difference being that the colours used in the pictures for decorating chinaware, &c., are chosen to stand heat, and are composed of metallic oxides. The picture and its colouration is generally far from being a work of art, and M. Vidal is of opinion that if these "would-be artists" could be persuaded to employ photography the work done would be much more correct and render service to public instruction.

M. Vidal has experimented upon the best system to attain the object in view, namely, making enamel portraiture, &c., and that mechanically. He proposes to modify Mr. Woodbury's process in this wise:—Instead of gelatine being employed to hold the coloured matter, M. Vidal proposes the use of gum. A metallic oxide is mixed in a thick solution of gum arabic, and poured upon the leaden proof of a Woodbury press. The paper is put on and the lever is pulled down. Now, we all know what happens when gelatine is used. The gelatine sets, adheres to the paper, and when the press is opened an image is raised, showing all the form of the leaden model. Now gum will not set, but will remain liquid. M. Vidal has overcome this difficulty by coagulating the gum with rectified alcohol. After having placed the paper upon the coloured gum the press is closed, and thus all the excess of colour is driven out. The press is then lifted, blotting-paper impregnated with absolute or pure alcohol is now laid upon the paper, and the press is again closed. The alcohol goes through the paper, and sets or coagulates the gum. In a short time the paper bearing the image can be raised and transferred to the enamel, and then burnt in. This system would be much more rapid than the dusting-on process. It remains to be proved whether it be practical on a large scale.

A new invention, or "photographic colours," was then discussed. I can do no better than quote the paragraph from *The Times* of May 2nd last:—"*Photographing Colours.*—An engraver at Versailles claims to have discovered the art of taking photographs in colours; or, in other words, of reproducing the colours of the body or landscape photographed." This is, as usual, a *canard*, as well as a secret process.

An engraver of Versailles, named Baudran, has been soliciting the Ministre de l'Instruction Publique for a yearly subvention or grant of money, in exchange for which he would reveal a secret by which all the pictures in the Louvre could be reproduced in natural colours. So insinuating was he and so firm in his own belief that he succeeded in imparting some of his own confidence to many government officials. An appointment was made, and the inventor was asked to reproduce a picture. Of the number of the picture he had been previously informed. On the appointed day he made an experiment before the Ministre de l'Instruction Publique and a great number of statesmen. The preparation was covered with black paper, as he said he could not divulge his secret, &c., &c.; in fact, his manner appeared like that of Robert Houdin, or any other conjuror or wizard. In a drawer he tore off the black paper from his preparation, put the latter into a printing-press upon the negative of the picture, and exposed it to the sun's light. The exposure being sufficient the preparation was taken out of the printing-frame, plunged into a bath, when, lo! and behold! a very pretty reproduction of the picture was presented to the audience with all the colours of the original. "Marvellous!" "Wonderful!!" "Extraordinary!!!" and many other such expressions were heard and repeated. At last, when the enthusiasm had subsided a little lower than boiling-point, one of the audience—another St. Thomas, if not so incredulous as the saint in question—was at least wise enough to insinuate that before the world should be informed of an invention far above any of the nineteenth century, and which would not only confer honour and riches upon the inventor but shed glory upon France, &c., &c., it would be wise to have the opinion of some practical men well versed in photographic manipulations, &c. The proposition was seconded, and the inventor was politely informed that another interview would be accorded to him. A council of scientific men was called, and the following is, within a little, the result of their investigations:—That the inventor has not succeeded in reproducing natural colours by photography. This is short and explicit.

I will now endeavour to inform my readers how the inventor deceived himself, and how the results he obtained can be got by any amateur or photographer. M. Baudrau is an engraver and an amateur photographer, but not very conversant with photographic lore nor manipulations. This may be his excuse. Now, let any person take a negative of a picture, print the image very slightly upon salted paper—that is to say, paper prepared with a chloride and then sensitised upon a silver nitrate bath. Upon this skeleton of an image must be painted the colours of the original picture, and that as similar as possible. The colours to be used must be those mixed with albumen. I believe such colours are sold in England under the name of "moist colours." When the colouring is completed the paper is floated upon a solution of albumen salted with a chloride. When dry the paper, canvas, or other material is sensitised upon a silver nitrate bath, and when dry it is placed in juxtaposition upon the negative. The photographic image is now fully printed out, as in an ordinary silver print. The image is then plunged into a solution of hyposulphite of soda, and when fixed it is well washed and then dried. All the colours can be seen through the albumen, the photographic image giving the half-tones and shades—in all presenting a very pretty appearance, and quite capable of inducing any one to cry out "wonderful!" This is the history of photography in natural colours which has made so much noise—not only in scientific circles, but also among the public—during the last few days.

The Secretary mentioned the loss which photography had sustained in the death of J. B. Dumas, one of the most illustrious representatives of modern chemistry, and a lover and energetic protector of photography. Perhaps had it not been for the pecuniary aid he gave to Daguerre, photography or the development of the latent image would still remain to be invented. France has to weep for one of her *savants.*

England has to bewail the loss of one of her children in the person of the amiable President of the South London Photographic Society. I had unhappily only the pleasure to be in his company once or twice, and I sincerely sympathise with the Society in their loss, and bewail with the family in their sad bereavement.

A new publisher of photographic publications has come to the front in the person of M. Tiquol, 45, Quai des Grands Augustins. He has just published a work by M. Liebert, the well-known photographer, on carbon printing, being a practical description of the process and its manipulations. I wish success to the author and publisher.

25, *Rue des Apennins, Paris, May* 5, 1884. E. STEBBING, *Prof.*

INCREASING THE RAPIDITY OF COLLODION EMULSION FILMS.

To the EDITORS.

GENTLEMEN,—It has often been desired—at least by those who used formerly to practice the old collodio-bromide process—to obtain quicker results on plates thus prepared. Reading in last week's Journal Mr. W. K. Burton's article on mixing emulsions and your leader on the same subject, it occurred to me that something might be done towards increasing the rapidity of collodion emulsions.

You will recollect that last year Mr. E. Banks wrote some very able and interesting articles on collodion unwashed emulsions, in which one of the main features of the process he recommended was the small amount of pyroxyline used in the collodion. The plates having been coated with collodion emulsion were washed and then coated with gelatine, which allowed a strong developer to be used without fear of fog. I for one followed those articles, and experimented in that direction with a certain amount of success; and I have reason to hope that that success will be carried still further by adopting the principle contained in the articles referred to above as to mixing emulsions.

My proposition is to carry out Mr. Banks's process up to the point where he coats the collodio-bromide plate with gelatine; but, instead of gelatine, to use a thin, rapid gelatine emulsion just floated over the plate and run off at the corner, so as to leave a very slight trace of gelatino-bromide over the collodio-bromide. This would act as an accelerator and preservative, and would develope quickly, which development would be communicated to the collodio-bromide film in much the same way as by first setting fire to a few sticks, coal will take fire from them.

This, if successful, will bring our old friend once more to the front as an old friend with a new face, and I trust with a sparkle on his face, too; and I am sure the process would be welcomed by many old workers.

Plates thus prepared would dry very quickly, and could be used wet, if desired, in the studio or out of doors; and for coating large plates, which are sometimes very uneven, it would possess an advantage over gelatine, which requires levelling. They would also be more uniform and more easily worked in hot climates, and the films could readily be transferred or detached.

During the next few days I hope to put this process to a trial, and I hope other old workers will do the same, as I feel sure there is something in it.—I am, yours, &c., G. V. J. POIRON.

8, *Victoria-chambers, Westminster, May* 6, 1884.

DARK-ROOM ILLUMINATION.

To the EDITORS.

GENTLEMEN,—It is satisfactory to hear from Mr. A. Pringle that the committee of which he, Mr. J. M. Turnbull, Mr. J. G. Tunny, Mr. Hume, Mr. Jamieson, Mr. W. Forgan, and other gentlemen were members, found, as the result of their experiments, that a yellowish-green light had the least effect upon a sensitive plate when compared with a ruby light; but it is disappointing to be informed that, in spite of this, Mr. Pringle himself prefers ruby light, because to him yellow green is obnoxious.

I venture to say that a prefence for red light, as a matter of comfort and pleasantness to the eyes, is quite exceptional; and, although it is desirable to put exceptions on record, it would be of general service to know the views of the other gentlemen who took part in the experiments.—I am, yours, &c.,

London, May 6, 1884. W. E. DEBENHAM.

STANDARD DIAPHRAGMS.

To the EDITORS.

GENTLEMEN,—As we have numerous inquiries as to whether it is our intention to adopt the standard diaphragms recently recommended by the Photographic Society of Great Britain, permit us to state that we have already done so for some time in our new formulæ of portable and rapid symmetricals, and have advertised this fact in the ALMANAC for the present year.—We are, yours, &c., ROSS AND CO.

112, *New Bond-street, London, May* 7, 1884.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

To the EDITORS.

GENTLEMEN,—Please allow me space for a few lines to inform intending contributors to the "Statham Testimonial Fund" that the subscription list will be closed tomorrow (Saturday), May 10th, and oblige,—Yours, &c., F. A. BRIDGE,

9, *Norfolk-road, Dalston-lane, E., May* 9, 1884. *Hon. Sec. and Treasurer.*

A CORRECTION.

To the EDITORS.

GENTLEMEN,—Permit us to correct an error in the report of the Liverpool Amateur Photographic Association with respect to the new stand shown to the members by Mr. Cornish.

The stand was first introduced and is manufactured by us. We are not merely the agents for its sale, as incorrectly stated in the report.—We are, yours, &c., NEWTON AND CO.

5, *South John-street, Liverpool, May* 5, 1884.

Notes and Queries.

SYNTAX inquires:—"Of the following two methods of intensifying a gelatine negative—*a*, bichloride of mercury, followed by ammonia; *b*, bichloride, iodide, and hyposulphite, as recommended by Edwards—which is to be preferred?" —— In reply: The former is believed to be the more stable.

"I have a plano-convex lens twelve inches in diameter which I wish to mount as a condenser for solar camera purposes. Which side should I place next to the negative?—FRED. B. HASLETINE."——In reply: The flat side must be next the negative, the convex surface being to the outside.

C. WALKER inquires:—"Can you tell me why the photographic image appears upside down on the ground glass of the camera? A friend of mine is very anxious to know why it is not correct, the same as shown in an opera glass; and because I am in the photographic profession he taunts me about not being able to explain the reason."——In reply: It is somewhat surprising that our correspondent allows himself to remain in a state of ignorance on such a simple matter, when by reading the literature of his profession he may so easily acquire knowledge. Meantime we refer him to that chapter in the series of articles on the *Optics of Photography and Photographic Lenses*, published in our volume for last year, entitled "The Cause of an Inverted Image," to be found on page 276. After reading this he will experience no difficulty in giving a reply to his friend.

"Is there any advantage in fuming ready-sensitised paper, or should it be used just as purchased?—A. SCOTT."——In reply: There are some brands of paper which will not yield good tones unless they are very much fumed; but, as a rule, paper purchased from respectable dealers is ready for placing in the printing-frame without such preliminary treatment. Fuming may be resorted to if there be much difficulty experienced in getting a good tone.

H. T. asks:—"Is it necessary, when making chloride of gold from coins which have been alloyed with copper, to remove the baser metal; that is to say, will the presence of the copper in the finished chloride have an injurious action on the tones of the finished prints?"——In reply: Chloride and nitrate of copper have a certain toning action which is said to pass away in the fixing-bath; but we have not heard of any injurious effect having been produced by their presence in the chloride of gold. Perhaps some reader who has had experience in this direction will give some information.

F. B. J. writes:—"I have occasionally heard of dark slides for gelatine negatives which have been formed throughout of paper or thin cardboard. Is this possible? and, if so, where can such slides be obtained?"——In reply: It is quite correct that dark slides of this class are made and sold—but only in America, not in England. It is said that they answer the intended purpose exceedingly well, their thickness being such that twelve slides filled with plates only equal in bulk eighteen plates when piled together. The camera must have a special adapter made for these slides. We are unacquainted with the details of their construction, but imagine that they will not be able to stand much wear and tear.

G. M. D. inquires:—"Can you inform me what are the advantages claimed to accrue from fuming sensitised silver paper with ammonia? I read in certain American works accounts of the method of printing, and ammonia fuming forms in every case an integral portion of the operation; whereas, on the other hand, I cannot discover any recommendation of, or even allusion to, it in several English works which, from the status of their authors, should be considered authoritative."——In reply: The advantages alleged to be derived from fuming with ammonia are increased sensitiveness, the possibility of obtaining good tones with a weaker silver bath than usual, and a rich tone with a minimum of gold. It is better to make use of strong ammonia and short fuming than to fume a long time with weak ammonia.

J. T. T. says:—"With reference to the adaptation of a Nicol prism to a lens for obtaining landscapes: there is no doubt that from the very nature of its construction very few other than central rays can be transmitted so as to prove of any benefit in depolarising the light from a landscape. Having a large Nicol prism capable of transmitting a beam of light, large in a corresponding degree, I had it fitted to the lens of a pantoscopic camera; and, as the rays by which the plate in this camera is impressed are all axial, I have had complete depolarisation of a subject measuring 120° on the base line of the picture. I do not attach much importance to this feat, as there are only few circumstances or occasions under which it will be of practical value; still, it is well to place it on record as a means—and, so far as I can see, the only means—by which the photographing of a wide angle of view by the agency of depolarised light can be effected."

"AT the lecture on photographic composition, delivered by Mr. Norman Macbeth at the recent meeting of the South London Photographic Society, it was stated that Burnett's treatise on *Composition* was out of print. Considering how highly it was eulogised by the lecturer permit me to inquire if it could not be reprinted? There is now no copyright restriction applicable to this case, as the author has been dead for a very long period—indeed, over the seven years mentioned in the act.—X. Y. Z."——In reply: The work mentioned, although valuable to painters, is not so to so large an extent to photographers. We believe it was reproduced by photolithography (for there are more pictures than letterpress) in America some years ago; but, so far as we are informed, it was not appreciated by photographers as highly as might have been considered desirable. Such a discourse as that by Mr. Macbeth, prepared as it was specially for photographers, if published *in extenso* and illustrated by the various diagrams and pictures he exhibited, would prove invaluable to every one who makes use of a camera for taking either a landscape or a portrait.

POSTMASTER writes:—"I am glad to see the subject of lenses of long focus mentioned by 'R. F. W.' When I read his letter I unscrewed the lens of my astronomical telescope, which is rather larger and of longer focus than that of your correspondent. I fixed it temporarily in a hole in an extemporised shutter adapted for a small window in the rear of my house, but from which a fine view is obtained. As might have been expected, I was charmed with the large and distinct view projected on a sheet of white cardboard upon which I received the focus. But I reasoned in this way: the only difference between this image and one obtained from the same point of view by any other, even the smallest, lens is one of actual magnitude, not of difference in proportion. Why, therefore, not employ a quarter-plate camera to obtain a negative, and enlarge this up to the same dimensions as those yielded by the large and costly object-glass? Not much sooner said than done. As the quickest way of proceeding I exposed a bromised collodion plate, developed it by alkaline pyrogallol, treated it with nitric acid, placed the transparency thus obtained in an oil optical lantern, and projected its image side by side with the direct large one obtained by the costly telescopic objective. Both were alike in dimensions. What conclusions ought I to draw from this experiment?"——In reply: The inference to be deduced from the experiment narrated is that a well-made enlargement is of equal value with a direct large picture—a doctrine that has been invariably taught in this Journal for many years.

Exchange Column.

No charge is made for inserting these announcements; but in no case do we insert any article merely OFFERED FOR SALE, *that being done at a small cost in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a* NOM DE PLUME *be thought desirable), otherwise the notice will not appear.*

I will exchange two boxes ferrotype plates, 14 × 10, 200 in box. Wanted, good half-plate lens, or offers.—Address, STUDIO, Frederick-st., Cardiff.

I will exchange roller background frame, to carry six or more changes, for good 10 × 8 field camera, or offers.—Address, H. G., 158, Regent-street, W.

Wanted, Dallmeyer's rapid rectilinear or Ross's rapid symmetrical lens, in exchange for Dallmeyer's 4D patent lens.—Address, SMALLEY BROS., 2, West-street, Fleetwood.

I will exchange a 10 × 8 wide-angle view lens, Photo. Stores make, new; what offers? Wanted, Solomon's magnesium lamp.—Address, TAYLOR, photographer, Chislehurst.

I will exchange a Victoria camera, with four lenses, and part cash, for a 10 × 8 or 12 × 10 patent group lens by a good maker.—Address, W. S., 13, Trinity-street, Hanley, Staffordshire.

I will exchange a good dark tent, Murray and Heath's, very compact, suitable for a dark room, for a half-plate camera with double slide, or offers.—Address, R. MORRIS, 97, Price-street, Birkenhead.

I will exchange a Solomon's magnesium lamp, double burner, with two coils of ribbon, cost £4 10s., for a good magic lantern.—Address, A. PARKER, photographer, Broughton-in-Furness, Lancashire.

I will exchange a photomicrographic camera, 36 inches bellows focus, for a good half-plate or whole-plate lens, by a good maker; also, THE BRITISH JOURNAL OF PHOTOGRAPHY for 1873 for anything useful.—Address, C. G., 31, Wigan-street, Bradford, Yorks.

I will exchange a portable half-plate tourist bellows-body camera, three double backs, and frames for other sizes, with tripod and view lens, for a whole-plate bellows-body camera and double back.—Address, GEORGE T. HARRIS, Long-street, Atherstone, Warwick.

What offers in exchange for a 10 × 8 ebonite bath and dippers, with cover, a 12 × 10 porcelain ditto, collodion filter, Thomas's tent, with wheels, Solomon's cabinet hot press, and Vogel's whole-plate triplet lens?—Address, A. GOULD, Glen View Studio, Bournemouth.

I will exchange a 12 × 10 portable Kinnear camera, with one dark slide, in good order, Watson's twenty-one shilling shutter, new, a drop shutter, fits two sizes of lenses. Wanted, Solomon's enlarging lantern and a large-sized doublet lens, or open to offers.—Address, T. L. W., 19, Beckenham-road, Penge.

I will exchange a biunial lantern, four inches condensers, about 150 slides, gas bag, boards, retort, screen, frame, &c., together or separate; also, light, four-wheel waggon for the above, suitable for a boy to draw. What offers in good photographic apparatus?—Address, 283, Broadfield-terrace, Abbeydale-road, Sheffield.

Wanted, a No. 3 Ross's portable symmetrical lens, must be in perfect condition, in exchange for any of the following:—A Seavey's rustic stile and steps, cost £4 10s. (equal to new), an Oakley's A1 tripod, two good head-rests, by Harrison, and two cameo, cabinet, and *carte* embossing presses, by Marion, also a superior iron studio table, with walnut circular top and inlaid chessboard. Photographs and particulars of any of the above on application.—Address, EDWIN ECCLES, 15, Broad-street, Bury, Lancashire.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

NOTICE.—*Each Correspondent is required to enclose his name and address, although not necessarily for publication. Communications may, when thought desirable, appear under a* NOM DE PLUME *as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.*

ALEX. SCOTT.—Doubtless one of the zinc etching processes was referred to by the lecturer.

PHOTO.—Dickens's *Dictionary of London*, price one shilling, will answer your purpose best.

ARGOL.—The paper may be obtained direct from the Willesden Paper Company. Their address is Willesden, Middlesex.

B. P.—Any good portrait lens having a back focus of six inches for *cartes* and eight inches for cabinets will answer. The latter will suit both purposes.

BROMO.—Precipitate the iron, either with caustic or carbonate of potash, and employ the solution for making a new developer by the addition of fresh iron.

A NOVICE.—The addition of a small quantity of carbolic acid to starch paste, if employed for mounting photographs, will exert no injurious effect upon the pictures.

F. E.—This correspondent directs our attention to an advertisement in our last number. Had the advertisement alluded to come under the notice of the Publisher of this Journal it would not have been inserted.

J. C.—The plate will keep best if preserved in the same packages in which they are issued by the manufacturers. The method of keeping proposed by yourself would be no improvement.

R. W. C.—In reply to your query, we must ask what you consider the requirements of "a professional landscape photographer," what process he is to work, and what size of picture he is to take?

G. T. H.—1. Yes, if the light be good and the plates very sensitive; but not otherwise.—2. If you send the pictures here, together with postal orders for one shilling and sixpence for each picture, we will effect the registration of copyright for you.

Wm. Prentice.—No wonder the plates fogged if your window was "protected" with the fabric of which you send a sample. In reality it is no protection at all. It admits a large proportion of the violet ray. It is quite useless for dark-room windows.

Thos. Snowdon.—1. If the wax be not decomposed the spots can doubtless be removed by subjecting the picture to a moderate amount of heat.—2. We are not aware what kind of mountant the gentleman employs. Probably glue applied to the edges only of the picture will answer quite well.

E. Jacobs.—As the lenses are sold for a few shillings each, and have the same number of glasses as a portrait combination—which, indeed, they are in miniature—you cannot expect them to possess a very high degree of perfection. Certainly they cannot be expected to answer for photomicrography.

Hugh.—We cannot, at a moment's notice, search out the particular number of the Journal in which the process was first published. Dr. Eder says the plates will keep six days, and probably longer. Opticians in their catalogues, as a rule, mention the back focus of their lenses, and not the equivalent focus.

A. G. Downing.—1. No satisfactory method. You had better make a negative and produce the prints from that.—2. We cannot in this column devote the space necessary to give the working details of an entire process, more particularly when the process has been an obsolete one for many years, and is, therefore, of no interest whatever to our other readers.

R. J. B.—The portraits are by no means well produced. Their principal fault lies in the lighting. Too much front light has been used; hence the pictures are flat and lacking in rotundity. Stop off a large proportion of the light in front of the sitter, and admit a stronger one at the side. If by this treatment you find the shadows are a little too heavy, soften them by means of the reflecting screen. There is no fault whatever in the construction of the studio—rest assured of that.

R. A.—Employ a small stop in the lens, and use a very large proportion of restrainer in the development.—2. Gelatino-chloride plates will not be suitable for the purpose.—3. Dry collodion would possibly answer best; but plates by this process can scarcely be considered an article of commerce nowadays. With slow gelatine plates, and a developer well restrained, you should experience no difficulty. The notice with regard to correspondents enclosing name and address does not appear every week. It appeared the week you wrote, and again this week.

G. Richards.—This correspondent asks—"How long will sensitised carbon tissue keep good?" This is a difficult question to answer, inasmuch as all will depend upon how it is dried and how it is kept afterwards. If the tissue have occupied a long time in drying it will not keep long—probably not more than a day or two. If it be quickly dried, and then carefully preserved from atmospheric influences, it will keep good for two or three weeks. We have kept some for as long a period as six weeks after sensitising; but this was an exceptionally long time. You can certainly "purify" the bichromate of potash by recrystallising it; but this it is scarcely necessary to do if you get a good commercial sample. The addition of a small quantity of spirit of wine will not cause a precipitation of the salt.

A Miniature and Portrait Painter writes:—"Can you tell me what is the best plan to adopt with regard to photographers who carry on the following system:—They send a small order accompanied by cash; this is followed by a larger order, which they pay for; and then comes a still larger order, which they *don't* pay for. They obtain the artist's confidence, and then abuse it. I believe there are several men who carry this plan on regularly with all the advertisers. Four photographers have treated me like this lately. They expressed themselves perfectly satisfied with the work, promising cash by next post; but since then I can get no reply to any application. Can such men be shown up?" We hope our correspondent will take legal proceedings, and thus "show up" at least one of the fellows who follow such nefarious practices.

Photographic Club.—At the forthcoming meeting of this Club, at Anderton's Hotel, Fleet-street, on Wednesday next, the 14th inst., the subject for discussion will be—*On Developing with and without Sulphite of Soda.*

An Outside Recognition of Photography.—At a *conversazione* in connection with the recent Exhibition of the Horticultural Society of Liege, Belgium, an album of Mr. Henry Stevens' flower studies, which happened to be in the possession of the President of the Liege Section of the Belgian Photographic Association, was exhibited by him, and so pleased the horticulturists that the Society has done Mr. Stevens the unsolicited honour of awarding him a *medaille en vermeil* for the excellence of his photographs. The Belgian Photographic Association has also awarded him a special diploma in addition to the medal gained at the recent exhibition.

Photographic Society of Great Britain.—The next ordinary meeting of this Society will take place on Tuesday next, the 13th inst., at eight p.m., at 5A, Pall Mall East (the summer exhibition of the Royal Society of Painters in Water Colours being on view), when the following papers will be read:—*Observations on Fading*, by John Spiller, F.C.S.; *Illumination of the Dark Room*, by W. E. Debenham; and *Commercial Fabrics Suitable for Dark-Room Illumination*, by J. R. Sawyer.

The Photographic Artists' Co-Operative Supply Association, Limited.—*On dit* that the business of this Company, carried on at 43, Charterhouse-square, E.C., has changed hands, and that a new Company has been formed to carry on the concern on the co-operative principle. Mr. A. H. Loring, Mr. A. F. Charrington, and Mr. W. B. Whittingham are mentioned as being on the Board of Directors, and Mr. H. R. Faulkner, who has been connected with the concern for upwards of five years, has been appointed Manager and Secretary.

Business Changes.—When recently visiting the establishment of Messrs. Horne and Thornthwaite, philosophical and photographic instrument-makers and dealers, Strand, we were not a little gratified to find that the business had passed by purchase into the hands of our whilom contributor, Mr. James Martin, who will be remembered as having been for many years connected with the business while it was conducted in Newgate-street. Mr. Martin has made the purchase on behalf of his son, who has graduated in a good school, no fewer than eight years of the time devoted to acquiring a knowledge of the routine of the trade having been passed in the establishment of Messrs. Ross and Co. Aided by the great photographic experience of Mr. Wm. Ackland—who still controls the important spectacle department—we have no doubt that Mr. Martin, Jun, will prove thoroughly successful in carrying on and increasing the business of Messrs Horne and Thornthwaite, the familiar title of which firm is still continued under the new *régime*.

The Law of Copyright.—Mr. Hastings has again introduced a Bill to amend and consolidate the law of copyright in works of fine arts and in photographs, and the Bill was read a first time in the House of Commons on Wednesday. The Bill is backed by Mr. Hanbury Tracy, Sir Gabriel Goldney, Mr. Agnew, and Mr. Gregory, as well as by Mr. Hastings. It is, we understand, substantially the same Bill as that introduced last session, but it has been carefully revised, and some modifications and additions have been made with respect to copyright in photographs, to meet, or rather avoid, the vexed question, "Who is the author of a photograph?"—a question that puzzled the learned judges in the case of Nottage *v.* Jackson, in which the ownership of copyright in a photograph of the Australian cricketers was in dispute. A short Bill intended to meet this point, and this point alone, was introduced towards the end of last session by Mr. McLaren, but was dropped at an early stage. When the present Bill is printed we propose to examine and comment upon the clauses dealing with photography.—*Athenæum.*

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician,
For three Weeks ending May 7, 1884.
These Observations are Taken at 8.30 a.m.

April.	Barometer.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max Shade Temp.	Min. Tem.	Remarks.
17	29·97	NE	45	40	—	45	39	Cloudy.
18	30 02	NE	40	36	90	47	36	Cloudy.
19	29·86	NE	40	35	79	47	35	Cloudy.
21	29 97	NE	45	40	90	50	36	Hazy.
22	30·03	NE	43	38	84	51	33	Cloudy.
23	30 00	E	43	38	—	50	33	Hazy.
24	29 90	E	42	38	79	50	32	Bright & Clear
25	29·89	E	43	40	—	50	35	Overcast.
26	29 86	SW	45	41	82	54	39	Overcast.
28	29·75	SW	45	44	—	51	40	Raining.
29	29·81	NW	44	42	81	59	38	Foggy.
30	29·79	N	51	47	85	60	40	Hazy.
May. 1	29·93	W	47	44	93	57	38	Fine.
2	29·79	NW	52	46	84	57	46	Cloudy.
3	29·44	W	55	52	99	58	51	Cloudy.
5	29·49	W	50	46	103	59	40	Cloudy.
6	29·74	NW	49	44	95	61	39	Cloudy.
7	30·10	W	51	46	93	58	40	Hazy.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

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IODIDE OF SILVER IN EMULSION.

At the close of our article on this subject last week we reiterated the opinion we long ago expressed that the presence of a certain proportion of iodide of silver is not necessarily injurious to the sensitiveness of an emulsion of silver bromide. We say "not necessarily" because under certain conditions such an addition will, undoubtedly, lower the degree of sensitiveness in the same manner that other substances will do.

Thus, if an emulsion be boiled or stewed in the neutral state for a given period, a certain degree of rapidity will be attained; but if to a second quantity, otherwise similarly treated, a small trace of acid be added, an equal degree of sensitiveness can only be gained by more prolonged cooking. In like manner the presence of a small quantity of iodide of silver lengthens slightly the period of cooking necessary to produce a given degree of rapidity, and this in proportion to the quantity present; but, so far as we have been able to ascertain, if the proportion of iodide be kept within reasonable bounds, there is no permanent injury done to the sensitiveness of the preparation, its only slowing effect being manifested in the operation of cooking.

But, setting aside for a moment the question of sensitiveness, the presence of iodide of silver, it is almost universally agreed, confers beneficial effects upon an emulsion. The chief of these is the opacity it gives to the film, which minimises the chance of mechanical "halation" (by reflection from the back surface of the glass), and its specific action in the film itself in preventing chemical halation by separating the particles of silver bromide, as pointed out by Captain Abney. It has also been claimed that the admixture of silver iodide renders necessary a less "safe" light in the developing room; but it has never yet been satisfactorily proved whether this is actually the case—so far, at least, as it was said to reduce the sensitiveness of the film to rays of lower refrangibility.

That films containing iodide are less liable to fog, are more easily managed, and give generally clearer and brighter negatives under similar conditions than those of plain bromide, is a fact which no one who has used both kinds can have failed to notice; and the difference in this respect is the more palpable in proportion as the sensitiveness of the preparations is increased. Indeed, in the course of a discussion on the subject of plates combining exalted sensitiveness with perfection of quality, a well-known emulsion maker some months ago expressed to us the decided opinion that in order to secure this much-to-be-desired combination of qualities a certain proportion of iodide is *absolutely necessary*.

It is possible that this extra cleanness and vigour in working which an iodide plate displays when compared with a plain bromide one, while being purely chemical in its character, may have given rise to the supposition alluded to that the sensitiveness of the film to certain rays is lowered. In other words, if two plates of equal camera-sensitiveness—the one a plain bromide, the other a bromo-iodide—be developed side by side under identical conditions of light, and the one fogs while the other does not, then, assuming that in the case of the bromide plate the fog is caused by excess of light or by light of an unsuitable character, it would be only reasonable to argue that the bromo-iodide plate, while equally sensitive in the camera, is less easily affected by light of a certain colour which suffices to fog plain bromide.

But if the cause of the fogging action on the bromide plate be not light, but merely a stronger tendency to abnormal reduction under the action of the developer, then that argument fails completely. If instead of "light" fog it be really "chemical" fog, then it only proves that iodide has a beneficial chemical action wholly independent of any consideration of the quality or quantity of the light admissible during the various operations of preparation and development.

The following experiments, from amongst many, will illustrate our meaning and tend to show that any advantage which iodide confers upon the film is entirely beside the question of its colour sensitiveness:—Two plates of commercial manufacture, and as nearly as possible equal in sensitiveness (the one plain bromide, the other bromo-iodide), were exposed and developed side by side in separate dishes until each exhibited the same amount of detail in certain portions of the subject. Both plates were equally exposed to the light (ruby and orange) during the time of development, and, upon fixing, the plain bromide plate showed a decided veil while the other was quite clear.

Two similar plates were exposed and developed, the dishes this time being kept covered, so that practically the development was effected in the dark. Upon fixing, the bromide plate was again found to be veiled, being, in that respect, not a whit better than the one which had been freely exposed during development. Here we had ample proof that the difference was not caused by light but by the necessity, on the part of the bromide plate, for a more powerful fog restrainer.

Another line of experiment was then taken. The quantity of restraining bromide necessary to retain the clearness of the bromide plate during the application, for a measured time, of a developer of the strength already used having been ascertained, two more plates were exposed, as before, for equal periods, and afterwards developed under identical conditions. In this case, however, though the bromide plate came out without veil, it was most decidedly less exposed than the other. Here, then, we find that iodide of silver is capable of replacing soluble bromide as a fog restrainer, and, what is of greater importance, it performs that function with less effect upon sensitiveness of the plate than is exercised by the bromide; consequently, there is a probability we may be able to prove that, *cæteris paribus*, a bromo-iodide plate may be actually *more* (instead of less) sensitive than a plain bromide one.

In a subsequent article we shall show that iodide is capable of perfectly replacing free acid during the preparation of the emulsion, and is especially valuable in connection with the ammonia methods.

PHOTOGRAPHS ON IVORINE: A NOVELTY.

It is scarcely necessary to make any explanation as to what is meant by "ivorine," seeing that it has been so extensively used during the last year or two in the production of Christmas and birthday cards, and is, therefore, familiar to everyone. The surface of this material, from its ivory-like texture, is exceedingly easy to paint upon, and very delicate and effective pictures can be produced with the expenditure of but little time or skill, and, consequently, at a very cheap rate.

Ivorine, it may be explained, is simply gelatine containing some white pigment, such as sulphate of baryta or oxide of zinc, together with a small proportion of glycerine, to prevent its becoming brittle when in thin sheets. This solution (or, rather, emulsion) is poured upon a levelled glass plate, allowed to set, and the plate is then reared up to dry in the same manner as ordinary gelatine plates. When the coating is dry, the film is stripped from the glass, and this is the ivorine of commerce. It is almost needless to say that the glass must have previously been waxed or rubbed over with powdered talc to prevent the film from adhering when dry.

When looking over a number of these effective little pictures on ivorine it occurred to us that photographs on the same material would be exceedingly effective and very convenient for the album, as they would be thinner than prints on the ordinary mounts. Also, from the translucent character of the ivorine, the pictures could be viewed as transparencies—a double advantage. Furthermore: there would be a certain amount of novelty about such pictures which would possibly render them a success if introduced commercially. The idea of employing artificial ivory is by no means new, as from the very early days of our art-science it has been used—or, perhaps, it would be more correct to say has been attempted to be used, as the results produced were not always the most successful. However, the late Mr. Burgess, of Norwich, did undoubtedly produce—and on a commercial scale, too—some most charming pictures by what he named the "eburneum process."

Mr. Burgess's plan was to produce a collodion picture on glass in the camera, as in the collodion transfer process, and then to apply the eburneum mixture in a fluid state. This, in composition, was similar to that now used for the manufacture of ivorine, except that it contained a larger proportion of pigment. Although the eburneum process was very successfully worked by Mr. Burgess himself, it was not to any extent employed by others, as it involved some few difficulties which they did not appear to surmount. The chief of these were that by camera printing it is difficult to obtain pictures of a pleasing, warm tone, and the inky-black, so generally obtained by this method, was very objectionable on a material like ivory. Added to this, the gelatinous coating, on account of its thickness, took a very long time to dry, several days being frequently necessary in damp weather.

We know quite well that any process to be useful commercially must not be beset with difficulties, as was undoubtedly that just alluded to; hence we abandoned the idea of employing the gelatinous preparation in a fluid condition. Having ascertained that ivorine is an article of commerce, and is sold by most fancy stationers, we procured several samples, and found, as might be expected, that when placed in cold water they became soft and pliable like ordinary gelatine. In hot water, after soaking in cold, they dissolved freely, though some more so than others—possibly from the more insoluble ones containing a certain proportion of alum. From these experiments it was clear that ivorine could be made to take the place of paper, either in the collodion transfer or the carbon process.

In putting the idea into practice with the latter process we met with no difficulty whatever, and here is the method we adopted:—Some carbon prints were made upon collodionised glass, in the same manner as if they were to be transferred to paper, except that they were not allowed to dry after being "alumed." The ivorine was then soaked in water until it became quite limp. It was now removed and laid upon the picture, the superfluous water being expelled with a very soft squeegee. The pictures were then allowed to dry, when they were stripped from the glass and trimmed round the edges with a pair of scissors. The pictures, it may be mentioned, were developed and the ivorine applied in the evening, and they were found to be perfectly dry by the following morning. Nothing can be simpler to work than this process, and the results produced are exceedingly pleasing. One or two things noticed during the experiments may, however, be mentioned, as they may be of some little assistance to those who may try the process. The ivorine must be made thoroughly and evenly soft, otherwise, when it is squeegeed on to the glass, it will "buckle up" and leave the picture. This we noticed particularly with one of our pieces which happened to be thicker at one end than at the other. When this piece was applied to the glass the thickest end (although quite soft, was not so soft as the other) could not be kept down, but upon re-soaking it all difficulty disappeared.

It is advisable not to soak the ivorine more than is necessary, as the longer it is soaked the longer it will, of course, take to dry. All the moisture it is possible to expel with the squeegee should be expelled; for, if any superfluous water be allowed to remain on the surface, it will cause the gelatine to continue swelling, and be liable to produce markings on the back of the finished picture from unequal drying.

In our first experiments we had some doubts as to whether, if the ivorine were simply softened in cold water, it would prove sufficiently adhesive to the carbon film; but our doubts were groundless, as by no possible means could the two films be separated when dry. However, it is quite possible that some samples of ivorine may be more insoluble than those we tried, and the mere treatment with cold water will not be sufficient. We therefore placed a sheet of it in tepid water before applying it to the picture; but this rendered it very difficult to manage, as the heat dissolved, or partially dissolved, both surfaces.

We then hit upon the following plan of softening, or, rather, bringing about a state of partial solubility of one side only, which at once overcame all difficulty:—The picture, after development and being treated with alum, was dried. A piece of the ivorine was now softened in cold water. The picture was placed in warm water, of about 110° Fahr., until the glass had acquired that temperature. The softened ivorine was then applied and squeegeed down as before. By this method of procedure only that surface in contact with the picture is partially dissolved, instead of both. When this plan is adopted the ivorine should be cut somewhat larger than the picture, as, when it is placed upon the warm glass, it appears to contract to a considerable extent. It is well to put a few American clips round the edges of the plate to prevent any portion of the picture from leaving it before all parts are dry, which might cause markings.

It may be as well to mention that brown tones, to our taste, are much preferable on ivorine to purple. Those most satisfactory, to our mind, were printed in a warm chocolate pigment; but, of course, this is merely a matter of taste.

We commend this process to those who are in search of novelties for the coming season as one that may prove remunerative.

PNEUMATIC AND HYDRAULIC SHUTTER APPLIANCES.

The eulogiums in which we indulged when giving, in 1878, the first details of the pneumatic shutter of Mr. J. W. T. Cadett have been well endorsed by the success with which it has been attended subsequent to that period. Ingenious experimentalists and mechanicians have had, by the invention of Mr. Cadett, their attention directed to the value of pneumatics in other directions than that described in the 1878 patent of this gentleman, mainly in that of discharging bolts or operating upon triggers, by which instantaneous shutters are started into action.

The convenience of being able to transmit through a long and tortuous piece of flexible and elastic tubing, by a touch at its farther extremity, the force by which the shutter is actuated is one sufficiently important to have induced photographers to ascertain, as far as possible, the full capabilities of the system, so as to note the direction in which further developments might be made.

When the flexible rubber tube is employed as the agent for insulating a pair of wires communicating with a tolerably constant battery of the capacity of three or four cubic inches, and without any liquid to spill, so as to be capable of being attached to an interior corner of a portable camera, with electric magnets *en suite*, then an exposing power of exceedingly great value will be placed at the services of photographers, who will very speedily discover the best and most convenient form in which to have that power applied.

We are quite well aware that, several years since, and by means of ingenious contrivances, electricity had been applied to cameras in the studio; but what we now aspire to has reference to those of a strictly portable class.

It is no secret that Mr. Léon Warnerke has recently obtained a patent for a method of transmitting force through a rubber tube, from the hand to the camera, by means directly mechanical rather than pneumatic. Having had an opportunity of examining the appliance we can speak of its success. The tubing, which need not exceed the thickness of the handle of an ordinary penholder, is lined throughout its interior with wire in close coils, such as that so commonly found in rubber tube employed for conveying gas—an addition which scarcely adds to the expense. Through the interior of this is passed, loosely, a second length of wire closely coiled, very much like the bass string of a pianoforte if the central core were removed, the action of the system resulting in this—that if a button at the end of the tube be pressed this pressure is immediately, and with almost full force, responded to at the further end by the interior tube or coil darting out with a measure of rapidity and force commensurate with that applied by the hand of the operator. Owing to the spiral form of the wire tubes it will readily be conceived that they may be curved or coiled without impairing the action of the central piece. As we shall have occasion subsequently to describe Mr. Warnerke's system in detail, no further allusion to it is at present necessary.

A system which was exhibited during the past week at one of the societies by Mr. A. Mackie elicited much attention from the exceedingly simple way by which pneumatic force may be rivalled by hydraulic force, in being made to operate upon an exposing shutter. It merely consists in filling the pressure ball and the connecting tube with water instead of air. That it answers the intended purpose there cannot be a doubt; and we are well aware that a patent, which was allowed to lapse two months ago, took cognisance of the substitution of water for air, strictly in this connection.

By way of experiment we have applied this hydraulic system to shutters of various forms which had been previously actuated by pneumatic force, and find that for some purposes—such as that of liberating a catch, pulling or pushing a trigger, or elevating a shutter or cap and keeping it so for a few seconds or minutes—the substitution of water for air is not attended with any disadvantage. Where it would prove less successful would be under circumstances in which two sharp puffs were required in rapid succession. This is, perhaps, not a likely contingency; but it is known that among the innumerable forms of quick-acting shutters is one, at least, which commences the exposure of the lens by one quick pressure of the pneumatic ball and terminates it by a second pressure, the sluggish action of water for such a purpose contrasting unfavourably with that of the more elastic atmospheric air. For every other purpose, however, the one fluid may be substituted for the other. It is possible that the thickness, and consequently the elastic power, of the rubber ball which acts as the reservoir for the force may have to be somewhat increased, and also that the water-ways of the fittings may have to be somewhat enlarged in order to secure the highest degree of efficiency. As stated, all our trials were made with appliances intended for air alone.

But another question here arises: how will the substitution of water or other non-compressible fluid for atmospheric air affect the original patent of Mr. Cadett? It is not pertinent to the question now before us to inquire here whether the claim for the shutter described and figured in that patent specification—which was republished at page 542 in our volume for 1878—be considered sufficiently comprehensive to include all that has since been effected—or, in other words, to include the broad principle of the application of pneumatics to the exposing of plates in the camera. This, we say, is a question which need not be discussed here; but what must prove of interest will be the ascertaining whether taking one, or a *facsimile* imitation thereof, of the admittedly-original patented pneumatic shutters, precisely as described in the clear language of the specification, and by ejecting the air contained therein and supplying its place with water, would be what in legal phraseology is designated a colourable imitation. And, if any case arising out of this were to be submitted to the Vice-Chancellor for adjudication, would he find that in this particular function air and water were considered in one and the same light, and that pneumatics and hydraulics were interchangeable terms?

If for the fluid in question oil, instead of water, were preferred, then further complications, especially in scientific nomenclature, would be expected to arise. On the other hand, should the discovery be made, as humorously suggested by a member at the meeting of the Society to which we have already referred, that the rubber ball may be made to enact the part of a flask for containing fluids for the refreshment of the inner man when fatigued with searching for and photographing the beautiful and pictorially-interesting scenes in nature, then we shudder in contemplating the dimensions at which this at present small, egg-shaped vessel may eventually arrive.

DROPPING, AND THE SIZES OF DROPS.

For many years, as it is scarcely necessary to remind our readers, we have seized every opportunity to express our sense of the necessity for exactitude in weighing and measuring in photographic operations, if any approach to uniformity of result be desired. It is gratifying to note that the old mode of describing these manipulations—such, for instance, as in the development of a dry plate, "a drop" of this and "a few drops" of the other—is comparatively rarely adopted nowadays. The manufacture of dry plates and, with it, dry-plate development, have made great strides towards perfection within a very short period; and, in consequence, to obtain the full value capable of being extracted from them, definite and accurate measurements must be not only made, but also described, in such a manner as to convey information to every hearer or reader.

Such information is not carried by the term "drop," and, whatever meaning the word may have for any one particular experimentalist, it is comparatively useless to another until reduced to a recognised scale. What we mean is that, if in using (let us say) ammonia for the alkaline developer, the experimentalist always use the same bottle, and really do count the drops, he will for his purpose get a near and, perhaps, a sufficiently close approach to exactitude; but let him employ a different bottle, or desire to publish, for the benefit of others, his method of producing certain results he has obtained, and he is utterly at sea unless he reduce his drops by means of a tentative experiment to an acknowledged standard. Whether it would not be infinitely better to use weaker solutions and measure them we leave our readers to decide.

The subject of the exact size of the drops formed by various liquids, under different circumstances, has always been an interesting one, and several tables are in existence showing the results of experiments in this direction by various chemists. They are as conflicting as interesting, and to read the details given by these experimentalists and the figures obtained is sufficient to cause the practice of dropping to be entirely discarded. When one experimentalist makes more than half-a-dozen trials of the simple act of dropping pure water out of a one-ounce phial, and, after counting the number needed to fill up a drachm, obtains results varying from thirty-four to sixty-five, and a mean of forty-eight, the absurdity of the system becomes evident, and it would be almost impossible to bring stronger evidence as to the inadvisability of its employment in any formula whatever.

We have made an examination of the various results tabulated by different workers, and compared it with one lately published by a French chemist, M. Boymond. If one point more than another about the tables impresses us it is the utter want of uniformity in all the results and the impossibility of correlating them. We extract a few of these to show our meaning.

A well-known work gives a table by Mr. Alsop, from which we extract the following number of drops required to fill a drachm measure:—

	Dropped from a large bottle.	Dropped from a small bottle.
Sulphuric acid, diluted	24	84
Hydrocyanic acid	35	70
Distilled water	31	54
Ammonia	40	48
Alcohol	100	130

Here the largest drop is over five times the size of the smallest; but we may observe in the case of ammonia that, whether dropped from a large or a small bottle, there was not a difference of more than twenty per cent. in the two results, while with dilute sulphuric acid the drops in one case were more than three times the size of the other.

Take Professor Proctor, an American authority, and we have—

	Dropped from a Minim Measure.	Dropped from a Pint Measure.
Nitric acid	44	62
Sulphurous acid dilute	49	54
Acetic acid	52·5	55
" " commercial	102	73
Alcohol diluted	124·5	98
Alcohol	143	118
Chloroform	276·5	180

In this table the irregularities are extreme. The largest drop is more than six times larger than the smallest, and instead of the invariable increment in size of the drops from a large over those from a small vessel, as in Mr. Alsop's table, we find no regularity at all. Thus, dilute acetic acid gives drops the same size almost whichever vessel was used, but the strong acid (not glacial) gives drops from the large vessel half as large again as those from the small; while nitric acid exactly reverses this, the smaller vessel giving the drop of increased size.

Still a third authority (American) gives:—

Hydrocyanic acid	45 drops.
Muriatic "	54 "
Nitric "	84 "
Sulphuric "	90 "
Glacial acetic "	120 "
Dilute alcohol	120 "
Strong "	138 "
Ether	150 "

The proportions here, it will be seen, bear no similarity to the foregoing, and in some instances are the very opposite. Thus, sulphuric acid drops are only half the size of those of hydrocyanic acid, but in Alsop's table they are tabulated half as large again!

We must say our own experiments tend more to the results shown by these last of Durand than those of Alsop. We will, however, not add to the confusion by placing them on record here, but will give the latest results obtained by M. Boymond, which, while they give a more scientific aspect to the question, are of no further practical help. He shows, firstly, that the size of the drop depends not upon the interior but upon the outer diameter of the tube from which they are delivered, the result being the same whether the tube be wholly or partially occupied by the liquid while dropping, the latter condition only affecting the speed. Secondly, that the nature of the liquid only—be it water, alcohol, ether, chloroform, &c.—and not the dissolved contents, whatever their proportion, influences the weight of the drops. Thirdly, to obtain drops of distilled water of a given size at a definite temperature, he gives the following data:—Temperature, 15° C.; drops, twenty to the gramme; outside diameter of the dropping tube, exactly three millimetres. Using such a dropping tube and making his observations with the utmost exactitude, he obtains the following results:—

A gramme of	distilled water is equal to	20 drops.
"	Alcohol "	61 "
"	Dilute alcohol "	52 "
"	Alcoholic tinctures with alcohol of 60° "	53 "
"	Do., of 80° "	57 "
"	Do., of 90° "	61 "
"	Fixed oils (variable) about	48 "
"	Essential oils " "	50 "
"	Aqueous solution, weak or saturated	20 "

Here we have results still more contradictory, and tending to prove that, after all, dropping under definite conditions may be exact. But, again, we cannot decide for our readers, nevertheless it is our earnest recommendation that a system of weighing and measuring should be adopted in all cases, and the mischievous practice of "dropping" entirely eschewed.

Our attention has been called to a proposed art loan exhibition to be held at Guildford, from the 26th inst. to the 3rd June. Landscape photographs, by residents of Surrey, will be amongst the exhibits admitted. Further particulars may be obtained from the Hon. Secretary, T. M. Brownrigg, Esq., Guildford.

From Chicago, U.S.A., we have received the first number of *Photography*—a fortnightly journal to be devoted to photography. It contains a variety of matter, of none the less value that much of it is extracted from English journals. We give our young American contemporary a cordial welcome.

The coloured afterglows, about which so much has been written during the past six months, are now seen more fitfully and less brilliantly, and we do not suppose it possible to take another photograph like that illustrated in *La Nature;* but there is still a continual discussion being carried on as to their cause, the eruption of Krakatoa being the most generally-accepted explanation. This volcanic eruption has been the subject of an investigation on account of the Dutch Government, and the astounding calculation is made by its agent that the ejected substances must have been at least eighteen cubic kilometres in bulk. Such an immense mass of what was mainly fine dust ejected to a great height in the atmosphere might well be conceived to be able to extend in a state of suspension over the whole face of the globe. At a meeting of the Meteorological Society an account was given of dust that fell on board a vessel a thousand miles away, which was clearly from Krakatoa.

In reference to the phosphorescent pictures, which, as alluded to by us, a correspondent of *La Nature* described a week or two ago, M. Léon Vidal writes to that journal pointing out, as we did, the futility of taking out a camera to get a fugitive luminous positive, and suggests that a negative or a transparency be used for the purpose—remembering that a negative will give a phosphorescent negative, while the latter will give a positive impression on sensitised paper. He recommends gelatine sheets instead of glass for receiving the paint, and green gelatine sheets for destroying the luminosity when required. To prevent the action of the diffused rays before the phosphorescent plate is quite in contact, a piece of black paper is to be placed over the sensitive surface while the plate is being lowered; it is then quickly withdrawn and pressure applied.

On the 28th ult. a paper was read before the Academy of Sciences, *On the Absolute Standard of Light*, by M. Violle, who, as we have before pointed out, proposed molten metal at the point of solidification as a standard of light. He now finds that platinum best fulfils the conditions required as an absolute standard, as it rests on a perfectly-defined and constant physical phenomenon, and constitutes a practical term of comparison with ordinary standards.

Singularly enough, the committee on standards held their last sitting upon the same day, and ratified M. Violle's conclusion. The resolution was that the practical unit of simple light be the quantity of light of the same kind emitted in a normal direction by a square centimetre of the surface of melted platinum at the temperature of solidification. The practical unit of white light is to be the quantity of light emitted normally from the same source. So, if a photographer wish to test his plates according to this standard, he will require an apparatus for melting platinum—a metal needing the utmost heat obtainable by any artificial means short of the electric current! We do not doubt, however, that ordinary gas burners will be made bearing, at a certain pressure, and with a certain kind of gas or a vaporised hydrocarbon, a definite proportion to this standard. Such a series of burners to burn ether or a petroleum of a definite character would be invaluable for plate-testing purposes, as with a single burner the intensity of the light can be regulated to great nicety by altering its distance from the object illuminated.

Photographers who travel in unfamiliar parts of the country find the use of an ordnance map almost a necessity. They will be interested to learn from a "blue book" recently published that the only parts remaining to be surveyed are the counties of Anglesea, Carnarvon, Dorset, Pembroke, and Radnor, and that at the present rate of progress the whole country will be surveyed by 1888, and the maps published in their entirety by 1890.

M. de Forcrand has been investigating the properties of the sodium sulphites and bisulphites, and he finds that the anhydrous bisulphite is the only one which is permanent in solution.

We learn that, so far, seven hundred tickets have already been issued to members and associates for the Montreal meeting of the British Association. Associates, it is to be understood, includes relatives of members.

MM. Parmentier and Amat have obtained crystals of hyposulphite of soda of a very unusual character. By cooling very concentrated solutions by means of a freezing mixture, in the absence of any particle of the ordinary form of crystal, they obtained crystals agreeing in constitution with the ordinary form, but melting at 32° instead of at 49°.

Hypo., it is well known, will dissolve in its own water of crystallisation, and a very pretty experiment may be thus made:—A few clean crystals—say two or three ounces—are placed in a clean flask and gently heated. After a while the whole will become fluid. If the flask, lightly covered, be allowed to cool without disturbance its contents will remain fluid at the ordinary temperature for some days. If, however, a small crystal of hypo. be dropped in, the liquid will instantly begin to crystallise, and in a short time become a solid mass, disengaging so much heat at the moment as to cause the flask to become too hot to hold with comfort.

THE LATE MR. H. BADEN PRITCHARD.

It is with more than ordinary feeling that we announce the unexpected decease of Mr. H. Baden Pritchard, for the last four years proprietor of our contemporary, the *Photographic News*. For many years previously Mr. Pritchard was well known in connection with photography, and more especially with the Parent Society, of which he was for some time Honorary Secretary, and one of the Vice-Presidents at the time of his death.

Few losses would cause a greater blank in the rolls of our art-science than will that of Baden Pritchard, and very few men leave behind them so many mourning friends in so many different circles of society. As a *littérateur*, rather than by his connection with photography, will Mr. Pritchard be better remembered by the world in general; for his energies were by no means devoted to the one subject, and his nature was to make friends in whatever circle he entered.

His death occurred on Sunday evening last, after an attack of pneumonia. The crisis was supposed to have been surmounted; but somewhat unexpectedly a change occurred, and he passed away. We reserve until next week a more extended notice of the deceased, which will be accompanied by a portrait.

The funeral took place yesterday (Thursday), at Abney Park Cemetery.

THE DEVELOPMENT OF INTERIORS.

Interiors are, as a rule, the subjects which receive the least satisfactory treatment at the hands of photographers, if I may judge from my own experience in that line, as well as from an inspection of the specimens shown at our exhibitions and in the shop windows. Yet these subjects, as a class, are the very ones which, with the expenditure of a small amount of trouble, are capable of giving the most beautiful results, whether they be selected from amongst our cathedrals, the stately halls of the nobility, or the more homely drawing-room of everyday life.

Many photographers, especially amateurs, are given to believe that interiors are difficult to photograph; and so, no doubt, they were, in a measure, before the advent of gelatine plates. Even with wet plates exposures of great length were necessary, as a rule, while the workers of dry collodion were practically out of the hunt. With gelatine plates, however, though comparatively long exposures are still necessary, or at least advisable, the difficulty of properly combining the different gradations is altogether removed; and, with careful and judicious development, it is possible to render on the same plate, with equal truth and perfection, the delicate tracery of a window outlined against the sky and the deepest shadows of the interior. There are, of course, instances which present special difficulties, as where very violent contrasts are found in close proximity. Then, again, halation has to be considered and avoided; but these cases may be met nearly invariably by a proper choice of plates combined with suitable development.

With regard to the sensitive films I for one consider that iodide of silver is a *sine quâ non* for interior work. With a plate containing a considerable proportion of iodide, and working as rapidly as the ordinary run of commercial plates, I have exposed for an hour directly in front of a window without losing a single thread of the lace curtains from halation. I need scarcely say that every precaution was also taken, by "backing" the plate, to prevent reflection from the back, the iodide serving merely to hinder halation arising chemically in the film itself.

The most common fault in photographs of interiors is excess of contrast. This lies in the very nature of the subject; for even leaving out of the question extreme cases, such as those in which a window is represented, the contrast between the well- and feebly-illuminated portions is greater than that met with out of doors. The light, in fact, coming in through one or more small openings is less diffused than it is outside, and consequently throws heavier and sharper shadows.

In the old days of collodion dry plates it was these sudden contrasts that formed the stumbling-block; for, in consequence of the disproportionate sensitiveness of the films to the differently illuminated portions of the picture, it was necessary to expose for the shadows, giving exposures that too frequently ruined the better-lighted portions of the picture, no matter how carefully the development might be effected. But the sensitive gelatine film is pre-eminently suited to the purpose of rendering these feebly-illuminated portions of the subject, and the development offers such a wide margin of treatment that the better-lighted portions may be readily held in check while the shadows are being coaxed out.

If we take an ordinary interior subject with the light principally behind or on one side of the camera and proceed to develope in the usual manner—that is to say, with the usual proportions of pyro., ammonia, and bromide employed for landscape or portrait work where the contrasts are less marked—we shall find the following results, presuming, of course, the exposure to have been sufficient. First of all the high lights make their appearance and are soon followed by the middle tones, the better-lighted portions of the subject coming up in their completeness before the shaded parts and recesses commence to show any detail. A pause now ensues, so far as the production of fresh detail is concerned, during which the image already formed goes on increasing in density. It becomes necessary to add more ammonia in order to reach the detail in the shadows; but this, while it effects the purpose thus intended, adds still further to the density of the earlier developed portions of the picture, and by the time the shadows have attained printing value the higher lights have become too dense. It is, therefore, necessary to make a compromise of some sort, sacrificing some of the perfection either of the lights or the shadows.

The result may be modified to a certain degree by developing more rapidly; that is, by using a larger proportion of ammonia to start with, or by reducing the proportion of restraining bromide. A more harmonious result is thus obtained, but it is at the expense of crispness and brilliancy. The tendency of rapid development is to produce a thin, flat image, especially in those parts which have received the greatest amount of light; and the consequence is degradation of the lights and general flatness.

If, however, we proceed nearly in a reverse direction we shall obtain an entirely different effect, and this is the mode of procedure I wish to recommend. The plan is to weaken the developer all round—that is, in all its constituents—but especially in regard to the pyro. and bromide. The result is a slower and more gradual development, and the production of an extremely thin image which is incapable of passing a certain point in density. We are thus able, by continuing the action of this weak solution, to bring out the finer details without giving undue density to the lights; in fact, we form a thin, delicate image complete in all its detail, but devoid of all density.

Up to this stage the effect of the treatment has been merely to keep back the density of the lights, without, however, destroying their power of taking on density under more vigorous treatment. Let it be observed that though I speak of the developer as a "weak solution," its weakness as a developer is confined to its inability to give density; its power of producing detail is great in consequence of the pyro. and bromide having been reduced to a greater extent than the ammonia. It is, in fact, if I may use the expression, an energetic developer restrained by simple dilution instead of bromide.

At this stage the thin image produced is capable of intensification or modification in any desired manner. The original effect of light remains nearly unchanged, and under a more robust system of treatment the high lights possess the property of acquiring density more rapidly than the less strongly impressed half-tones and shadows. All that is necessary, then, is to judge the amount of additional density required by the different portions and to convert the developer in a well-restrained, density-giving one; in other words, to add more pyro. and bromide freely, and ammonia more sparingly, until the desired effect is gained. Every portion of the already-developed image acquires greater density, but this occurs in direct proportion to the original action of light; and so any degree of contrast may be secured by suitably modifying the treatment.

With regard to the modification of the first development: this will, no doubt, vary with different descriptions of plates; but as a guide I will mention the proportions I have found to answer under my own circumstances. The plates I employ require for ordinary treatment three grains of pyro. solution, to two ounces of which I add, to commence development under *ordinary* circumstances, equivalent to one-tenth of a grain of bromide and two minims of strong ammonia. In the modified development I reduce the pyro. to one-sixth, the bromide to one-third, and the ammonia to two-thirds. Or to put it in a tabular form, I use—

Pyro.	1	grain.
Bromide	$\frac{1}{30}$	"
Ammonia	$\frac{2}{3}$	minim.
Water	2	ounces.

In addition to the greater harmony between lights and shadows produced by this treatment the effect is similar to a great increase in exposure, owing to the larger amount of detail it is possible to get out before intensification. I recommend the plan to the readers of the Journal.

H. Y. E. Cotesworth.

HE LATE DR. ANGUS SMITH AND THE ELIMINATION OF HYPOSULPHITES.

The death of Dr. Angus Smith, F.R.S., of Manchester, is announced as having taken place on Monday last, the 12th instant, at Colwyn Bay.

Dr. Smith was born near Glasgow in 1817, educated at the University of that city, and studied chemistry under Liebig at Giessen. His contributions to scientific literature were numerous and important. *Inter alia*, he was the first to recommend carbolic acid as a disinfectant. For several years he was President of the Literary and Philosophical Society of Manchester.

It was in May, 1866, that Dr. Smith communicated to the world, through the Photographic Society of Scotland, his discovery of the means by which the last trace of hyposulphite of soda could be removed from photographic prints. This he effected by the agency of peroxide of hydrogen, by which those traces of the fixing salt—which clung with such tenacity to the pores of the paper as to be got rid of only after a degree of washing to which it was not at all times possible to subject the prints—were eliminated, in the sense of being converted into another and innocuous body, namely, the sulphate.

It is scarcely necessary to observe that a particle of the hyposulphite may be so locked up in the interstices of the paper as to be beyond the reach of removal by water; but it cannot resist the application of a chemical reagent such as the peroxide of hydrogen. This body is a powerful oxidising agent, and converts many protoxides into higher oxides and several acids—the hyposulphurous, for instance—into those of a higher class. Although other substances possessing similar properties have since been discovered and made use of in this direction—hypochlorite of lime, alum, and others; yet to Dr. Angus Smith is due the credit of being the first to point out the means by which hyposulphite of soda could be deprived of its power for mishief.

It is to be regretted that the numerous engagements of this *savant* did not permit of his directing his attention to photographic chemistry to a still greater extent than proved to be the case in his busy professional life.

COLOURED AND NON-ACTINIC LIGHT.

I do not think I should have made any remarks on a matter which may, perhaps, be thought "none of my funeral," had not Mr. H. S. Starnes referred directly to some experiments, described by me, as to compounding white light out of only two colours of the spectrum. Any confusion as to the effects of successively *adding* or *subtracting* the supposed two colours in plates of glass has been sufficiently dealt with editorially, and nothing more need be said about that. But some confusion of ideas respecting the whole matter seems very general in some other points, which a few plain words may do something to clear up.

First of all, I should like urge very strongly a purely practical suggestion. It is, simply, that everyone who makes experiments or investigations in connection with this matter at all should do so with a small direct-vision spectroscope constantly at hand. Such can be obtained now for a very small sum. The cost even of one which will divide the two D (sodium) lines is not very great; and it would more than save its cost in avoiding useless experiments and in preventing mistaken notions which confuse and throw one off the track. There is the notion, for instance, that any kind of light can be "converted" into some other kind.* If it were so—if, for instance, a red glass made or converted out of white or other light any *more* red light than there was before—it is plain that the spectrum, after passing through the red glass, would show *more* red than without it. The spectroscope *shows* that no light is ever "converted" in this way—that there is not the least shade more red than before; and hence people who work with the spectrum itself as their test never fall into these mistakes. They soon learn, in a way *no* reading can teach them, that all colours, except original coloured flames, are mere residuals after more or less colour has been absorbed or otherwise *taken out*. Moreover, one glance through the prism will show instantly whether or not any given glass, or paper, or gelatine has the qualities which make it decently promising for any given purpose.

In the next place: not only is it perfectly possible to compound a white light out of green and reddish, but for all practical purposes it can be done by sending the light through coloured glasses. A room in the front basement of my house has blinds, for privacy, glazed with lozenge-squares of variously-coloured cathedral glass. There is no set pattern or order, but the various colours are fairly balanced; and there is no effect of colour thrown on the floor at all. Now, in the same way, if we have found, or can find, any sort of green glass and red glass which answer the required conditions—if we glaze one side of a lantern with alternate narrow strips of each colour, and an inch in front of this (by "in front" I mean *further away* from the light) arrange a piece of ground glass still further to cross and diffuse the coloured rays—we shall have the white light desired.

Whether it be desirable is the next question, and leads to the further question of "*non-actinic*" light. I perceive the notion is still very general that the so-called "actinism" and visible light are bound up separately, as it were, in the rays, and can be detached, so that we may have the "light" without the "actinism." This is all a mistake. Science, so far, knows nothing but certain *periods of vibration* in the ether. Some of these come within visual limit and some not. Some which are too slow for vision are adapted to set swinging the heavier atoms of gross matter, and so produce heat. Some which are too swift for vision set up other motions, which produce energetic chemical effects. Thus it happens that yellow light produces very little effect of a chemical (photographic) kind upon the salts of silver which were employed in early photography, and so it used to be said they were chemically "inactive." But these very rays are among the *most* active in producing vegetable changes, which are also chemical effects; and thus every rate of motion has its own special aptitudes.† And there is *no* "non-actinic" light whatever, as Captain Abney has shown already.

* In fluorescence, where invisible or infra-violet rays are made to yield visible rays, there may be thought to be an exception; but there is no direct "conversion" even there. Vibrations which are too short and quick to be seen set up vibrations in the atoms of the fluorescent substance, and these originate *new* vibrations which are within the limits of vision.

† A familiar illustration may make this a little more clear. We may drop a hammer, with a nearly flat face and weighing four pounds, from a height of three inches upon a planed iron surface; the latter will not be appreciably dented. We can calculate, from the weight, height, and velocity at impact the exact momentum of the blow, and we may adjust the blow of a small hammer weighing a-quarter of an ounce so as to give precisely the same momentum; but in this case a very conspicuous dent will be made in the iron. The same mechanical energy applied in rather different form is adapted to produce very different effects.

The nearest to it would be this, which will show us the next essential in systematic experiment:—Suppose we have a bromide plate prepared in any given manner, and we throw upon it a spectrum from (say) the oxyhydrogen flame: the solar spectrum is unsuitable, because its dark absorption lines would lead to error; we must have a *continuous* spectrum. Giving a fair exposure and developing, suppose we find in some part of the spectrum a band which is *absolutely unacted upon:* in that case, could we find a coloured light whose visual spectrum answered to that band *and no other* we should have what we wanted. But even then it would only be for that particular formula, and the least variation in the condition of the plate used would do away with the absence of chemical action.

It is doubtful whether any band of absolute no-action could be found with sensitive plates and good exposure; and, did the problem practically lie in finding such a colour, it would be insoluble. Fortunately it does not. There is a wide difference in the *amount* of chemical action, so that with *short* exposures *nearly* inoperative bands can be found in the spectrum. And, secondly: it appears well-established that some *small* amount of exposure in preparation is actually essential to sensitiveness itself, though too much spoils it and causes fog. These two facts make the problem practicable, and define and simplify it. We cannot possibly find "non-actinic" light; we may find that which combines with most visual power and least visual injury the amount of chemical action which is desirable, and no more. Obviously we must find this most quickly and most certainly (1) by finding the *least* actinic bands in the actual spectrum on the actual plates to be used; and (2) by finding, with the prism, coloured glasses or other media which correspond with these bands. Any other method is a kind of "hit or miss" that is sometimes necessary, but which, when better methods are accessible, is like groping in the dark.

Tracing the matter thus, general experience is that red light beyond a certain wave-length is the least actinic over a wide range of bromide plates. But, in spite of individual opinions, the general demand for some other colour, Mr. Ackland's experience as an oculist, and a variety of other evidence, go to show that the colour is often painful and generally injurious. And now the practical problem is of this sort: by adding green of certain wave-length to it, as suggested by Mr. Starnes, and which is perfectly practicable in the way above suggested, we can produce white light which will *not* be painful or injurious, and gives far more visual power to average eyes. But the green to be added is, undoubtedly, considerably *more* actinic than the red. The main question, therefore, is simply whether the increased visual power from the added colour will allow of the *total light being so far reduced* as to leave the action on the plate within the allowable limits. If it do the photographic object is secured; and, while the eyes of the operator may not possibly have actually *more* light to work by, they will, at least, have it in a better shape and free from the irritation of the colour. The same applies to a yellow light procured by various expedients,* or to any other.

Such is really the essence of the whole question. "Non-actinic" light will never be found; the limits of *permissible* actinism for any given plates may be found. That is a research with the purpose of finding quantitative conditions in two directions. But the research ought, I think, to be carried on systematically, by the methods indicated, if the best results are to be reached with the smallest expenditure in material, time, and trouble. LEWIS WRIGHT.

ASTRONOMICAL PHOTOGRAPHY IN FRANCE.

OUR contemporary, *La Nature*, had a week ago some interesting remarks upon astronomy and photography, and accompanied them by an engraving from one of the negatives obtained by the French expedition to observe the solar eclipse last year. "The applications of photography to scientific research," it says, "multiply daily, but the results that it has obtained, astronomically considered, are especially remarkable, and the study of the sun, moon, eclipses, and even the stars have of late years received most valuable aid from it." The great advantage of photography, as M. Faze says, is to banish the observer and to replace his eye and his brains by a sensitive plate which receives and fixes the phenomenon without any need for his lying in wait for it, gazing at it with painful assiduity; and it further entirely protects it from those errors inseparable from rapid observations.

* I think sodium light would be worth experiment; and I may remark here that, as ordinarily produced, it is by no means *pure* yellow, which may injure results. There is considerable blue light in either a spirit or Bunsen flame; and this must be stopped before the performance of the yellow can fairly be judged of.

Describing the mode of taking this photograph, *La Nature* quotes M. Janssen as follows:—"Two large apparata carrying eight cameras were prepared for the purpose of studying the question of intra-Mercurial planets and of the form and extent of the corona. As to stars and planets of the circumsolar region, these photographs will require close examination; but with regard to the corona it may already be stated that the focal power of the objectives employed (eight inches and six inches), and the length of the exposure, enable us to say that the corona has a much greater extent than an optical examination would show with either the naked eye or a lens. Several of our large photographs of the sun are very sharp. They show important details of structure which will require discussing. The form of the corona was unchanged during the whole of the totality."

The photograph, which has also been reproduced in the *Annuaire du Bureau des Longitudes* for 1884, has been neither retouched nor enlarged. It was taken with an eight-inch objective of 1·20 m. focus, exposed during the whole of the totality (about five minutes), and, as our contemporary justly states, gives promise of a great future for astronomical photography.

THE LANTERN.

WITH the long days and light evenings the season for lantern work may fairly be said to have closed, and the present is, perhaps, an opportune time for making a few suggestions on the treatment of lanterns and apparatus. I have seen really first-class and expensive instruments, after being a short time in use, in such a condition that should only be possible supposing they had been employed for several years. The reason is (to sum it up briefly) "insufficient care." One would naturally think that we should not require to be told that it is necessary to look after that which has cost us a considerable amount to obtain; but, from practical experience in the matter, I can assure the readers of the Journal that such is the case, and trust they will accept the following hints with the assurance that they are given in the best spirit and in the hope that they may prove advantageous.

All brass-work should be carefully wiped *directly after use*, so as to remove finger-marks; for these marks—especially when made by warm hands—soon eat into and stain the brass, and in the case of sliding tubes prevent their working properly. In oil lanterns the lamps should be taken out of the lanterns and carefully drained of oil, and any spilt oil wiped up with tow or flannel.

Lime light lanterns should have the jets taken out, the lime-holders brushed, and all steel parts wiped with a slightly-greased rag or flannel. The trays should be freed from lime dust, and the body of the lantern dusted out, so that all crevices may be cleared. The dissolvers and all stopcocks should be taken out (one at a time, so as not to get interchanged) and wiped with a greasy rag. Benzoline is a capital cleanser and also lubricant for parts much corroded. The tin-work should be rubbed over with a piece of cotton wool having a little sweet oil on it, and the wood-work can be preserved and revived by being gently rubbed with a tuft of cotton wool inside a soft rag, damped with a mixture of equal parts of linseed oil and vinegar and half quantity of methylated spirits.

The lenses should be wiped with a soft and clean chamois leather and then gently warmed and wiped again. After this they should either be wrapped in a soft leather or done up in tissue-paper first, and then in brown paper; or a wad of tissue-paper should be placed before and behind the lenses in their mount. If the polished parts of brass-work are very much marked, then a little rotten-stone and oil should be put on some cloth and the part polished by rubbing in *the same direction as when made*, which will easily be discerned when looking at it. All telescopic tubes should be polished *length-wise*, and care must be taken to remove the flanges and so get a good movement up and down. All remaining grease, &c., should be taken off from tubes and edges, so that the brass-work is left dry and clean. Lacquered work should only be wiped.

Some finger-marks that resist a dry leather will come off with a damp one; but in no case must much force or friction be employed, as the lacquering will not stand it, and relacquering is somewhat expensive. In some instances a rag very slightly oiled will sometimes clean lacquered work nicely; but all must be finally gone over with a clean, soft rag or leather.

Before placing the instrument away for a long period, see that all parts are thoroughly clean, as explained, and find a *dry* store-room in which to place the apparatus. If any doubt be felt about the only available space, then dry the box and apparatus thoroughly, and paste strips of brown paper round the doors, over keyholes,

&c. Unless sure of the room being kept at a temperature of 40° or more, then the india-rubber tubing should be taken off before placing away, and kept in a drawer that is warm, coiled round in a circle, so as not to get set in bends.

Neither in storing or travelling should any hard substance be placed loose in the box, as the wood-work and brass mounts soon get damaged, and it is very easy to wrap up any extra piece of apparatus in baize, cloth, linen, or even soft paper to prevent harm. Gas bags should be well rolled out and warmed; then folded in their entire breadth into (say) three parts, and carefully wrapped in brown paper and stowed away on the top of or inside a warm and dry cupboard. All retorts, purifiers, &c., should be well cleaned and thoroughly dried.

In no case should the leather used for the lenses be employed for any other purpose, and it ought to be always shaken before use, so as to remove loose dust. The lenses should also have any loose dust blown off before wiping. The lanterns would not get injured nearly as much as they often are if care were taken to turn on the hydrogen only a little at a time, and mixed with it, *by degrees*, the oxygen.

G. R. BAKER.

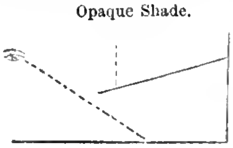
THE "HAPPY MEDIUM;" OR, DARK-ROOM ILLUMINATION.

IN THREE CHAPTERS.—CHAPTER III.

NOT only have we a choice of colour to suit our individual taste—not only can we choose between a transparent and a translucent medium—not only have we at command sunlight and artificial light, but we have the choice of ways by which our light can be made to reach our plate and our eyes. This opens another most interesting subject. It is perfectly certain that light reflected on to a sensitive plate is safer than the same light shining directly upon the plate, while a light may very easily shine directly upon a plate or be reflected on to it without our eye being within the influence of the light at all beyond the time when the light is purposely reflected into our eye—beyond the time, in short, when we are looking at the plate. This arrangement exists in more than one studio and amateur's laboratory with which I am acquainted.

I attempt to give a drawing of what I saw in one place in Edinburgh, and even my poor sketch explains itself. Here the light does not directly strike the eyes at all, and the plate can be most carefully examined without any strain or glare affecting the eye.

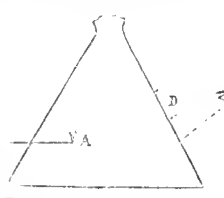
Opaque Shade.



Light

Plate.

In another arrangement the light is cast straight down upon the plate from the translucent bottom of a triangular lantern, of which I show a section. A is the source of light; a gas jet, B C, a translucent bottom; D a glass window, shuttable at pleasure, through which the plate can be examined by transmitted light when required—the plate being developed below B C, and the eye being opposite the opaque side of the lantern, but able to see the plate below if the lantern be swung at a proper height. The latter I saw in the hands of Mr. Wardale, an ingenious Edinburgh amateur. For comfort and safety to the eye both of these arrangements serve admirably, and the plates under development can be examined even more satisfactorily than with the glare of the coloured light shining into the eye. In fact, I mean to adopt both the methods in my own dark room, and I can give them no higher testimonial.



If in spite of all ordinary precautions anyone finds pain or mischief to arise from sudden emergence from the dark room into brilliant light, I would further suggest a practice recommended by some writer whose name I forget, namely, to have in a convenient spot near the dark-room door a pair of blue or natural tint "goggles." A few moments' wear of these on first encountering the bright white light would remedy to a great extent the evil that might arise to weak eyes.

All that I have yet written on this subject appears disconnected and rambling, and I only regret that my conclusion will still leave the question an open one. But if the question is by its nature an open one, so it ought to remain; and I think that within certain limits the matter should be settled by every man according to his own taste and manner of working. For my own part I require to examine the plate very carefully during the earlier and latest stages of development—during the period when the image first comes up—in order to determine what steps I shall have to take later, and, when development is almost complete, in order to be prepared to stop the process at the proper moment.

I have, therefore, determined how much red light I can use for a certain time transmitted by a certain medium without danger to my plate. Of that quality of light I use the utmost safe quantity in ordinary circumstances, shading my plate entirely from light when I am not examining it. When a more protracted development and more careful, frequent, and prolonged examination is required, I simply add to my ruby glass a yellow one. If I liked the yellow-green light I should act precisely in a similar manner. In a strong light, or during a protracted examination of the plate, I should add to my yellow window a layer of medium over and above what I found requisite under average circumstances.

I intended to finish these remarks at this stage, but I have just seen two articles in the Journal of to-day's issue (25th April). I came upon Mr. Starnes's remarks first, and I was as much "flabbergasted" as puzzled until I reached the editorial postscript to the chapter. Mr. W. H. Harrison's remarks, however, are more or less *ben trovati*; though some seem to "go without saying," some to be doubtful, and some totally contrary to my theories on light matters. Mr. Harrison "comes in like a lion" with (A) "Daylight should never be used," &c. His chief reason is that it is "enormously rich in actinic rays," &c. Illumination and actinism are more or less inseparable, and I find daylight not perceptibly richer in actinic force, *in proportion to illuminating power*, than artificial light, so I simply use less daylight than I should candle light. For my own part I always use daylight, though I have many kinds of dark-room lamps. When I have great numbers of negatives to develope I rise with the sun, but never develope by the gas. The same remarks may apply to his B, and even to C. If a translucent screen be used more light is required; but I am willing to admit that to some persons a diffused light is more pleasant.

As to Mr. Harrison's proposition D I speak with some diffidence, for I have not worked it out. His theory appears to be that light thrown on a plate at an angle of (say) 50° tends to fog it. But, as Mr. Harrison says, light cast at an angle of (say) 40° is reflected into space from the surface of the developing solution. Well, is that not simply light lost, so far as seeing the plate is concerned? If not, I have misunderstood Mr. Harrison. I agree with Mr. Harrison so far that the lantern should be large enough to illuminate the entire room; but, as I said before, I recommend that the eyes should be shaded from anything like direct light proceeding from the radiant. Even with translucent filtering media the diffusion is not perfect. F seems to me partly a truism and partly incomplete. I could suggest a safer than his "safest," by substituting for his "a yard" my own "a mile." If he mean that, when using a light not altogether to be trusted in ordinary cases, it is advisable not to approach too close to the light until it is necessary to do so, then I am entirely with him.

Mr. Harrison, under G, says no two coloured screens of the same material should be used in the window of one lantern. In detail he says this proposition "needs no defence." He partly saves himself by the words "by its colour." But the bare proposition G needs more defence than is likely to be forthcoming. Does Mr. Harrison mean to say that a glass flashed with ruby on both sides is no better than a glass singly flashed? If he do mean that I must refer him to the editorial remarks on part of Mr. Starnes's paper. Or does Mr. Harrison insist that a single screen of a certain colour must of necessity filter out the whole of any particular class of rays? If Mr. Harrison filter a solution once, does he never by any chance repeat the operation with a second filter? or does he never use a double filter paper for the first operation? That a double thickness of any material stops a certain amount of light no one will deny, but that a double filter of rays or anything else can do no more than a single one is a statement that will require very able defence indeed.

Mr. Harrison's concluding proposition is worthy of respect on account of its boldness—how much further I do not take upon me to say. Even Mr. Debenham—the champion of green light in combination with yellow—has not, so far as I know, made a statement so sweeping in its application or so emphatic in its phraseology as Mr. Harrison's H. Mr. Debenham has, no doubt, his reasons for recommending his shades of green; but Mr. Harrison says the blue rays of light must be "sharply" cut off for developing purposes. Has Mr. Harrison really found a green that, either alone or in combination with any pale yellow material, will cut off "sharply" or otherwise all the blue rays? If my two spectroscopes are to be trusted, I have not yet discovered any such combination, and many have been my examinations of various substances brought before me in these columns and by private individuals. As an argument against red or yellow rays Mr. Harrison adduces two statements of his own, of which one is—that if fields and forests were all of these hot colours we should all soon be blinded. I take it that our eyes are subjected constantly to much greater heat than is produced by colour, and yet I for one claim to have pretty fair eyesight. But I have no mind to take up further space, and I shall conclude by stating as succinctly as possible my ideas on the subject we have on hand. I have commented on Mr. Harrison's paper partly because it is a strong and able defence of its writer's principles, and partly because it happened to come before me as I was writing on the subject. All I wish to do is to protest against any rules being laid down by one person for another on matters which, in my opinion, depend on taste.

The media most in vogue at present are ruby glass with or without yellow, and with or without diffusion, combinations of green and yellow, and the greenish-yellow of canary medium. To these I may and papers of various orange colours, oiled and plain. Let the photographer take the one of these that he likes best, try his most sensitive plates under the most crucial tests likely to be required, use the most light he can with safety, pay his money, and—"take his choice!"

ANDREW PRINGLE.

PHOTOGRAPHERS AND SITTERS.

[A communication to the Edinburgh Photographic Society.]

PHOTOGRAPHY being a comparatively recent art, the photographer—perhaps much oftener than in other professions—is still found to be a man who did not begin his business life in acquiring a rudimentary knowledge of it in youth. In a large number of instances he will be found to have come from some other field of industry, and no doubt this will always more or less hold. So far as I have observed, no particular trade or profession has more largely than another been relinquished for the camera; but it has attracted all sorts of votaries, varying much in their capabilities. But time goes on, and, while much remains the same, we find in the ordinary course of things new conditions arise.

Rapid changes in our art soon make the past grow old. The collodion age, with its capricious baths and laborious manipulations, has practically passed away, so that the present generation only know part of the troubles and difficulties of earlier workers. Many of us know nothing of them, and the rising generation will read of them as ancient history, while doleful tales could be told of these old troubles; but I forbear, except to make one reference. One of our most eminent members, whose experience goes back to daguerrotype times, related to me the other evening how he had once been driven to the verge of distraction through a mysterious spotting of his plates a few hours after they were taken. He was harassed for days and nights to find the cause, till at last, about two o'clock one morning, his sleepless mind hit upon a probable explanation. He immediately left his restless bed, went straight to the studio, and found he was right. It was a very simple matter, and so do all our old vexations seem when they are past; but we may never cry too loudly, for we are seldom very far out of the wood. In proof of this I may just mention that, at our last meeting, a member who makes capital gelatine emulsion was describing how he had come to grief with something like pinholes in his plates, and was quite baffled to discover the cause. So it goes round. Old faults are overcome, while with the advance of processes new troubles arise and task our patience and carefulness. Perhaps it is better that this should be; but I need not moralise upon the uses of adversity, as photographers have some acquaintance with them.

I have just used the designation "artist" without staying to inquire concerning its suitability, and I think you must all be quite satisfied that more than enough has been written and spoken upon the question whether it be proper or not to apply it to the photographer. The seductiveness of the word to many, doubtless, lies in its desirable associations.

In the atmosphere of the Edinburgh Photographic Society—which I suppose is the largest in the world—we occupy a pretty favourable position from which to form a general idea of the class of men composing our order, both professional and amateur; and, visited as we are from many quarters by gentlemen of distinguished position in the art, I think a favourable impression must prevail as to the fraternal interest commonly manifested in what relates to the objects for which we seek association.

In reference to the subjects upon whom we operate (for the somewhat anatomical term "operator" is in familiar use amongst us) many have been the published hints and suggestions offered to gentlemen in our profession as to how best to treat their sitters artistically—not customers, mark you; that would not be a proper term, for photographers have no customers. We all know that certain words are appropriate, or the reverse, as the subject varies to which they are applied. It is not for a moment permissible to think of Sir Frederick Leighton speaking of his sitters as his customers. That style of speech belongs to other, though not less worthy, folks, such as cotton kings and merchant princes—in common, however, with sweeps, costermongers, and an infinite number of other legitimate callings which the law of usage has embraced in the matter. But the photographer—very high on the one hand and very humble on the other—for some occult reason, probably the same that rules the Royal Academy, has never come under this latter rule—never to my knowledge. He was a very timid man at first, I believe, and did not for some time speak of his studio; but the idea rapidly grew upon him, for his is an eminently progressive mind, and so from modestly speaking of his *skylight*—for which see his ancient advertisements—he now alludes without any hesitation, as he is properly entitled to do, both to his studio and his *sitters*, sitters and portraiture being associated as indissolubly as doctors and patients. Another word is indeed sometimes used when we are taking very fine "shop"—I refer to *clientèle;* but its use, though perfectly legitimate, is still select, and perhaps exclusively employed in our literature as yet.

However, be they called "sitters," or by any other term, a good deal has been written as to the most artistic manner of treating them with a view to the production of pleasing and successful portraits. Many very good and useful things have been said, and much that is of no practical use to anybody. But, while thankful for a good hint, of course every man has an individuality of his own, and in his own house will more or less make that felt, managing his own affairs in his own way. It is one of the charms of life that we are not all of one uniform pattern. A compelled dead level in human works and ways would be uninteresting and depressing. It is well that a man's work should bear his own stamp—that being as excellent as possible.

It is the case, generally speaking, that a person who steps into a studio for the purpose of having a portrait taken does so in what may be called a "smiling frame of mind." The idea is commonly looked upon more or less as a sort of joke, or at least something that is alluded to with a smile, and as if the proposal needed just the faintest approach to an apology. Whenever this is observed—and it will be often—it should be accepted as the keynote to what intercourse may follow. Other sitters come in serious moods. Partings and unhappy events bring business as well as joyful occasions. Death itself at times demands our services, and thus we do not always work under the most favourable or cheerful circumstances.

If, as Pope says, "the proper study of mankind is man," perhaps in this matter of portrait-taking we, who are engaged in it, see as considerable a share of the human nature about us as most people who serve the great British public; and while comparing one class with another, and noting differences in the manifestation either of weakness or of general social culture, we find there is a wonderful family likeness running through it all, and to the thoughtful man it is most instructive. Some studios, of course, invite, in the very nature of things, certain classes. In some the comparatively poor man is never seen, and in others, again, the aristocrat is a *rara avis*, or unknown. The experience of these two extremes in many respects are very different, and both present advantages or difficulties of treatment peculiar to themselves. The better classes, without question, are, for example, more refined in feature, and, of course, much better dressed. The sanctity of the æsthetic hangs about them all, all of which are distinctly great advantages and aids towards successful portraiture. The educated face in any class has generally an indication or suggestion of something superior behind it. Low caste or very unintelligent features do not attract the interest of any one, save it may be as a study of physiognomy. But there is another and very valuable aid afforded by the better class of sitters: they more easily assume a graceful or picturesque pose. The habits of good society powerfully lend themselves to this, and there is less failure through awkwardness in disposing of the hands than in the commoner classes of society. Any one who has had a little experience in the profession will readily appreciate these things as matters of fact.

Apart from the question whether a portrait has pleased the sitter or not—for that is a matter distinct by itself—picturesqueness, elegance, and attractiveness are all often secured in a portrait without any but the minimum expenditure of skill and tact on the part of the artist when the subject is a favourable one. Perhaps the professionals into whose hands this superior grade of subject usually falls may not be quite willing to admit much on this score which would at first sight seem to lessen their artistic capabilities, but there is no necessary connection. Subjects vary immensely in the facilities they afford for good composition, and so on; and I believe it will be agreed that it actually demands from everyone more tact and knowledge of effect to make a passable picture of a commonplace subject than of one of a higher type. That, I think, ought to be obvious at a glance. I do not now, of course, refer in any degree to *genre* pictures, where, in the very excess of the homely, rags and dirt even may be made to look delightful; just as (to take an illustration from a different kind of subject) a picture of a cottage (say) taken when it was built may be extremely commonplace, but when it has been vacated by its last tenant, and the hand of nature, with its inimitable touch, has pulled its walls awry, dilapidated its roof, and generally tinted it over with its own glorious colours, then it has become, as by a witching process, a thing of beauty. A beggar could not sleep in it, yet might its art presentment adorn a palace.

Perhaps I may be permitted to touch briefly on a few of the characteristics and odd points occasionally met with in sitters in our everyday practice. Popular ideas about portraiture, as about many other things, are often erroneous. Among these I would mention, for example, the notion commonly entertained that the photographer will do all that is required himself. "He knows best," and so he does doubtless; but Giles and his sweetheart go into the studio as nearly as possible in the character of lay figures. They have an honest resolve to be docile in order to get a good likeness, but wanting in intelligent conception how to assist to this end. This sitter is probably more frequently found in the shape of the country cousin than the town one, but they come from all quarters. When the lay-figure sitter is taken to be posed his distressing condition is most vexatious and trying, and it taxes the artist, who had better smile and bear it, to get him by any kind of artful byplay to feel at his ease and to relax the rigidity of his muscles; but no one unacquainted with the actual fact in extreme cases could fairly credit how difficult is the task. The sitter is gently inclined a little to this side or to that, and he mechanically obeys with all the elegance of a leaning chimney-pot. But there is one grand feature about this man: he never asks for credit—unlike my Lord

Heavymasher, who may give a world of trouble, and to whom the idea of cash payment is "bad form."

When a portrait is criticised and condemned, the difficulty of the subject is seldom considered. It is the operator who is blamed; and that he is often enough at fault I suppose none of us will deny, but in many instances he may do his best and fall short of all he could wish. It is not sufficiently understood by many that whatever peculiarity of expression is worn during the sitting that must be reproduced in the photograph, such as tight-set lips or elevated eyebrows. Nor, again, is the effect of certain little covert movements, sometimes indulged in, correctly reckoned upon. Miss Jones, for instance, stands pleasantly as placed, and all seems finally arranged for the moment of removing the cap, when she executes a little manœuvre on her own account by shifting a hand or rearranging something that has not been to her mind exactly, which may turn out all right, but is quite as likely to be all wrong. In this same connection sitters will occasionally allow themselves to be posed with the head-rest; but having a dislike to its use, from the impression that it makes them look "stiff," they quietly remove their heads from it at the moment of exposure, and by so doing generally expose their having done so.

Ladies very generally miscalculate the effect of *primming* the mouth. That feature is one over which, after a comparatively early age, they manifest a great solicitude, and it is precisely on account of this anxiety where the danger arises of a slight distortion. I need scarcely remark that it almost invariably takes the form of contraction. I make these remarks out of a deep respect for them, and a desire to see them fairly represented. But the weakness is not exclusively confined to one sex, for I have seen fellows with moustaches do it. How sitters can ever forget, or not imagine, that, in the strain after an effect, the strain itself will be visible in the portrait is difficult to account for; but it is as common as portrait taking.

Another great blunder made is to suppose that the more unconcerned and indifferent one looks the better it will be. Under this impression we all get visitors who want to be taken with their legs and arms sprawled over the place, or they dump themselves down in a heap before the camera in defiance of every grace or form of gesture that has been known to man.

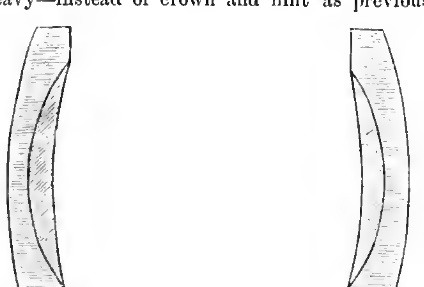
Again: we have a visitor who had once been young, and it may be blooming, who, after looking at various styles of work, will, in conclusion, point to some pretty girl's portrait, and, apparently oblivious of any difference in the original, gives us a commission to "take me just like that." How is it possible in these circumstances to explain the impossible, even in the most gingerly-chosen terms? It is better to do your best and leave the rest to fate, which is often very kind.

What I have said has had reference to studio work. There are other phases equally fruitful of remark, and I might have gone on to draw thus upon photographic memories and experiences; but enough, I think, has been said to make good the title of my remarks this evening. I have recapitulated a few of our difficulties and business characteristics, and the purpose they may serve may be regarded as merely relieving our severer studies and technical discussions. I apprehend that in our meetings the lighter as well as the more weighty matters of the law legitimately find a place, with the double object in view, understood if not expressed, that our friendship socially, as well as our advancement photographically, might be fostered and increased.

G. G. Mitchell.

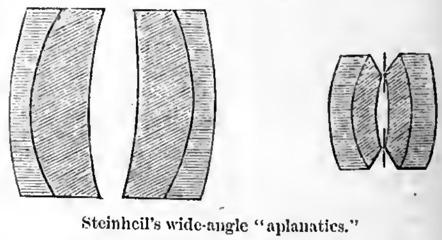
ON LENSES.*

A new departure was made by Steinheil in January, 1867, when he introduced the lens which he called "aplanatic." I think it only just to express my belief that photographic history will accord a place to the genius displayed in the various introductions of Steinheil only second to that of Petzval. The peculiarity of this lens consisted in the glass of which it was composed being of two kinds of flint—light and heavy—instead of crown and flint as previously. By this



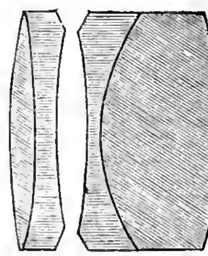
Steinheil's "Aplanatic" Lens, rapid form

means it was possible to so far reduce the spherical aberration that a much larger aperture could be employed than with any previous cemented photographic combination. This lens, with a power of light unequalled in any previous combination, except, of course, the portrait lens, had its field considerably flattened, and embraced a rather wide angle. The instrument is symmetrical—that is, the back and front are alike. The lens has had the sincerest flattery bestowed upon it in the manner in which it has been imitated by all the leading photographic opticians Differences of workmanship, of course, influence the results produced by different makers, but it is very doubtful whether any improvement has arisen from any little variations from the original calculations that may have been adopted by any particular manufacturer. The landscape and wide-angle aplanatics by the same optician have met with similar flattering treatment by other makers, though not, perhaps, to so great an extent.



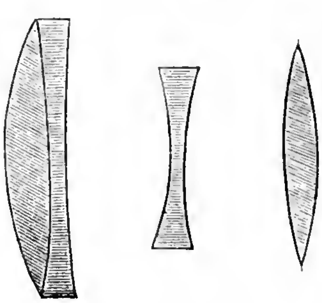
Steinheil's wide-angle "aplanatics."

We now come to another lens of Steinheil's which is as yet scarcely known in this country. It is, or, rather, they are—for there are two distinct varieties—called the "antiplanatic." One of them, called the "group antiplanatic," consists of two cemented combinations set so closely together as only just to allow of the insertion of the diaphragm. The front lens is of shorter focus than that of the whole combination. The back lens, when looked through diagonally, diminishes very powerfully and lengthens out the side pencils of light proportionally. By this means the field is much flattened, and the spherical aberration is so far remedied that it has an angular aperture giving a rapidity about equal to what would be No. 2½ on the universal system—less than half that of an ordinary rapid portrait lens. No doubt it will work better with rather a smaller opening, but for large portraits it is seldom, if ever, desirable to use a stop giving more rapidity than No. 3; and with our modern rapid plates smaller stops than this are generally employed. For ordinary portrait use it seems to me to be a very suitable instrument. However, I should judge that it is rather a difficult and expensive instrument to construct; but, unless other makers are deterred by these considerations, I should by no means be surprised to find it largely adopted as a model.



Steinheil's "group antiplanatic."

The so-called "portrait antiplanatic" has the back elements separated like that of Petzval; but, like the group antiplanatic and the orthoscopic, the back as a whole is negative. Astigmation has been wonderfully got rid of; but there is an amount of curvature of field which renders it unfit for working upon a large field, for which, however, it is not intended.



Steinheil's "portrait antiplanatic."

Lenses there are—and very good ones, too, some of them—bearing other names than those I have mentioned, and some photographer may think that I have omitted speaking of his pet instrument. If he will carefull examine that instrument, however, it is probable that he will find it included in one of the typs described. Where the difference is not marked, and the particulr details of construction have not been published, it could not be expected that they should be here specified.

Having now gone through these types, the question arises—"Whe is the best lens to use for any particular purpose?" To say that for rapid portrait work the Petzval form still holds its own, and that for lndscape—when rapidity is not required—the old single view lens is ard to beat, seems to suggest that no improvement has taken place within the last forty years. It is, however, in lenses for other purposesthat improvements have taken place. If it be desired to obtain the most perfect delineation of any particular subject, including nea and distant objects, irrespective of size of picture, that will be best secured by a lens of short focus. If it be desired to cover a ertain-sized plate, and there be a latitude in the amount of subjectto be included, or in the distance from which it may be photogrphed, choose a lens of long focus. This is particularly the case with nstantaneous views, where a small stop cannot be employed, and fr these reasons:—The field of a lens such as must be used is always urved. Now, the longer the focus the larger is the curve, and a lin of any given length—the side of the plate—will lie nearer to theircumference of a large circle than of a small one. The views of achts in

* Concluded from page 297

full sail now shown were taken with a Steinheil aplanatic of about seventeen inches focus. The length of the plate is about one-half that of the focus.

For portraiture, for the same reasons, flatness of the curve of definition, less departure from the focal plane, and the use of as long a focus lens as will take the subject of the required size, will conduce to the general sharpness of the result. An occasional objection to the use of a long-focus lens for portraiture is that in certain weather, especially in towns, the fog or illuminated smoky atmosphere between the lens and the sitter, destroys the brightness of the image, and the nearer the subject can be approached, the less this is felt.

For copying flat surfaces, to avoid the curved field the longer the focus the better, and I think that for this purpose a lens might be introduced having its normal field—that for parallel rays—convex. Astigmation and spherical aberration might abound, but stopping down would do a great deal to get rid of these evils, and for even delineation all over the picture, it is better to be *in* a rather bad focus than to be a long way *out* from a very good one. For architecural subjects there are to choose from, the flatter curves of the modern lenses made upon the symmetrical aplanatic plan, and the rounder curves of the earlier lenses that have been described. For very wide angles the rounder curves have an advantage in transmitting more light towards the edges of the field, as it strikes the lens nearly at right angles, and so less is lost by reflection. The flatter lenses, however, have less spherical aberration, and thus permit of a larger diaphragm being used; but when a very wide angle is desired—unless in the case of an interior, or with the sides of the subject advancing considerably—a small stop is absolutely necessary for good definition.

In addition to the panel portraits taken with the single Grubb lens, I have here some of the same size taken with the Steinheil aplanatic, and some promenades with a very similar instrument—the euryscope of Voigtländer. Here are also photographs of a sitter with accessories and scenic background, taken with eight different lenses without altering the position of the camera. These were all worked with apertures No. 3 on the universal system, and it will be seen that there is little difference in the results when thus brought to the same level. The lenses are portrait lenses by two good makers—a euryscope, a French lens on the Steinheil aplanatic pattern, an antiplanatic portrait, and an antiplanatic group, both, of course, by Steinheil. Here are also some scenes taken by Mr. Haddon with a euryscope of eight inches focus. Although the plates are nearly of the same length as the focus of the lens the definition is remarkably good. Of course, when this angle is included a small stop is used. W. E. Debenham.

Addendum.—I have been requested by a member to state how to calculate the focus of two lenses when combined in a doublet. Make the focal length of each lens the denominator of a fraction whose numerator is unity, and add. To those unaccustomed to arithmetical calculations an example may make it clear. Say that two lenses—one of twelve-inch and the other of ten-inch focus—are to be combined. Add $\frac{1}{12}$ to $\frac{1}{10}$ by bringing them to a common denominator; that is, $\frac{5}{60} + \frac{6}{60} = \frac{11}{60}$. Now reverse the fraction—$\frac{60}{11} = 5\frac{5}{11}$—and the lens is found to have a focus of $5\frac{5}{11}$, or just under five and a-half inches. If one of the lenses be a concave the operation is similar. Let the convex lens be of five inches focus and the concave one six inches negative. Then $\frac{1}{5} - \frac{1}{6} = \frac{6}{30} - \frac{5}{30} = \frac{1}{30}$. The compound has a focus of thirty inches. Separating the lenses will make a difference in the result, but not to an extent likely to mislead the photographer who wishes to provide himself with a set of lenses of different length of focus.—W. E. D.

RECENT PATENTS.

PATENT APPLIED FOR.

No. 7,365.—"Improvements in Photographic Shutters or Caps." William Henry Marshall, watchmaker and optician, Scarborough, Yorks.—*Dated May* 7, 1884.

Apparatus for Touching Up Photographic Pictures, &c.

The following is the provisional specification communicated by J. Geesbergen and La Societe Geruzet Freres, of Brussels, Belgium:—

The after touch on photographic pictures consists in the attenuation of the rugosity of the skin produced by transparencies on the negative, as well as unpleasant prominences on the face.

A skilful toucher up will then join in the just appreciation of the relative value of the lights and shades a great delicacy of the hand in order not to exceed the object.

According to this invention an electro toucher up is produced which mechanically produces a fine dotting by the vibration of the armature of an electro magnet carried on a pencil. All that is necessary is to place lightly this latter, on the part of the proof the opacity of which is to be increased to obtain a good result, without fearing, what often happens, a too-prominent or pronounced touching, thereby destroying the anatomy of the face.

It will be easily understood from what has been said that the electric vibrations are regular. The work will be thus divested from the nervous influence of the person doing it. It will be much more correct and more regular, besides the rapidity of execution will be increased to a very great degree.

The apparatus is composed of a bed consisting of a cupboard or case for containing the electric piles. On the top of this bed a support is provided carrying a balanced rod having counterweight and regulating screw; at the other end of this balance is suspended, by means of a string, an electro retoucher. This latter receives the electric current by means of a flexible connection having two conductors coming from an aperture formed in the top of the bed; on this same bed is placed a commutator to distribute more or less of the power desired to be given to the electric current.

It will be understood that when an electric current is brought into the electro magnet its armature will oscillate and will cause a block or stock to vibrate in a corresponding direction to which the pencil carrier is fitted, which is retained by a movable spring giving flexibility to it; the pencil carrier slides in a tube, in which is held, by means of a ring, a helical spring carrying a rod, one end of which is fitted in the head of the pencil carrier. A collar is provided with a screw, serving to regulate the course of the pencil; the tube itself carries a pencil carrier, in which the pencil is placed. The pencil or lead is held by a screw. It will be understood that by these combinations the pencil will sharply and lightly puncture.

In order to give greater facility in the movement of the apparatus a bridle is jointed to the points; that is to say, to its point of contact with the electro retoucher and to its connection with the suspension spring. There is a regulating screw on the armature provided with a spring for obtaining or producing by its vibration the rapid puncturing movement. The pencil carrier may be balanced in a tube having at its end a tail piece, against the bend of which a projecting piece fitted to the end of the armature strikes. By this means the pencil oscillates from top to bottom to give strokes instead of dots or punches.

A small spring is placed inside the tube and bears on the pencil carrier to push the latter upwards when the armature goes towards the bottom. The pencil carrier oscillates on a ring traversed by a pivot.

The invention may also be applied as a tool for engravers.

Improvements in and Relating to the Art of Obtaining by Photography Definite Photographs to be Used in the Production of Typographic Blocks and in the Art of Photolithography and Like Arts. By Messrs. Brown, Barnes, and Bell, of Liverpool.

Our invention has for its object to produce definite photographs broken up into dots, lines, or grains, so that they can be used in the production of typographic blocks by the art of photo-etching and like arts, and can also be used in the art of photolithography and like arts.

In the practice of our invention we proceed as follows:—We take what is known as a photographic transparency of the object or picture; we prefer that this transparency shall be as clear a transparency as possible when seen by transmitted light, and such a transparency can be obtained by processes well known in the art of photography. Having obtained such transparency we place the same upon a lined or hatched background, such as a sheet of white paper, having a lined or grained surface, or a stippled cross hatched or like surface printed or drawn thereon. Any material having such a lined or stippled surface, or effect, or variety of effect, may be used as the background for the transparency. The lining, graining, or stippling of the background may also be varied to suit the picture or object and its surroundings, so that portions of the background may be lined and portions stippled. Having so backed the transparency when viewed by reflected light, the picture of the object can be fairly seen broken up into dots, lines, or grains of the backing showing through the half-tones and clear parts of the transparent picture when viewed by reflected light. In attaching or fixing on the face of such transparent photographs the lined, grained, or stippled surfaces, or backing before described, we do not always confine ourselves to a single sheet of the said surface or backing containing one design only, but we sometimes make combinations by placing in various parts of the transparent photograph suitably cut-out portions of various and differing sheets of lined, dotted, or stippled material, so as to produce a varied and harmonious variety of background suitable to the subject under manipulation. Again, in preparing a suitable backing to combine with the transparent photograph we prepare the backing by hand, or by mechanical manipulation in an artistic manner best suited to the subject or object. Having so prepared and backed the transparency, we take from the transparency so prepared and backed a definite photograph on paper, glass, gelatine, or other sensitised material. This definite photograph has the photograph of the transparency broken up into lines, dots, or grains by the backing. The definite photograph is thus in a condition to be used in the production of typographic blocks by the art of photo-etching and the like arts, and is also suitable to be used in the art of photolithography and like arts.

Another method of producing a definite broken up or divided photograph, having dots, lines, or grains according to our invention, consists in covering the sensitive plate in the camera with a material such as net work, or with a photograph on glass, or other transparent medium, of lines, grains, or stipples, or cross hatched lines, fine or coarse according to the nature of the result required. The photograph on the sensitive plate will then be broken up into the dots, lines, or grains which are photographed simultaneously with the object on the sensitive plate. We thus produce direct a definite photograph broken up and divided into dots, lines, or grains, and in the condition to be used in the production of typographic blocks by the art of photo-etching and the like arts, and also suitable to be used in the art of photolithography and like arts. When required we complete such photograph by hand manipulation, removing or adding dark or light portions, after the manner known in the art of photography as "retouching."

By another method, according to our invention, to produce a typographic block we proceed as follows:—We take a transparent photograph of the picture or object, and we take a transparent photograph of grains, lines, or stipples; and we prepare a plate, or block of zinc, or other suitable metal with bitumen, or other substance that will give a sensitive surface to the zinc or other metal. We then place the photograph of the picture or object and the photograph of the lines, dots, or stipples before spoken of over the sensitised zinc or other metal, and print by light in the usual way, and thus we produce the picture in dots, grains, or lines upon the surface of the zinc or other metal. We then develope the picture, and subject the plate or block to the process of photo-etching in the usual way.

Having now particularly described and ascertained the nature of our said invention, and in what manner the same is to be performed, what we claim is—

First. The method substantially as herein set forth of producing from half-tone pictures and photographs, photographs to be used in the production of printing surfaces.

Second. The method substantially as herein set forth of producing in the camera and direct from an object photographs to be used in the production of printing surfaces.

Third. The method substantially as herein set forth of producing photographs upon sensitised surfaces of metal, such as zinc, to be used in the production of printing surfaces.

Rotary Stands for Exhibiting Photographs, &c. A communication by C. A. Schmidt, New York, U.S.A.

The object of this invention is to provide a new and improved rotary sample stand, for exhibiting samples of embroidery, photographs, pictures, or any other articles.

The apparatus consists of a reel-shaped frame, constructed of a pair of discs fixed to the ends of a tubular body and tied together by rods, the said frame being mounted to rotate on a verticle spindle, rising from a suitable foot into the tubular body of the rotary frame. Between the top and bottom discs of this rotary frame skeleton frames or wings suited for holding the photograph or other article to be exhibited are loosely pivoted by their upper and lower inner corners, the said pivots being received in corresponding sockets near the edges of the discs. The said frames are easily removable from the central frame, and the latter may be made without the central tubular body above referred to, the lower disc turning on the spindle, and the upper disc having a downwardly projecting central pivot, which is received in a corresponding socket in the top end of the spindle or standard.

The central frame in which the wings are mounted, and from which they stand out on all sides, can be rotated by a clock-train contained in a casing beneath the central frame and gearing therewith, or by any other suitable motor or by hand. A spring is mounted on any fixed support so as to project in the way of the wings or frames, so that when the stand is rotated the outer end of each wing or frame will strike against said spring and be thereby detained so that the sample upon the face of the wing can be distinctly seen. Or a U-shaped spring may be provided having small rollers at its ends which project in the path of the lower edges of the wings or frames, said spring being fixed to the standard beneath the rotary part of the frame and having its vertical shanks passing through guides in fixed bracket arms.

If the frame be turned around rapidly, the centrifugal force will swing the wings outward, and their lower edges will strike the rollers on the ends of the spring and will press the latter downward, thus permitting the wings to pass; but if any two wings are to be held open when the frame does not revolve, the rollers hold the wings.

Or a spring wire coiled to increase its elasticity and having its ends secured to the standard is bent to a semicircular form, and so placed as to press against the lower edges of the wings and hold them in whatever position they may be placed, the friction not, however, being sufficient to prevent the revolving of the rotary frame. Or a flat ring or segment of a ring is applied in the same position, and is carried on fixed arms by sockets sliding on the upwardly turned ends of the said arms, and is pressed up by coiled springs upon said arms.

The construction can be further modified in various different ways, but in all cases the rotary frame carrying the wings is combined with a spring for holding one or more wings open.

Samples of embroidery, upholstery goods, knitted goods, dry goods, hardware, cutlery, &c., can be held on the wings by suitable bands, or can be cemented to the same. The rotary frame can carry any desired number of wings according to the size of the apparatus.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
May 20	Bolton Club	The Studio, Chancery-lane.
„ 21	Photographic Club	Anderton's Hotel, Fleet-street.
„ 22	London and Provincial	Masons' Hall, Basinghall-street.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

The ordinary monthly meeting of this Society was held on Tuesday evening last, the 13th inst., in the Gallery of the Society of Water Colour Painters, 5a., Pall Mall East,—Mr. James Glaisher, F.R.S., in the chair. The summer exhibition of the Society of Water Colour Painters was on view.

The Chairman, in opening the meeting, said a few words on the sad death of Mr. H. Baden Pritchard, who had been a Vice-President of the Society. He had deeply regretted the death of the Rev. F. F. Statham, who had for so long been President of the South London Photographic Society, and had during all that time done what he could to advance the affairs of that society: but now he had received a shock which he could not describe. The other day he had opened a letter and had found in it simply the words "Baden Pritchard is no more!" For twenty years Mr. Pritchard had been an excellent member of the Photographic Society of Great Britain. He had, moreover, been a member of the Council and a Vice-President. Few men, he believed, had gathered around them such a circle of friends as Mr. Pritchard had done. His death would be deeply regretted by all, and all would, he was sure, join in the expression of sympathy to be conveyed to his widow in a letter of condolence from the Society.

Mr. A. Cowan suggested that a formal tribute be sent by the Society in the shape of a wreath to be placed in Mr. Pritchard's grave.

Mr. W. S. Bird seconded the motion, which was carried unanimously.

The Chairman then called on Mr. John Spiller, F.C.S., to read his paper, entitled *Observations on Fading.*

Mr. Spiller said that so much had been already written on the subject that it might appear superfluous to touch upon it again; but the supreme importance of the matter, together with the fact that the subject had been reopened by the reading of a paper by Mr. E. Dunmore before the South London Photographic Society, must be his justification. The cause of the fading of silver prints was pretty well known now by photographers, and, as a rule, due care was taken to use fresh hypo., to thoroughly wash, to use a neutral or alkaline toning bath, and to avoid weak negatives. But the photographer, having seen to all this, was still at the mercy of the paper-makers; for he had to mount his prints either on boards or (sometimes) in albums, and what use was it to remove all hypo. from his prints if he proceeded to mount them on boards with this very substance in them? Sixteen years ago he had pointed out the effect of hypo. on mounts. He had shown that cardboard was seldom or never free from that substance, and a mild appeal was made to paper-makers to abstain from using this salt as an "antichlor." Now that the subject had again come to the front, he had been making experiments and collecting the experience of paper-makers. He had found that hypo. was still present in cards of recent make, and that the use of hypo. as an antichlor was admitted by paper-makers. Experiments were, however, being made on improved methods, which would, he hoped, result in the introduction of a new system likely to be of benefit to photographers. It was possible that a paper might be produced requiring the use of no antichlor. There had been exhibited at a recent meeting of the Chemical Society a paper made by the disintegration of wood at a great pressure, and these specimens looked like the right article and required no antichlor. At the same meeting a large series of sulphites and bisulphites were exhibited which had been used in experiments. He had a set of samples of these chemicals with him. He had been told that the wood pulp could be moved with an equal quantity of rag pulp to produce the finest quality of paper, without any necessity for the use of hypo. If this were so, we were out of our difficulties. There had been a demand of late for cheap mounting-boards, and of course those who used these could not expect much. A patent had been taken out some time ago for neutralising the chlorine left in paper with anti-chloride of lime. In looking back, however, as far as 1844, he found a claim made for the same invention. It was a misfortune for photographers that the process had not been sufficiently perfected to allow of its general adoption at that time. He had tried the comparative effects of sulphite and of hyposulphite of soda on silver prints by immersion of them in saturated solutions of these two substances, and had found that, whereas the sulphite had no effect, the hypo. produced considerable fading. He had also tested the powers of the two substances to dissolve silver, and had found that, when a few silver coins were placed in solutions of them, a test for silver gave an indication in the case of the hyposulphite in a very short time, but none in the case of the sulphite. This showed how the silver image was effected, and how necessary it was to keep hypo. from it. Where there was a question of sulphite or hyposulphite the starch test was useless to distinguish which was present, as both acted in that case similarly. A very ready means of distinguishing between the two was, however, afforded by the fact that the sulphite discharged the colour of a solution of magenta, whereas the hyposulphite did not. This would be a guide for the paper-makers as to how much of the substance to use. Tinted mounts were to be preferred to pure white, as they were not bleached, and, consequently, were not treated with an antichlor. He was informed that in the south of Germany and in Scotland the paper-makers had given up the use of hypo. as an antichlor. Perhaps the reduced price of sulphites would now incline paper-makers to use them, in which case photographers would by no means grumble.

Mr. E. Dunmore thought that had Mr. Spiller looked further into his (Mr. Dunmore's) paper he would have seen it admitted that a solution of hypo. would cause a print to fade. He contended that whilst the print remained dry no such effect would take place.

Captain Abney said that Mr. Spiller had many years ago gone into another cause of the fading of prints, namely, the effect of acids on an organic salt of silver in them, and had pointed out the advisability of keeping the fixing bath alkaline. He thought that Mr. Spiller had been more on the right tack then than now. He could confirm Mr. Dunmore in his statement that, so long as a print remained dry, hypo. in it would not cause fading.

A. Member said he had made a few such experiments and had come to the conclusion that whereas a weak solution of hypo. would cause fading, a strong solution would not.

Mr. J. Werge had prints which thirty years ago had been most thoroughly washed—first in a mass, and afterwards singly—with tepid water. These were all now as good as when they had been printed.

Mr. J. R. Sawyer had some prints taken thirty years ago on paper sensitised on an eighty-grain bath, toned with hypo. and gold, and most imperfectly washed, but they were now as good as good as ever.

Mr. T. M. Brownrigg remembered printing, twenty-eight years ago, and afterwards immersing, the prints in a saturated solution of hypo. and silver, then treating with gold, and washing very imperfectly. These prints were almost the only permanent ones he had.

Mr. T. Sebastian Davis pointed out that we must distinguish between a pure silver image and one partly converted into gold by toning. He thought that if ther were sufficient gold in the print it would be permanent.

Col. H. Stuart Wortley mentioned a case where several of a batch of prints that had been very imperfectly washed had faded, whilst others of the same batch had retained their colour.

Mr. Spiller, in reply, said that although possibly whilst a print remained quite dry hypo. in it might have no effect; but paper was a very hygroscopic substance, and dampness was sure to occur at times. A great deal might be said concerning the organic compounds of silver in prints. He had tried to remove the albuminate of silver which remained in the whites of a print by the use of sulphite of soda, but had found it did not answer.

The Chairman hoped that the paper-makers might take the hint thrown out to them. He then called on Mr. W. E. Debenham to read his paper on *Illumination of the Dark Room.*

Mr. Debenham said that the preservation of one of our faculties was of great importance, and that there appeared little doubt that in the case of photographers that of sight was being greatly injured by the use of red light. He quoted several authorities to show that red light acted injuriously on the eyes. He was sure that for the greater number of operaters red light was a trying one, and that they would be glad to use a yellow light of similar illuminating power if they thought it as safe as the deep red. When first bromide was used for dry collodion plates it was stated that it was proportionately much more sensitive to yellow rays than iodide, and so strongly had this idea seized on the minds of photographers that when gelatino-bromide plates first came into general use, which was in winter, it was said that their superior sensitiveness was entirely due to their greater proportionate sensitiveness to the yellow light which is common at that time of year. When summer came round this was proved to be a mistake. Captain Abney had stated that by using a small quantity of iodide with a bromide emulsion the sensitiveness to the orange rays was so much reduced that an orange light might be freely used to work the plates in. Dr. Eder stated that the addition of iodide to a bromide emulsion increased the sensitiveness to the yellow and green rays. These statements appeared almost exactly opposed to each other. He (Mr. Debenham) had a set of ribands representing as nearly as might be the colours of the spectrum. Emulsions had been made containing—first, pure bromide; second, bromide with five per cent. of iodide; and, third, bromide with ten per cent. of iodide. The ribands were photographed with plates prepared with these three emulsions, and it was impossible to tell the one from the other; but in all cases the red gave more photographic effect than the yellow, so that, were one to use reflected light from such surfaces as a dark-room illuminant, we should choose the yellow colour by preference. He had at one of the technical meetings shown a lantern with four slides, having different coloured media in them. The two most contrasted consisted of two thicknesses of ruby and two thicknesses of yellow and one of greenish glass. The latter had given the most agreeable light, whilst it gave by far the least photographic effect. Captain Abney had, again, brought forward the question, stating that red gave a better result than yellow, selecting as types the glass known as "stained-red," and the paper known as "canary medium." Stained-red has the peculiarity that it is formed by the piling up of a yellow colour. If stained-yellow be piled up it becomes, with a sufficient thickness, red; but the spectroscope still shows the yellow. In the experiments of Captain Abney there appeared to have been an oversight. The trials for illuminating power were made with a small lantern. Now, with clear glass we may reduce the aperture without reducing the light, whereas with a diffusing medium we may not. The trials for the photographic power should, therefore, be made at the same distance from the light as those for the illuminating power; but this had not been done. Another curious thing is that Captain Abney should have found so much less photographic action with stained-red than with yellow, his (Mr. Debenham's) experiments showing the very reverse. When plates were exposed under canary medium, stained-red, and ruby glass, there was the smallest photographic effect with the first, and the greatest with the last. Captain Abney had further stated that the addition of green glass to yellow cut off no rays but such as were harmless. Now, green glass cut off both ends of the spectrum, but let the yellow through freely. It was thus possible to get a yellow light instead of the red, which would arise from accumulating yellow glasses, at the same time some rays of active power were cut off. Captain Abney had recommended stained-red with cobalt. A lantern fitted with this and one fitted with stained-red and green were shown. The latter let pass far most light, whilst the former gave by far the strongest photographic action. This was demonstrated by the development of a plate at the meeting. An arrangement was then shown whereby a comparatively safe *white* light could be got by reflecting on to a diffusing screen red and green light. At a reading distance from this only the faintest image was got on a sensitive plate by one minute's exposure. Another thing in favour of a yellow light was that it suited better the yellowish-green colour of the plates, so that the illumination tests, had they been made with marked plates instead of with matter printed on a white sheet, would have allowed the balance to be still further in favour of the yellow light than it was. He (Mr. Debenham) in summarising his remarks, said he considered that he had established—First: That the great difference in relative sensibility to different colours stated to exist in the two substances (bromide of silver in gelatine and iodide of silver as in a wet plate) does not exist.—Second: That as a consequence the difference said to be required in the colour of the light in which these two are to be worked is not necessary.—Third: That yellow light gives more luminosity in proportion to its photographic effect than does real red light.—Fourth: That stained red glass owes its power of passing luminous rays to the fact that it is an accumulation of yellow colour.—Fifth: That green glass cuts off both ends of the spectrum, and therefore, in addition to rendering a light colour, is a considerable protection.—Sixth: That green glass used as a supplement to red allows more illumination to pass than cobalt so used, and has much more strongly protective effect.

Mr. Sebastian Davis moved that the discussion on Mr. Debenham's paper be postponed till the next meeting.

The Chairman read a communication to the effect that the Art Union of Surrey would hold an exhibition in Guildford, in June, and that photographs of antiquities, &c., of Surrey, would be eligible for admission.

It was stated that Mr. Samuel H. R. Salmon had been elected a member.

Mr. Spiller announced that the funeral of Mr. H. B. Pritchard would take place at Abney Park Cemetery, on Thursday, the 15th instant.

The meeting was then adjourned.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society, held on the 8th instant, the chair was occupied by Mr. A. Haddon.

Mr. A. L. Henderson produced some developing solution made three years ago; also a plate now developed with some of the same liquid. There was plenty of intensity, and the fact that the mixture had not lost its developing power he attributed to his having added some bromine water to the usual pyro., ammonia, and bromide.

Mr. A. Mackie showed a contrivance for releasing a camera shutter, in which the ball and tube used were filled with water instead of air, as in Cadett's pneumatic arrangement.

The Chairman then called upon Mr. C. Darker to give the *Demonstrations of some of the Phenomena of Light*, for which the evening had been reserved.

Messrs. C. and T. Darker showed, by means of their oxyhydrogen lantern, a variety of experiments illustrating the characteristics of light, accompanied with appropriate explanations. Touching upon the corpuscula and undulatory theories of Newton and Huyghens, the speed of light was next referred to, as calculated by Reaumur from the eclipses of Jupiter; and then the question of the time taken by the optic nerves to convey impressions to the brain was considered. Several demonstrations were made of the effect of rapid motion in causing objects to assume an appearance not actually representing them. Two sheets of perforated metal being revolved, in the manner of a chromatrope, when the speed became high gave the effect of rays darting straight out from a central point. The photodrome was next brought into play, and light having been thrown at regular intervals upon a revolving wheel the spokes of the wheel appeared to be at rest. The identity of the angles of incidence and reflection of light was demonstrated by a beam passing through a smoky atmosphere, and the application of the reflection to record the feeble motion of a magnetic needle employed in long telegraphic lines was shown. Some very beautiful effects were thrown upon the screen by the lantern kaleidoscope of Messrs. Darker, very striking patterns being produced by apparently unlikely subjects. The alteration in light when reflected from a pile of glass plates was next discussed, and the effect of particular states of the atmosphere in inducing polarisation was touched upon and illustrated by a beam of light thrown into a column of water rendered cloudy by a little mastic. A display of objects in the lantern polariscope concluded the demonstration.

After a few observations from Mr. C. Ray Woods, a hearty vote of thanks was accorded to Messrs. Darker.

The next lecturette will be given on the 12th of June, by Mr. W. Coles, on *Altering the Density of Gelatine Negatives.*

EDINBURGH PHOTOGRAPHIC SOCIETY.

The seventh meeting of the current session was held in 5, St. Andrew square, on Wednesday evening, the 7th inst.,—Mr. William Neilson, President, in the chair.

The minutes of the previous meeting having been passed, Messrs. E. Park, James Melville, Robert Gray, and J. Wilson Stewart were admitted ordinary members of the Society.

The Secretary read the following revision of laws as re-arranged by the Council. These are to be discussed at the next meeting:—

1. The office-bearers of the Society shall be a President, two Vice-Presidents, a Secretary, Treasurer, and Curator—to be elected annually, at the first meeting of each session, and all of whom may be re-elected.

2. The Council shall consist of office-bearers and twelve councillors, five of whom shall form a quorum at all meetings of the Council. Four members of the Council shall retire annually by rotation. The Council shall have power to fill up any vacancy in their number during the current year.

3. The Council shall make all necessary arrangements connected with the business and general management of the Society, including its funds; but it shall not be entitled to spend more than ten pounds without special authority being obtained from the Society to do so.

4. The last Council meeting of the session shall be held sixteen days previous to the annual meeting, when the Secretary and Treasurer shall submit their reports.

5. The annual meeting shall be held on the first Wednesday in November.

6. Special meetings of the Society may be called by the Council, or by the President, on his receiving a requisition to that effect signed by ten ordinary members.

7. Applicants for admission as members must be proposed by a member at a meeting, and at a subsequent meeting shall be balloted for, one black ball in five being sufficient to exclude. This law shall also apply to the election of corresponding and honorary members, but these shall not be liable to any contribution to its funds.

8. On admission members shall pay five shillings each as subscription for the year then current. They shall not exercise the privilege of membership until their subscriptions are paid; and the annual subscriptions shall be payable on the first Wednesday of November in each year. Should a member be in arrear for a period of two years he shall thereby cease to be a member.

9. The proposer of a new member shall be considered responsible for the first subscription.

10. The Secretary shall call Council meetings after consultation with the President, and he shall give three days' notice to members. This law shall not apply to cases of emergency.

11. The Treasurer shall keep an account current with a chartered bank in his own name; but when the Society's funds in his hands exceed thirty pounds the surplus shall be lodged in the bank, on deposit receipt, in the joint names of the President and Treasurer as such.

12. The Treasurer's accounts shall, at the close of each session, be examined by the Auditor, and along with his report thereon shall be submitted to the Society at the annual meeting, along with a report by the Council on the business during the previous session.

13. Members may propose a motion or law at a meeting of the Society. The said motion or law shall be printed in the billet calling the next meeting, at which it will be discussed; the said motion or law to be approved by at least two-thirds of the members present at such meeting.

14. Twelve ordinary members shall form a quorum at all meetings of the Society.

Order of Business at all Meetings.—1. Chair taken. 2. Minutes of preceding meeting read and discussed. 3. Admission of new members. 4. Notices and discussion of motions. 5. Other private business. 6. Reading of papers and discussion. 7. Questions or other public business discussed. 8. Exhibition of pictures, apparatus, &c.

Mr. G. G. MITCHELL read a paper, entitled *Photographers and Sitters* [see page 313], for which he received a vote of thanks, on the motion of Mr. Tunny.

Mr. JOHN ANNAN exhibited a large number of landscapes by Mr. Andrew Pringle, Mr. Hay, the late Mr. Black, and others, both amateur and professional. He (Mr. Annan) had collected several sets, each representing the same subject, but by different hands, and was thus enabled to show great diversity of treatment. From the same point of view, and on the same-sized plate, one man produced a bold, massive composition, while another (perhaps through using a wider-angled lens) showed a poor, flat, insignificant result. Another set showed the great diversity of results from a very slight modification of the point of sight; while another set showed prints from the same negative, but cut in different sizes and shapes. In all these examples there was little difficulty in picking out one that stood out distinctly superior to the others, and Mr. Annan pointed out the reasons why, and showed how others had failed. The exhibition possessed high educational value, but without the illustrations his remarks lose their force.

The Chairman, Messrs. Matheson, Brebner, M'Kean, and others congratulated the meeting on the great treat Mr. Annan had afforded them; and a vote of thanks was awarded to him, and to Messrs. Hay and Pringle, by acclamation.

Packets of hydrokinone were distributed among the members willing to experiment with it and state the results at the next meeting.

A set of photographs of the characters in the Passion Play at Ober-Ammergau was exhibited by Mr. G. G. Mitchell, and excited considerable interest.

On the motion of Mr. Thomas Wardale, it was decided to reappoint the Picnic Committee of last year.

A vote of thanks to the Chairman terminated the proceedings.

SHEFFIELD PHOTOGRAPHIC SOCIETY.

THE ordinary monthly meeting of this Society was held in the Masonic Hall on Tuesday, the 6th instant,—Mr. Councillor Firth in the chair.

A very numerous attendance of members and friends assembled in anticipation of seeing the work of the first trip of the season, which took place on Thursday, the 24th ult. Haddon Hall and Meadows was again selected for the subject of our dry plate and camera campaign, and the force mustered for the "out" was one that any intelligent or scientific person might spend a very pleasant day amongst. There was a four-in-hand coach filled inside and out, and several private conveyances besides.

The day was misty and damp in the early part, and the trees were in some places covered with hoar frost; but as the party went on their journey and the Sun went on his, light and warmth increased, and with them the zeal of some of the members became almost uncontrollable, as they felt disposed to try a plate or two long before they got to their journey's end.

After passing through Bakewell, and making arrangements for a substantial wet plate each, to clear and fix when the daylight was exhausted, Haddon was reached about 11 o'clock. The weather for the first hour was not bright, but cloudy, and the splendid old Hall was overshadowed, so that many of the first pictures of the venerable pile and its surroundings, taken from the meadows, were wanting in contrast; with the exception of one taken by the President, Mr. Firth, who waited and was favoured with a gleam of sunshine which made his picture a brilliant and charming rendering of the subject, with the river, field, and bridge in the foreground, and the massive trees and the well-known castellated wall of the Hall against the sky.

Mr. W. Dakin, with his new outfit of 10×8 camera, by Hare, and various lenses by Dallmeyer to suit, used them as only one long connected with the art could be expected to do, and produced some charming pictures of the old place—one, in particular, of Dorothy Vernon steps, which was very original in selection and remarkably well-timed in exposure, considering the very shady corner the steps stand in.

Mr. J. Taylor, the Hon. Secretary, succeeded in adding to his already valuable and choice selection of Haddon pictures some splendid 12×10 views from new and picturesque positions.

Mr. Seaman, of Chesterfield, worked two cameras, both in and out of the Hall, with unflagging enthusiasm all day, being the first to arrive and the last to leave, taking home with him a rich lot of pictures, both in selection of subject and quality of manipulation.

Mr. H. Rawson, in his usual careful manner, selected a few choice bits as stereos, and half-plate pictures. W. B. Hatfield exposed eleven plates on such positions as were absent from his collection of Haddon, and succeeded in winning in the contest for the best picture, with a whole-plate representation of the banqueting hall interior. Mr. Wood showed a lot of very good pictures—$7\frac{1}{2} \times 5$. Mr. Hayball also succeeded in making up a nice and varied selection by availing himself of the lady figures, which were more for studies than representations of the place.

Mr. Milward, a careful amateur, who has long had in his possession pictures of Haddon Hall which have been much admired at our exhibitions, made some good additions to his stock. Mr. Foxen—a quiet, plodding worker in the art—found many subjects suitable to his way of producing pictures, he having a preference for those compact "bits" he can enlarge.

On this trip there was a good attendance of new members, all amateurs—namely, Messrs. Gilley, Johnson, Pearse, Hibbert, Mottersham, and others—most of these producing something which repaid them. In all there were seventeen cameras at work, and 112 plates were exposed, of various sizes, during the day. There were fifty-six finished pictures shown at the meeting.

The next trip will be to Dovedale, on Thursday next, the 22nd instant. The subject for the competition picture for the forthcoming meeting is *A Rustic Bridge.* Two prizes will be given.

Mr. J. Charlesworth was elected a member.

HALIFAX PHOTOGRAPHIC CLUB.

THE usual monthly meeting was held on Wednesday, the 7th instant,—the Rev. W. E. Hancock, M.A., Vice-President, in the chair.

Mr. THOMAS BIRTWHISTLE, the President, gave a practical demonstration of the platinotype process, developing a large number of prints before the audience. The simplicity of all the operations and the beauty of the results were highly appreciated by all. The majority of the members, however, did not consider the new sepia tint an unqualified success.

The CHAIRMAN asked Mr. W. Clement Williams if he still held the same high opinion of single lenses for landscape purposes.

Mr. WILLIAMS always used them when practicable, and preferred one of the longest possible focus. He did not think any modern single lens that had come under his notice gave as good definition, depth, and brilliancy, or as pleasing perspective, as that afforded by the old-fashioned and bulky form. Its weight and size were certainly a great drawback; but the better quality of results was to him an ample compensation for the other "pains and penalties" connected with it.

The annual trip of the Club was arranged to be held on Midsummer Day next. Bolton Woods was the place selected for operations, when a number of prizes will be offered for competition.

A hearty vote of thanks to Mr. Birtwhistle for his very able and interesting demonstration brought the proceedings to a close.

BOLTON PHOTOGRAPHIC SOCIETY.

ON Wednesday evening, the 30th ult., the third annual *soirée* of the members of the Bolton Photographic Society was held in the Baths Assembly Rooms, when there was a large attendance of members and their friends. Round the room were ranged tables filled with specimens of the photographic art, the work of the members, the productions being highly creditable to amateur effort, and would certainly not disgrace the work of the accomplished professional artist.

Prominent amongst the specimens exhibited were those of our townsman, Mr. T. Parkinson—a hundred in number—which claimed, and justly so, a large share of attention. Amongst the finest of these views was one of the interior of Mytton Hall, the residence of John Hick, Esq., J.P., the esteemed President of the Society. Another was a good view, taken by electricity some few years ago, of a group of the members of the Microscopic Society in the Town Hall. Other specimens were a large carbon *plaque*, on opal, of the Rev. Canon Powell, and mounted in plush; a group of the family of Major Cross Ormrod, taken at Barnacre, the family seat at Scorton; a carbon enlargement of the Parish Church interior; view of the Germania Monument, on the banks of the Rhine; an interior of Holy Trinity Church, in carbon; and the interior of the Botanic Gardens, Southport.

Some exceedingly good specimens of photography were shown by Mr. C. K. Dalton, Bridge-street, including a view of Pandy Mills, near Bettws-y-Coed; an instantaneous photograph, entitled *A Cloudy Day at New Brighton;* another instantaneous view of Bridge-street, besides a scene in Ashworth Glen, in platinotype. Mr. R. Mercer, Market-street, had some beautiful views, also in platinotype, chiefly of Smithills Hall, which were greatly admired.

Mr. John W. Hawksworth, the energetic Secretary of the Society, displayed a few good specimens, recently taken, of Furness Abbey, as well as a large view of the Fever Hospital, with the Sanitary Committee posed in the foreground.

J. R. Bridson, Esq., J.P., Belle Isle, one of the Vice-Presidents, displayed some twenty views of Windermere scenery, as beautiful in execution and production as the exquisite subjects deserved; and Professor Heaton displayed some pretty views of Swiss scenery.

Mr. Wm. Banks, Corporation-street, had a few good photographs—one of the *Switching Room*, in connection with the Telephonic Exchange at Manchester, being particularly good. He also displayed a quantity of apparatus, &c.

Mr. W. Laithwaite had a few good views of Turton Tower, the Jumbles, &c. Mr. E. N. Ashworth, Turton, had some fine photographic pictures of Scotch and Cumberland scenery and Haddon Hall, with Dorothy Vernon's door—dear to the lovers of romance. Mr. B. Abbatt and Mr. J. S. Jackson were also exhibitors, their specimens, though few, being good; and the Rev. J. W. Cundy, M.A., had some excellent photographs of the Italian alps.

Among the outside specimens may be mentioned three excellent sea views from the Autotype Company, London, and a number of splendid photographs produced by Mr. J. B. Wood, a member of the Manchester Photographic Society, who kindly officiated as descriptive lecturer in the place of Mr. Galloway, who had on previous occasions amused the audience by his anecdotes, &c. In Mr. Wood was found a very able substitute, as he kept the company in roars of laughter by his terse and racy descriptions and tales.

Mr. J. R. Bridson, one of the Vice-Presidents, acted as chairman in the absence of Mr. John Hick. He congratulated the Society upon its proficiency, and heartily wished the members success.

Mr. Hawksworth, Secretary, read the report, which was satisfactory, showing that since last season twenty new members had joined the Society.

The Bolton glee party (Messrs. Houghton, Howarth, Warburton, and Walls) were in attendance, with Mr. J. Bentley at the pianoforte, the proceedings being enlivened by their united efforts.

Correspondence.

THE NEW DEVELOPER.

To the EDITORS.

GENTLEMEN,—Your article in the Journal of April 25, on *A New Developer*, was very interesting to me, as doubtless to most of your readers, for it threw new light on the use of sodic sulphite, and especially in connection with carbonate of soda.

I have long preferred the carbonate of soda developer to the ammonia, but have met with sundry difficulties in producing *uniformly* negatives of high class. Upon reading your article I at once developed a Swan "ordinary" according to your formula, and obtained in ninety minutes a fully developed negative *slightly* veiled. I then gave some $7\frac{1}{2} \times 5$ Swan's "ordinary" and Autotype "challenge" slow plates a five seconds' exposure in fair light, with No. 5 stop (*the smallest*) Ross's portable symmetrical, and developed with—

Pyro.	4 grains,
Sodic sulphite	30 ,,
Water	1 ounce,
Anhydrous carbonate of soda	40 grains,
Water	1 ounce.

I flooded the plates with water for (say) a minute, then applied one ounce of pyro. and sodic sulphite; I kept it moving for, perhaps, half a minute to a minute, and then added one ounce of the carbonate of soda. The image developed quickly and with ample density, excellent gradation, and beautifully clear shadows; while in colour, gradation, and sparkle it more nearly resembled one of my old iron negatives than anything I have yet obtained with gelatine.

I have also given an exposure of five seconds to one plate and ten seconds to another, and by using a less quantity of the carbonate of soda to the ten-second plate produced two negatives barely if at all distinguishable one from the other.

I prefer the anhydrous soda to the ordinary or even the recrystallised; it seems to give clearer shadows and crisper pictures, and it must be a more definite product than either of the others.

If you have not tried this form of developer, and will take a Swan ordinary plate, give a *short* exposure with a small stop, cut it in half, develope one half with the above and the other with the ordinary ammonia-pyro. developer, I think you will find that the former will give you by far the best negative and with at least one-third less exposure than for ammonia and pyro.

As to the asserted permanent character of the sulpho-pyro. developer: if you will mix (say) enough to develope two or three negatives as per the above formula, develope *one* negative and note the exposure and time of development, then keep the remainder for only one week and give a plate a similar exposure, also cut it in half and develope one half with the week-old mixture and the other with a freshly-made one, you will find that you will hardly get any image at all on the first while the second will be all right.

Have you ever tried precipitated chalk for removing the gloss of varnish for retouching? If not I think upon trial you would prefer it to either ground cuttle-fish, a pumice, or any of the *smeary* messes which are used for that purpose. It gives a *very fine* matt surface without any scratches.—I am, yours, &c., W. BASSANO.

Haden Cross, Old Hill, May 12, 1884.

MOUNTING PRINTS.—PRESERVING THE MOUNTING SOLUTION.

To the EDITORS.

GENTLEMEN,—I may first say I know nothing of chemistry, and only work in a practical way as taught by the skill and experience of others. There may, therefore, be something wrong in what I recommend; but I only give my own experience, to be tested by others possessing more knowledge than myself.

I mount my prints with the solution of gelatine and alcohol given in your ALMANAC. I found that here, in India, it went bad in a week. I have been in the habit of using boro-glyceride to keep meat and milk fresh, and I find one teaspoonful of boro-glyceride will keep a pint of milk sweet for quite a week. I therefore, in making up my mounting solution, put a small egg-spoonful into the solution of about three ounces. I made up a bottle of solution in October, 1883, and when I had occasion to use it a few days ago it was perfectly good and sweet.

Perhaps this boro-glyceride may be a useful addition, not only to the mounting solution, but also to albumenised paper, and may be to emulsion.—I am, yours, &c., E. P. R.

Mahablishmar, Bombay, April 23, 1884.

DEVELOPING-ROOM ILLUMINATION.

To the EDITORS.

GENTLEMEN,—Your correction was technically right about there being more colour absorption by two sheets instead of one of the same glass, especially feebly-coloured samples. I stated there was some. I was writing briefly for practical purposes, and in a general sense the rule of action was correct. From recent experience I should be sorry hereafter to use a screen which did not let more and cooler light through than one sheet of ruby glass; but this can only be done by selecting two screens upon scientific principles—translucent and not transparent.

What does Mr. W. E. Debenham mean by entitling his paper to the Photographic Society "Illumination of the Dark Room?" If the room be dark, how can it be illuminated? The same question may be put to Mr. A. Pringle, who heads his articles "The 'Happy Medium,' or Dark-Room Illumination." If one thing more than another makes a medium unhappy it is the illumination of the dark room.—I am, yours, &c.,

London, May 9, 1884. W. H. HARRISON.

HYPO. IN PHOTOGRAPHIC MOUNTS.

To the EDITORS.

GENTLEMEN,—Having noted in your issue of April 25th Dr. Nicol's remarks regarding Mr. A. Duthie's statement as to the presence of hyposulphite in mounts, and having examined some of the same mounts, I beg leave to confirm Mr. Duthie, my tests having shown undoubtedly the presence of that substance in distinct traces.

The tests were conducted very carefully in my own laboratory. Every precaution which the science of chemistry could suggest was used, the mounts being digested in *boiled* distilled water to prevent oxidation. One of the tests employed, according to Dr. E. J. Reynolds (*Chemical News*, vii., 283), detects hypo. when present in the minutest traces—even $\frac{1}{300000}$th part.

If Dr. Nicol will state the test which apparently satisfies himself I shall be happy to use it, and state my results.—I am, yours, &c.,

Glasgow, May 12, 1884. JAMES MUTER.

THE SOCIETY OF AMATEUR PHOTOGRAPHERS OF NEW YORK.

To the EDITORS.

GENTLEMEN,—It may interest you to learn that we have just organised a new amateur photographic society for this city and vicinity, of which I am President.

No society here proposes to do or does what we intend to perform. We have several wealthy amateurs interested, and propose to fit up a hall with suitable appliances for photographic experiments, in order that practical demonstrations can be given at meetings.

We also wish to establish a system of exchange of pictures, apparatus, and negatives with foreign societies, and open a correspondence with the same. We expect to have a very complete photographic library replete with copies of the latest English and American patents and current literature.

Should you or any of your friends visit this country be sure and give us a call.—I am, yours, &c., F. C. BEACH.

361, *Broadway, New York.* *President, Society of Amateur Photographers.*

Notes and Queries.

W. M. H. writes:—"Can anyone inform me as to the best means of improving a studio where the side lights have been blocked out by a wall higher than the said studio, and situated at four yards' distance? Would painting the said wall a light colour do? The sun, it must be remembered, shines all day on the wall. Would anyone who has been in the same 'fix' give me the result of his experience, which will be thankfully received."

"THERE appeared in your Journal, some time since, a letter from Mr. Smith recommending the use of the 'ferrous oxalate developer,' and great stress was laid on the fact of its keeping qualities. Now, I have given it a fair trial, and am perfectly satisfied with it *as* a developer; but I cannot prevent it forming crystals and turning the sides of the bottle green when kept and allowed to remain where the sun can shine on it to revive it. I have tried it with more or less acid, but it just goes the same, although I have carried out M. Audra's formula to the letter. I shall be glad if Mr. Smith or any other reader of the Journal inform me how to prevent the formation of crystals, and keep the developer up to its strength.—A. HOLT."

"Is there any way by which old collodion can be decolorised? I have some obtained a few years ago for negative work; but which the influx of gelatine plates caused me to abandon. It is now of an exceedingly deep, red colour, and I am desirous of trying the wet collodion process once more, previous to which I wish the collodion restored.—S. R. S." ——In reply: Shake up some zinc filings with the collodion and it is probable that the colour will disappear. But we do not believe that the original sensitiveness of the collodion will ever be restored. If it be required for the preparation of lantern or other transparencies, then its age will prove no drawback to its employment, because, for this purpose, old collodion not unfrequently answers better than new.

"INQUIRER" is making a collection of "men of mark" in photography who have passed away, and asks by what means he can procure a portrait of Mr. Thomas Sutton.——We reply that in 1875, within a few weeks subsequent to the death of that gentleman, we published a sketch of his history illustrated by an admirable portrait, which in the estimation of his friends is one of the best that has ever been taken. To the volume for the year mentioned, and page 211, we refer "Inquirer."

GEO. BARCLAY says:—"I observe, in a report of the proceedings at one of the London photographic societies, that attention was specially directed to the use of a plano-concave lens inserted immediately in front of the sensitive plate as a means of ensuring extreme sharpness up to the edges, even when a lens is employed with full aperture. Will you inform me if such plano-concave lenses can be readily procured, and, if so, where?"——In reply: Lenses of the class referred to are not commercial productions, and to procure one it would be necessary to have it specially made.

"IN practising the collodion transfer process what is the best preparation for the plate to enable the collodion film to leave it readily? I sometimes experience difficulty in stripping, and imagine that it is owing to the intimate adhesion of the collodion to the surface of the glass.—P.P.A."——In reply: The plate may be rubbed over with a five-grain solution of wax in rectified benzole previous to applying the collodion; or it may be briskly rubbed with a calico pad well charged with finely-powdered French chalk. This will ensure successful stripping, provided the transfer paper be good.

"I FIND it rather difficult to follow the description of the instrument for viewing lantern transparencies without a lantern, suggested in your article of the 2nd instant. May I ask, in my own interest and that of my fellow-readers, if you could kindly give rather fuller details, illustrated by a simple sketch or sectional view? This would prove very useful to all those who, like myself, intend to construct it.—B. O. S."——In reply: We shall endeavour before long to place on public exhibition one of the instruments described, with full permission to all to copy or imitate it to any extent desired. We have the satisfaction of knowing that the description we gave has proved in more than one instance sufficient to cause a satisfactory result to be obtained.

"I PROPOSE making a camera to take views about $2\frac{1}{2} \times 2$ (to be afterwards enlarged) with a snap shutter and plates or, if obtainable, films, of such rapidity as to allow of pictures being taken while the camera is held in the hand. My question, therefore, is—'What lens would be the most suitable?' I should prefer one of some depth of focus, so as to dispense, if possible, with the necessity for adjustment. I intend to use a view-meter. I read, some time back, a paper by M. Léon Vidal, in which he spoke highly of some films made by a fellow-countryman of his. Are these obtainable in London (if, indeed, you can identify them from my somewhat vague reference)?—REGD. M. SMITH."——In reply: Let our correspondent employ a portrait lens of the class intended for lockets, and which will usually cover the size of plate intended to be used in this case. If of foreign manufacture the cost will not exceed a sovereign. Should a diaphragm be found necessary, let it be placed as closely as possible to the front lens, in order to diminish the chances of a flare spot being formed in the centre of the picture. We have no practical knowledge of the films of which M. Léon Vidal has spoken; but, for pictures of such small dimensions, we think glass as a means of support will offer advantages superior to flexible films.

Exchange Column.

I will exchange a new victoria camera, with nine lenses; also, a Shew's 5×4 extra-rapid rectilinear lens for anything useful in value.—Address, C. P. GEE, Weymouth.

I have a Solomon's magnesium lamp and a 10×8 wide-angle view lens (Photo. Stores make) for exchange. What offers?—Address, CHAS. TAYLOR, photographer, Chislehurst, Kent.

I will exchange eighty-nine numbers (complete) of Cassell's *Illustrated Dictionary of Mechanics* for a pedestal and balustrade, or other useful studio accessories.—Address, A. J. G., photographer, Honiton.

I will exchange a beautiful double-plated electric machine, equal to new and cost £15, for a good half-plate bellows-body camera with double backs and lens, by a good maker.—Address, G. J. H., Post-Office, Ballincollig, Co. Cork.

I will exchange a Ross's 10×8 rapid symmetrical lens, quite new, used a few times, for a half-plate, same make, or half-plate doublet, must be good; also, wanted a solar enlarging lantern.—Address, J. COLLIS, 8, Stuart Hall, Cardiff.

Wanted, a good 10×8 Kinnear camera in exchange for a cabinet rolling-press, upright rollers, eight inches long, cost £1 4s. six months since, and a mahogany camera to take two on a 5×4 plate; photographs, three stamps.—Address, H. WALKER, 150, College-road, Bradford, Yorks.

I will exchange a four-lens gem camera, which takes twelve on a-quarter plate, dark slide, all in complete order, for a 5×4 or half-plate lens for groups, &c., or a good binocular stereoscopic camera and lenses, with dark slides, or ferrotype plates.—Address, 21, Bartholomew-street, St. Olave's Row, Exeter.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

A. SEYMOUR (Cambs.).—If you copy the cartoons in *Punch*, *carte* size, and publish them, as you propose, you will certainly get yourself into trouble. *Punch* is very jealous of his copyright.

ENTHUSIAST.—We fear you are aspiring to too much. Such pictures are very interesting as local views; but they will have little commercial value out of the district in which they are taken.

R. S. HILL.—In all probability the print was sulphuretted in the fixing bath; hence the cause of its fading so rapidly. Possibly the mountant was acid, and that further accelerated the fading.

IN THE DARK.—If the lens be three and a-half inches focus the plate wi have to be, approximately, that distance from the optical centre when the view is taken. We should recommend you to purchase some cheap work on optics.

R. B. Y.—Your surmise is probably correct—that it was the thunder that caused the emulsion to behave in the way it did. Your experience is by no means exceptional. Thunder has often a marked influence on solutions of gelatine.

B. CLARK.—If you reckon the parts as drachms or ounces, according to your requirements, whether fluid or solid, you will be correct. Heinrich's gelatine may be procured from Messrs. A. and M. Zimmerman, 27, Mincing-lane, E.C.

X. A. B.—The old makes of photographic papers—such as Canson's, Turner's, Whatman's, and others—which were used in the calotype and wax-paper processes, are not to be procured at the present time. Try *Saxe* or *Rives* instead.

J. W. WRIGHT.—If you stop out all the light from the end of the studi you will find a marked improvement in your pictures. It is having so much front light in the room which causes the faces to appear so flat and wanting in rotundity.

WM. J. J.—The process has not been published, nor is it likely to be at present, as those who work it keep the details a secret. It is, however, believed to be a modification of one invented by Mr. Woodbury—the same you refer to at the conclusion of your letter.

A. BRAY.—The want of sharpness in the pictures is clearly due to a movement of the camera during the exposure, possibly caused by the instantaneous shutter. The remedy is to make the shutter run more freely in the groove, or to get a new one on another principle.

A YOUTHFUL EXPERIMENTER.—Unless the pyroxyline be an exceptiona sample, ten grains to the ounce of solvent will be a great deal too much for collodion in the wet process, notwithstanding what you were told by the chemist. Five or six grains is much nearer the mark.

W. H. JAMES.—1. The apparatus is not yet an article of commerce; you will, therefore, have to construct it for yourself from the description given.—2. You will have to substitute another form of shutter. Any shutter that works horizontally instead of vertically will answer.

G. R. FLUDDER.—The instrument is very good, we believe, for the price. Of course it would not be fair to compare it with one costing several times the amount, such as the second you mention. With regard to the shutter: we have had no practical experience with it, so can offer no opinion.

BOS.—The washing out of the delicate half-tints of your carbon prints is due to the tissue being in a too-soluble condition; that is, supposing you have printed sufficiently deep in the first instance. The remedy is either to keep the tissue longer before printing it or to dry it more slowly. Another remedy for this evil is to sensitise the tissue in a stronger bath.

REV. J. B.—The best suggestion we can make is that you get a few practical lessons in lithographic printing from some experienced lithographer. If you understand a little of the practical portion of the work you will find the knowledge of great value in your experiments. Indeed, it is almost imperative that you understand the printing before you commence to experiment.

ECCLESIASTIC.—The "canon's uniform," referred to in the article on *Photography at a Fancy Dress Ball*, is an emendation of the "devil"—the "p. d." of course. We cannot expect him to have an intimate knowledge of things ecclesiastical, but we fail to discover the line of thought by which he connects a "canon" with a "Somerset House porter." We wrote "*curious* uniform," but then we don't write copper-plate.

NUMBER ONE.—Yes; if you dissolve silver in nitric acid you get nitrate o silver. But in dissolving your half-crown you have got nitrate of copper as well as nitrate of silver; hence the cause of the green colour. You appear to be unaware of the fact that the current coin is not pure silver, but an alloy of silver and copper, and therefore should not be employed to make nitrate of silver for photographic purposes. You will find it much better to purchase your nitrate of silver than to manufacture it yourself.

RECEIVED.—A. Conan Doyle, M.B., C.M. In our next.

PHOTOGRAPHIC CLUB.—At the forthcoming meeting of this Club, at Anderton's Hotel, Fleet-street, on Wednesday next, the 21st inst., the subject for discussion will be—*On the Relative Merits of Boiled and Ammonia Emulsions.* Tomorrow (Saturday) the members will have an "outing" to Watford and Grove Mill.

BALLOON SOCIETY OF GREAT BRITAIN.—This Society has made arrangements for holding a number of garden parties during the ensuing season. The first will be held at the Crystal Palace on Saturday, the 31st inst. Photographers who are members of the Society, desirous of being present, may obtain tickets on application to the Secretary.

CONTENTS.

THE BRITISH
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IODIDE OF SILVER IN EMULSIONS.

In our previous articles we have spoken of the beneficial restraining action which iodide of silver is capable of exercising when present in a sensitive film; and we now wish to demonstrate that a similarly beneficial effect is produced by it during the preparation of the emulsion.

Let us first mix a bromide emulsion in the ordinary manner, observing that it is strictly neutral, and before boiling divide it into two portions, to one of which a few grains—say one grain to each ounce—of iodide of potassium are added, and to the other an equivalent quantity of bromide of potassium. We have now two emulsions containing precisely the same quantities of silver and the same excess of soluble bromide; but differing in that one contains plain silver bromide, the other bromo-iodide. The colour of the latter by transmitted light will be of a deeper and browner red than the other, and it will be found upon boiling the two that the red colour is more persistent in the case of the iodide emulsion. Thus, at the end of half-an-hour's boiling, under whatever conditions that operation may be performed, it is nearly certain that the bromide emulsion will have lost every trace of red or orange by transmitted light; but in all probability the other will still retain a decided orange tint, and will give a film which dries full orange, or even red.

If the boiling be prolonged, and small quantities of each emulsion drawn off at measured intervals for trial, it will be found that not only in the matter of colour is there a marked difference between the two emulsions, but that the character of the image as well as the sensitiveness vary greatly. The image given by the plain bromide will, when a certain stage is reached, commence to grow thinner, the sensitiveness continuing to increase until a point is arrived at where the thinness of the image is so excessive as to render the emulsion useless. This thinning process, in fact, governs the degree of sensitiveness practically attainable. In the case of the bromo-iodide emulsion the process goes on, but the thinning of the image is more gradual and commences at a later point. The rate of increase of sensitiveness is about equal in the two emulsions—if anything slightly more rapid in the case of the plain bromide.

The result of pushing this experiment to its utmost limit—that is to say, of continuing the boiling in each case until the emulsion becomes useless—will be to find that a more sensitive preparation is obtainable with than without iodide. If carried to the extremest limit which will permit of the formation of a developable image, the mixed emulsion will be many times more sensitive than the other; but, confining the experiment within the bounds of practicability—that is, arresting the process before the image ceases to be of a utilisable character—we can get a sensitiveness of 3 : 1 in favour of the iodide. This, of course, involves, as will have been gathered, a longer boiling in the case of the iodide containing emulsion, the function of the latter being to retard the acquisition of sensitiveness and the production of fog and thinness of image, but the action is proportionately feeble in the first case.

That the effect produced is really a restraining action of some sort exercised by the iodide during the process of boiling is, we think, clearly proved by the fact that the addition of the iodide *after* boiling appears to be quite without effect. A plain bromide emulsion mixed and boiled to the verge of fog was divided into two parts, to one of which iodide of potassium was added in the proportions mentioned previously. In spite of the circumstance that this last emulsion would contain a larger proportion of free bromide than the other, not the slightest difference was discoverable between the two. The addition of a portion of a separately-formed and washed iodide of silver emulsion in place of the iodide of potassium produced also negative results; but when this addition was made before boiling the beneficial action of the iodide became evident.

So far we have spoken only of boiled emulsion, as our experiments with neutral mixtures have been confined to that method of preparation; but there is no reason why the same effects should not be obtained when any other method of emulsification, prolonged or otherwise, is adopted. Possibly in any of the precipitation processes the different molecular condition of the iodide of silver may cause a variation in the results, but it would not be difficult to devise a modification of the usual mode of procedure by which the beneficial action might be secured.

Turning now to the method of emulsification with ammonia—we treat the method as a principle without reference to variations of formulæ—we find the presence of iodide even of greater benefit than under the conditions already stated. The beneficial effect in this case, however, is more marked upon the quality of the image, and, of course, through that, indirectly upon the *practical* sensitiveness of the preparation. The ammonia appears to exercise a powerful sensitising action upon the iodide of silver, or, perhaps, more correctly speaking, it confers upon it the power of giving dense images. Something of the same sort may be seen if a drop of dilute ammonia be placed upon a film containing iodide of silver, when, if taken into daylight, that portion of the film will darken rapidly to a dense black.

If a series of comparative experiments similar to those referred to above be conducted in connection with an ammonia emulsion, the same general results will be obtained; but in this case the beneficial action of the iodide becomes more and more apparent (in improvement of the quality of the image) in proportion as the sensitiveness is increased.

Before finishing we may describe the method we adopted in performing the successive trials of the emulsion at different stages. At stated intervals small portions (of one drachm each) of the thin emulsion were drawn off into test tubes, and to each were added two and a-half grains of dry gelatine. When dissolved the drachm of emulsion was spread upon a quarter-plate, allowed to set, plunged into a mixture of two parts of alcohol and one of water for five minutes, then for two minutes more into undiluted alcohol, and finally rinsed over with a third application and dried. By this method a comparatively-small quantity of emulsion suffices for a large number of comparative experiments. The inconvenience of removing the decomposition salts from a large number of distinct emulsions is minimised by treating the films separately; and if care be observed we secure almost absolute identity of treatment in all cases.

In conclusion: let us impress upon our readers that we do not for one moment claim, or wish to appear to claim, that iodide of silver is more rapid than bromide, or even as rapid; but that, by utilising the peculiar restraining action it exercises, the bromide of silver itself may be made more practically sensitive than is the case when it is employed alone.

REVOLVING ADAPTER FOR LENSES.

To obtain results by the quickest and most direct means is one of the characteristics of the age, and it pervades many departments of applied science. In none, perhaps, is this tendency more definitely displayed than in what are so well known as revolving firearms. In microscopic science, too, has the principle of rapid successive action been applied, and with such an acknowledged measure of convenience and success as to have led to its further extension. We here allude to what are so well known as "nosepieces" for objectives, which, at first, double, soon became triple, and are now quadruple, in their scope. The function of these, we may here inform the non-microscopical reader, is to carry, screwed up into position on a rotating plate or adapter, a variety of objectives or powers of varying degrees of strength, which are capable of being brought in succession, and almost by a touch of the finger and thumb, into the axis of the instrument, thus enabling the observer to study any special object under circumstances of quick transition from a low to a high standard of magnifying power. In photographic optics an instance of this successive adaptation is familiar to every reader in the form of the rotating plate of diaphragms.

Taking advantage of the uniformly small sizes in which photographic lenses of great focal range are now constructed, we have for a considerable period had a battery of three lenses of this class screwed side by side on the camera front, the outer two being of similar foci for stereoscopic purposes, and the central one of longer focus for covering the whole area of the plate ($7\frac{1}{2} \times 5$) in that particular camera. This principle of utilising what would otherwise be waste space and saving an extra front to the camera is known to, and adopted by, several of our readers; but of late we have sought to carry this adapting principle much farther for single camera views in contradistinction to binocular photography.

At first we had a row of small lenses of different foci mounted upon a straight strip of wood in which were a series of notches, and into these a catch fell when any lens was brought directly opposite the aperture in the camera front. This answered its purpose well and provided the means of viewing upon the ground glass the scene intended to be depicted under various degrees of amplification, and, of course, with more or less of the subject included. Under ordinary circumstances this could only be effected by the tedious process of unscrewing one lens from the camera and screwing in another; but here it is done with a touch—the lens is pushed to one side, and a click announces that its successor is centered and in its correct position.

Although the system just described has answered the intended purpose in an admirable manner, yet of late we had experienced a desire to try a rotary system in strict analogy with the six-chambered rotating charge-holder of the modern revolver firearm. Premising that the camera is a portable one for 8×5 plates, we have a circular plate of four and a-half inches diameter revolving upon a screw in the centre, like the rotating diaphragm plate, and having five perforations round the margin. In these are screwed four small lenses of a strictly portable class, having equivalent foci varying from three and a-half inches up to twelve inches, together with a fifth lens of larger dimensions and greater rapidity of action for employment with an instantaneous shutter.

The advantage of this method of mounting lenses lies in the extreme rapidity with which any one of the battery can be brought into action at a moment's notice, and the tentative system that can be adopted without loss of time, permitting the effect to be perceived on the ground glass whether the subject be depicted by a long- or short-focus lens.

In fitting a number of lenses in this revolver fashion certain precautions are necessary, but, happily, they are only few. The rotating plate upon which the lenses are screwed must be attached to the rising front of the camera, and the circular aperture in this front must be no larger than the back cell of the lens at the front, while it must taper out rather widely at the back to admit of the transmission of an extremely-oblique ray when a lens of very short focus is employed. Again: the rotating plate upon which the lenses are screwed must be fitted so closely upon the camera front as not to permit of any leakage of light between them. But it would be almost an insult to intelligent photographers to hint that such leakage may be altogether prevented by the insertion of a band of velvet ribbon, such fact being obvious to every reader.

When only three or, at most, four lenses are employed they may be attached to the revolving piece by the usual flanges; but when, owing to their increased number and consequent proximity, there would be no room for them were such flanges adopted, then they must be affixed by other means. The most simple method is to cut an aperture in the wood of a size just capable of admitting the lens and a ring which is inserted from behind and screwed upon the lens mount. True, a flange could be employed in the usual way, having its sides cut away so as to enable the lenses to be brought close together, but the projecting plate of rotating stops would in most cases interfere with this; for, unless these were previously removed from the mount, the latter could not be screwed in its flange on account of the contiguity of the adjoining lens. But no matter by what means the lenses are screwed upon the revolving front it is necessary that there be no projections whatever upon or behind the latter.

The lenses, when brought in rotation precisely opposite the aperture in the camera front, must be retained there until a mark is made on the periphery of the circular revolver, in which a notch is eventually cut. We may add that no one who tries this system of mounting lenses will care to revert to the old and original method of screwing and unscrewing the lenses to suit the varied requirements of the subject about to be photographed.

THE NEW COPYRIGHT BILL.

Once more a new Copyright Bill has been introduced into the House of Commons, read a first time, ordered to be printed, and was issued last week. Whether it will share any better fate than its predecessors—which have been brought forward annually or several years past—time alone will determine.

In its main features the present Bill differs in no material extent from the former ones, most of the principal clauses being retained in their entirety. But some few and by no means unimportant ones have been added—the necessity of which have been suggested by the recent decisions under the old act of 1862—while others have been amended. For instance: in clause 9, which in its meaning is similar to that in former bills, we find the term "author"—upon which the now famous case of Nottage *versus* Jackson broke down—is expunged, and that of "person" used in its place. With this clause is now embodied clause 11 of the former bills, which provides that the copyright in all work executed by an *employé* is to be the property of the employer. This clause also defines the duration of copyright in photographs, which is to be fifty years from the date of publication. As this clause is one of the most comprehensive and important in the Bill we here give it in its entirety:—

9. Every person who, without infringing any copyright, shall lawfully make or have made any photograph which shall not have been published before the commencement of this Act, such person being a British subject, or domiciled in some part of the United Kingdom, at the time when such photograph shall be published, shall have the sole right of copying, reproducing, and multiplying the same for the term of *fifty years*, commencing on the first day of the calendar month in which it shall be published: Provided always (first) that, where in making a photograph a negative is first made, the said right shall belong to the maker of the negative; (secondly) that, where a photographic copy of any work of fine art is made on commission for or by request or permission of the owner of the copyright in that work, the copyright in the copy shall belong to the owner of the copyright in the work copied; (thirdly) that if any person employs another as his assistant, servant, or workman to work for him for salary, wages, or hire, for the purpose of making or assisting in making any photograph, or the negative of any photograph, the copyright in such photograph and negative shall belong to the employer, such employer being a

British subject, or domiciled in some part of the United Kingdom at the time when such photograph shall be published.

Clause 22 is framed expressly to prohibit the importation of pirated works of art and photographs produced abroad, which experience shows to be very necessary. It enacts—or will enact if it become law—that any owner of copyright, if he have reasonable cause to suspect that any parcels of goods being imported contain pirated copies of his work, may make declaration to that effect. Then any such suspected goods will be unpacked and examined by the Custom House officials, and by them detained. Notice of the detention is then to be served on the importer, and if within fourteen days an action in respect to such detention shall not be brought against the owner of the copyright, then all the pirated copies are to be delivered up to him or his agent, and will become his property.

A very important clause in the new Bill is clause 23, which enacts that anyone selling pirated copies of any photograph or work of art is bound to disclose from whom he procured them. The importance of this clause is great, inasmuch as it will enable the actual pirate to be detected and probably brought to justice. This it is next to impossible to do under existing circumstances, unless the evidence be voluntarily given by the seller. Hence, in prosecutions for infringement of copyright, it is no uncommon circumstance for the prosecution to withdraw the case as against the seller, or to ask only for mitigated penalties, upon the consideration that he will give information as to the actual producer of the pirated pictures. Upon refusal to give the necessary information a penalty of five pounds will be incurred. As this clause is entirely new, we give it at length :—

23. Every person who shall import or export, or cause to be imported or exported, into or out of any part of the United Kingdom, or shall exchange, publish, sell, let to hire, exhibit, or distribute, or offer, or hawk, or carry about, or keep for sale, hire, exhibition, or distribution any unlawful copy, repetition, or imitation of any work of fine art, in which or in the design whereof there shall be subsisting copyright, or of any photograph in which there shall be subsisting copyright, or any work of fine art upon or to which any name, initials, monogram, or mark shall have been signed, placed, or affixed in manner prohibited by section twenty of this Act, shall be bound, upon demand in writing delivered to him or left for him at his last known place of abode or business, or at the place of such exchange, publication, sale, exhibition, or distribution, or offering or keeping for sale, exchange, exhibition, or distribution as aforesaid, by the owner of such copyright or other person aggrieved, to give the person requiring the same, or his attorney or agent, within forty-eight hours after such demand, full information in writing of the name and address of the person from whom and of the times when he shall have imported, purchased, or obtained such copy, repetition, or imitation, or such work of fine art, and the number of such copies, repetitions, and imitations which he shall have imported, purchased, or obtained, and also to produce to the person requiring such information, or his attorney or agent, all invoices, books, and other documents relating to the same ; and it shall be lawful for any justice of the peace upon information on oath of such demand, and of refusal or neglect to comply therewith, to summon before him the person refusing or neglecting, and on being satisfied that such demand ought to be complied with, to order such information to be given and such production to be made within a reasonable time to be appointed by him ; and any such person who shall refuse or neglect to comply with such order shall for every such offence pay to such owner of copyright or other person aggrieved the sum of *five pounds*, and such refusal or neglect shall be *primâ facie* evidence that the person so refusing or neglecting had full knowledge that the article or thing imported, purchased, or obtained was an unlawful copy, repetition, imitation, or work of fine art.

A former clause gives power to search any premises suspected to contain piracies, and to seize them if found. Hence it will be seen that the Bill is constructed to prevent piracy as far as possible. In the new Bill the price for registration is to be one shilling, as heretofore; and for a certified and stamped copy of the entry two shillings and sixpence will be charged. This certified copy will be accepted as *primâ facie* evidence in legal proceedings that the registration has been duly effected.

Clauses 33 and 34 are quite new. The former provides that any inaccuracy in the registration at Stationers' Hall shall be no defence in case of prosecution, unless the Court be of opinion that the inaccuracies were of such a character as to cause a misapprehension on the part of the offender. The latter clause gives power to amend a registration. Upon written application the registrar of the Stationers' Company may make any correction in the name, style, place of abode, &c., of the owner of the copyright. The charge for making the amendment is fixed at one shilling for each entry corrected. This projected Bill, if it pass into law, is to take effect on the 1st of January next year.

We regret to find there is nothing in the Bill, if it pass the House, to make it retrospective with regard to such photographs as have from time to time been duly registered, under the impression that the registration was being effected in strict accordance with the requirements of the existing Act. We refer to such pictures as have been taken by paid assistants, as in the well-known Nottage-Jackson case, and were registered in the name of the employer. In all such work there is now, practically, no copyright whatever, notwithstanding that it was registered under the *bonâ fide* impression that all had been done that the law required, and this, up to the decision in the case referred to, was never before questioned.

No doubt this omission is, in great measure, due to photographers, as a body, being so generally apathetic with regard to their commercial interests in the matter of copyright. We have on several previous occasions directed attention to the necessity of professional photographers—particularly those who publish their works—banding themselves together to watch over their interest in any new Copyright Bill that might be introduced. It is scarcely possible that the gentlemen who are associated together in promoting the new Bill have any practical experience in what is actually required by photographers, but, doubtless, they will be open to any suggestions if brought forward in a definite form. So far as we are aware our advice has been disregarded. Possibly, had the desirability of making the Act retrospective, so as to meet such cases as those referred to, been brought prominently before the promoters of the present Bill, a clause might have been inserted which would have remedied the present unsatisfactory state of affairs.

Some of the clauses of the Bill, as at present framed, if it pass into law, will materially affect the system of business now being practised by many professional photographers. Next week we shall make some further remarks on the Bill as it now stands, and point out some of its most salient features affecting photographers generally, and professional portraitists more particularly.

THE PERMANENCY OF SILVER PRINTS.

The discussion on Mr. E. Dunmore's paper on *Old Photographs*, in which prominence was given to the question of the permanency of silver prints, again brought before thinking men a problem of paramount importance to the wellbeing of the art and its professors. It is one that is too apt to be lightly cast aside as a threadbare topic, the interest in which has quite ceased, and so-forth. The interest in the subject ought never to cease. Continued observations on the facts of fading, and a careful superintendence of the practice of those to whom printing operations are deputed, should be carried on by all who love their art and have a respect for their profession. The composition of a gold-toned print is complex and uncertain to an extent that forbids any conclusion of value to be drawn from their supposed composition, so that the results of actual practice, guided by certain known chemical facts regarding the production and toning of the picture, are all that have to be relied upon at the present day to enable us to solve the question—"Can a silver print be permanent?"

There is a tendency at present to propose a return to the older methods of toning; but we think a very complete discussion should take place before any such decision be arrived at. It is now about a quarter of a century since the method of toning which receives the name of "alkaline" was introduced. It was before the prevalence of the *carte* mania, and when that became so very pronounced photographers generally had had every opportunity of forming a judgment as to its possibilities, relatively and absolutely. Have any new facts been since discovered to overturn the unanimous verdict which the practice of photographers showed forth so clearly?

Those of us who are familiar with the photography of a score of years ago know very well the sort of thing the print from the old toning and fixing bath used to be—very beautiful on plain and very rich on albumenised paper, frequently permanent in the former and usually fading in the latter in a very short time—a fading quite different from the familiar alteration undergone by prints of the present day. If silver printing, as then practised by the leading men of the day, were universally carried on under the alkaline system, there must have been most excellent reasons for it.

Mr. Mayall may be said to have been at the head of professional photographers at the distant time we refer to—certainly as to the magnitude of his business; and we believe we are correct in instancing him as the last prominent photographer of the time to continue the gold toning and fixing system in the routine of the work of his establishment, his results having all the peculiar richness that so characterised that process. But in time he also abandoned it and took to alkaline toning. It would be interesting to know whether it was from a conviction of the non-permanent character of the old process, or from the greater facility for quick "output" offered by the newer.

Those were not times for a professional photographer to play at experimenting. He had to make his election; he had to decide upon the tools to use or his harvest time might pass. The election of the process to be employed came at a time when the immense increase of photographic operations was so great and so sudden that we may fairly believe considerations as to permanency were not the only ones actuating the general body of photographers. The time has now come when the question may be re-opened with the advantage of a vast accumulation of facts having been collected, and with large numbers of capable and earnest men being connected with the science.

The question is twofold in its aspect. Here we have two processes decidedly different in their mode of execution, and, to the best of our belief, embodying chemical changes of a very opposite character. Does either present possibilities of permanency, whether as at present carried on or under any possible alteration of conditions? It is the answer to this question that creates the uncertainty and confusion which undoubtedly exist, and which are increasing in intensity at the present time. It is unquestionable that many prints may now be seen toned by the old method of toning and fixing in one operation, which, though twenty or thirty years' old, are still very beautiful and apparently unfaded. There are also a large number of photographs still to be found which owe their tone to "alkaline toning," and which are equally beautiful, and also apparently as free from fading as the day upon which they were first produced.

We cannot, however, forget that the outcry against fading was very strong when the old method was in vogue, and perhaps the chief consideration that led to its abandonment was the promise of permanency given for alkaline-toned prints. Many books at one time were illustrated by the prints toned in the old way; but they faded so very rapidly that a reproach was very quickly cast upon the art from which it has never entirely recovered in popular estimation. Prints toned by the present method have also faded in large numbers; but it is our opinion, arrived at after a long and most careful weighing of evidence, that the proportion which of late years faded photographs have borne to unfaded is far less than that relatively borne by prints a quarter of a century ago.

It cannot be denied that the existence of even a few pictures after the lapse of a score of years indicate that fugitiveness of results cannot be inherent in the process, though it may be so complicated by side issues, so to speak, which cannot be thoroughly worked out, that want of permanence is the actual character of the results. That character attaches more to the old than modern processes.

Having thus laid the ground for a fair discussion of the process on its merits, we propose in our next to bring forward the more definite conclusions which it appears to us may be drawn. We may conclude by saying that we are justified in believing the chief distinction between the results of the produce of the two processes is that in the new any fading that supervenes is not necessarily in the print itself, but is owing to external influences; while in the old, not only is the print subject to the same external influences, but in the majority of instances it also contains within itself the germs of fugitiveness.

It is not often that photography gains the unqualified approval of the artist or art-critic; but so great an authority as John Ruskin has paid a very high compliment to a photograph. Referring to an ink-photo. portrait of himself, printed by Messrs. Sprague and Co., he writes:—"The portrait is out-and-out the best yet done of me."

It is a new feature in the character of an operator that is sought by an advertiser in another column. The operator, preferably a lady, must "have tact to cope with the ignorance and manners of a shabby-genteel neighbourhood." The neighbourhood, however, is one that is far from considering itself "shabby-genteel."

By the way, it is news to us that the unit of time, the second, belongs to the metric system, nor did we know that it was due to the originators of that mode of measurement; yet, in the article described in another portion of our columns, *La Nature* speaks of "the illustrious founders of the metric system, and the admirable system of weights and measures they have founded. All scientific measurable quantities are now expressed in terms of the three fundamental units—the centimètre, the gramme, and the second."

Willesden paper—a communication on which was recently read before the South London Photographic Society—was the subject of a paper read before the Society of Arts the other day, and which seemed to create considerable interest. It appears that the manufacture may be said to have been in hand for a considerable time, but many practical difficulties have stood in the way; they are, however, now removed, and a very large demand ought to spring up for the material. We see nothing whatever to stand in the way of its employment for many photographic purposes. For temporary studios it possesses manifest advantages, as also for the many little odds and ends in alterations which a photographer more than most men is so frequently carrying out. As a temporary roof, even, during summer months it must be of great value, while for dishes for development it should form a very valuable cheap substitute for the expensive ebonite. The Willesden Company make a solution for uniting the surfaces together, though experience in its use is required to perform the operation satisfactorily. The *rationale* of the manufacture is simple:—An ammoniacal solution of copper, which possesses the property of dissolving cellulose—paper, &c.—is allowed to partially act upon the surface of the material selected, which is then dried, when it has a varnish-like, impermeable surface of dissolved paper. Very full details of the process and its application at Willesden are to be found in the *Journal of the Society of Arts* for May 16th, to which we refer those of our readers who may desire further information.

When "solar enlargements" were more in demand than they now are, an instrument for keeping the rays of the sun in a constant direction would have been an important consideration; but its use at the present time would be more for astronomical or spectroscopic photography, for which, particularly if it were not expensive, there should be a demand. Dr. Johnstone Storey described such an instrument before the Royal Dublin Society, there giving to it the name "local heliostat," on account of its being capable of use anywhere in the British islands without any special adjustment being needed. He stated that this local heliostat had hitherto been made with mirrors about six inches by three for use in physical laboratories; but the design has been rendered so simple that it could be made at a small cost with a mirror as large as a toilet glass and driven by a cheap, common clock—a form which Dr. Storey points out would render it useful in photography.

Solar photography formed the chief topic of discussion at the last meeting of the Royal Astronomical Society, our esteemed contributor, the Rev. S. J. Perry, of Stoneyhurst, having started the discussion by an interesting paper on solar spots. Colonel Tennant rather objected to drawings of such appearances. "What we want," he said, "are photographs of sun spots on a larger scale than they have hitherto been taken, so that we may study the rapid changes which take place." This was being done on a large scale at Potsdam, it was stated, but not with sufficient frequency. Mr. Brett caused

H. BADEN PRITCHARD, F.C.S.

INK-PHOTO, SPRAGUE & Co LONDON.

some laughter by remarking that "it is easy to exaggerate the accuracy of photographs. Photographs are liable to misrepresent appearances unless they are taken by artists."

This is a very far-reaching assertion, as artists are usually supposed to fight shy of photography. They, or some of them, let others photograph, and "set" the results in the framework of an evolution of their inner consciousness.

Mr. Norman Lockyer reminded his hearers, at the same meeting, that the subject of good observational work was necessarily mixed up with the "brutal question of finance." He believed that all future observations would be made photographically. "No one now, for example," he said, "would think of drawing the nebula of Orion after what Mr. Common has done; and, if we are to do anything for the people who come after us, we must hasten to obtain a complete photographic catalogue of the whole heavens. We picture to ourselves, in a hundred or thousand years hence, a gallery filled with photographs which will give a complete picture of every part of the heavens, from the North Pole to the South. The great telescope will be charged with twelve plates at a time, which can be exposed by means of an electric magnet, and the whole work of the observer will consist in reducing and comparing the photographs. I hope members of the Society will agree with me that it is our duty to do what we can to provide such a celestial library to those who come after us."

We can cordially re-echo Mr. Lockyer's wishes, and we should be glad to find that, whenever such work is carried out, those for whom such photographs are taken may really see them as they are produced, and not through the translation of an engraving executed by an artist, possibly one who knows nothing of either photography or astronomy. We would again impress upon all who are connected with such work the desirability of letting photography tell its own tale. If it be the valuable aid to science which is generally admitted, why should its evidence be smoothed and made pretty to such an extent that deductions may be drawn from incorrect premises where rigorous exactitude should obtain? We shall not tire of harping upon this string till we see photographs of spectra, sunspots, stars, and comets—in fact, of all phenomena of scientific interest—brought before the scientific public as photographs (it should be known by every one now that permanency can be easily ensured) and not as pretty examples of the engraver's art.

With the unerring certainty of the camera to check too exuberant exercise of imagination the illustrated papers—at anyrate in scenes near home—may be expected to keep fairly close to literal truth, and photography in that sense subserves a most useful end. Thus, the recent earthquake in Essex offered a fine field for exaggeration; but negatives have been secured of the effects, and at the Royal Society's *conversazione* the week before last photographs of the damaged buildings were shown, that all might see the actual extent of what really was a disaster.

THE LATE H. BADEN PRITCHARD.

The late Mr. H. Baden Pritchard, whose sudden death was briefly announced a week ago, and whose portrait embellishes our present number, was the third son of the late Andrew Pritchard, well known as a microscopist and the author of the *History of Infusoria*, as well as the constructor of diamond microscopic objectives of high refracting power. Mr. H. Baden Pritchard was born in November, 1841, and at the age of twenty entered the Royal Arsenal at Woolwich, where he remained without intermission until the date of his death, and where, many years past, he had had the direction of the photographic department.

In 1868 Mr. Pritchard joined the Parent Society, to the council of which he was elected in 1870. Two years later he became its Honorary Secretary—an office which he continued to hold for three or four years—and in 1883 was elected one of the Vice-Presidents. On the formation of the Photographers' Benevolent Association Mr. Pritchard was elected Honorary Treasurer, which office he held continuously to the time of his death. Mr. Pritchard contributed numerous papers to the Parent Society, and occasional articles appeared from his pen in various journals, but chiefly in the *Photographic News* with which he was intimately connected as a contributor for many years, and of which he became managing proprietor on the death of Mr. George Wharton Simpson, a little more than four years ago. But photography alone did not claim Mr. Pritchard's energies for he was a prolific contributor to general literature, the range of his powers extending from newspapers leaders, scientific essays, and lighter magazine articles to three-volume novels. In the last-named department he gained some distinction with *Dangerfield*, *Old Charlton*, *George Vanbrugh's Mistake*, and *The Doctor's Daughter*, while his *Tramps in the Tyrol*, and his latest effort—but just published—*A Trip to the Great Sahara with the Camera*, by "A Cockney," showed his capabilities as a descriptive writer.

His connection with literature necessarily brought him in contact with men of all sorts and conditions within the circle which is supposed to constitute "Bohemia;" but the modern Bohemia differs widely from the shady and loose mode of life with which tradition and outside popular opinion are too ready to connect the name.

A member of the Savage, Whitefriars, Urban, and other literary clubs, Mr. Pritchard was intimate with many of the foremost men in connection with literature, art, science, and the drama, and his bright, genial disposition, his fund of humour, and his kindly nature made him friends everywhere. In social life he was especially a favourite, and whether the occasion were a children's party or a more sober literary gathering he was equally able and willing to contribute his quota to the general enjoyment. Many of our readers may have had the opportunity of hearing some of his humorous songs—a number of which were his own composition—at recent annual dinners of the South London Photographic Society and Photographic Club, while those who have the *entrée* of the narrower circles of the Whitefriars and Solar Clubs are aware that he was one of the moving spirits in both.

Mr. Pritchard was passionately fond of travel, and had penetrated almost every country of Europe, with many of which he was nearly as familiar as with England. His latest journey, from which he returned but a few weeks ago, was to Algeria and the Great Sahara, and already his experiences in that new field have been printed and published.

In 1873 Mr. Pritchard married Miss Evans, whom he met at the house of his friend Mr. H. P. Robinson. This lady and four children survive to mourn his untimely loss—a sorrow that will be participated in by a very large number of friends in the circles of photography, literature, and art.

The funeral took place on Thursday, the 16th instant, at Abney Park Cemetery, within but a short stone's-throw of the last resting-place of his former friend and predecessor, G. Wharton Simpson. The hearse bearing the coffin (heaped high with flowers and followed by several private carriages) arrived from Blackheath shortly after half-past four. A brief address took place, and the coffin was lowered into the grave where already lie his father, a sister, and a nephew; and, after a last look from sorrowing friends, who again showered flowers and wreaths upon the coffin, the crowd of mourners separated.

In addition to the immediate relations of the deceased a very large concourse, including many ladies, assembled in the cemetery. We counted upwards of thirty faces from amongst the photographic friends of the deceased, while, in addition, there were many members of the Savage, Whitefriars, and other clubs to which he belonged, including amongst them leading representatives of science, literature, art, music, and the drama.

Looking around on the sea of faces during the delivery of the mournful address, it was easy to see that no mere feeling of curiosity or of formal duty had drawn many to the spot. The sorrow was unmistakably genuine; and the large attendance, despite the fact that no public notice had been given of the sad event, spoke volumes for the esteem in which Mr. Pritchard was held.

Our portrait is from a photograph by Chevalier Lafosse, of Manchester, and is remarkably characteristic of our departed friend.

PACKING DRY PLATES.

This is just the time of the year when such questions as that of the best method of packing dry plates are likely to assume an importance in the minds of many landscape photographers which they do not possess during the stay-at-home period of the "off" season. In fact, as the photographer begins to form his plans for the coming campaign or for his summer holiday he will, if he be wise, pass in review his experience of the previous season, with the object, wherever possible, of improving his arrangements.

To the travelling photographer there is, perhaps, no single question which has given rise to so much doubt and difficulty as that of packing plates. I do not, of course, refer to mere packing for storage purposes, but packing for travelling, where it is necessary to combine under the head of general convenience the qualities of compactness, portability, facility for packing and unpacking, and, of course, safety from breakage. There are many ways of securing each of these qualities separately, but perhaps *the* perfect combination of the whole remains yet to be discovered.

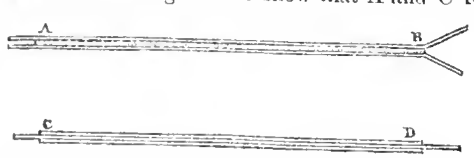
In the course of many years' dry-plate work I have tried, I think, every method of packing that has been suggested—from the bulky grooved plate-box to the mere insertion of slips of cardboard between the borders of the plates. The comparative hardness of the gelatine film, and its consequent less liability to injury than collodion, renders the matter of packing somewhat simpler nowadays; but, on the other hand, the greater sensitiveness necessitates a method which enables the plates to be unpacked, transferred to the slides and repacked with the utmost celerity, and, sometimes, in absolute darkness, in order to avoid fog. A plan that I used for some time with satisfaction on short journeys consisted in simply placing sheets of smooth tissue paper between, and in contact with, the surfaces of the films; but I found that if kept for a few weeks in this manner the plates became liable to markings of various sorts.

About this time I noticed Mr. England's method of using cardboard masks the size of the plate with the centre cut out, leaving a narrow frame an eighth or three-sixteenths of an inch wide, which, when placed between two films, came in contact only with the borders. Here seemed to be the very thing that was required; but, upon making inquiries of a mount-cutter for a supply of such masks made of very thin cardboard, I found he would only undertake the order at a price that was perfectly prohibitory, the separating masks costing about twice as much as the plates. I then set about building up a supply of the frames after the manner mentioned by Mr. England, by joining strips of card by means of squares of paper pasted on to the corners. The process was a slow and tedious one. The frames were not always square, and, when made, were very iable to break at the corners; but the three or four dozen I made answered their purpose so much better than anything I had previously used that I resolved to adhere to the principle, and, if possible, improve the method of manufacture.

I think I may say I have succeeded in simplifying the method and accelerating the speed of manufacture, and in producing a mask which is practically as strong as, or even stronger than, a cut-out cardboard one; and, as the method will be useful to others, I will briefly give it.

The weak point in Mr. England's masks is the difference in strength between the cardboard and the paper corners; if the mask be bent or strained the paper breaks. It struck me that by building up the masks of different thicknesses of paper instead of cardboard, and dovetailing, or rather "mortising and tenoning," the corners together the necessary strength would be gained; but at first sight the trouble of manufacture seemed likely to be greatly increased. After one or two experiments, however, I found in the latter respect the reverse to be the case. Here is the method of working:—

Take any good smooth and tolerably-stout paper, and cut it into pieces of any convenient length and of the following widths—the length is immaterial, the width important:—Two strips a quarter of an inch *wider* than one dimension of the plate, and one strip an eighth of an inch narrower than the same dimension; then two strips an eighth of an inch *narrower* than the other dimension, and one a quarter of an inch wider. The two sets of three are then pasted together sandwich fashion, with the two longer (or shorter) strips outside and the odd one in the centre, as shown in the diagram, which represents an end section of the compound sheets. An examination of the figure will show that A and C form what



the joiner calls a "tongue and groove." When quite dry, the two surfaces of the projecting portions at C and D and, if necessary, the inner surfaces at A and B are well gummed (the latter being opened, as at B, for the purpose), and again allowed to dry.

We have now a three-sheet cardboard with its edges tongued and grooved. By means of a sharp penknife and straight edge the sheets are cut into strips, three-sixteenths of an inch wide, in the direction of A B, C D. These strips, which present the same sections as in the diagram, are fitted together after the manner of a school slate-frame, the gummed extremities being moistened with the tongue, placed together, and pressed into contact with the thumb and fore-finger—four such operations, which occupy less than a minute, completing the frame.

As an example, suppose the masks are required for a half-plate ($6\frac{1}{2} \times 4\frac{3}{4}$): we cut two strips of paper $6\frac{3}{4}$ inches wide and one $6\frac{1}{8}$ inches for one dimension, and one strip 5 inches and two $4\frac{5}{8}$ inches wide for the other dimension. If the composite sheets are cut into strips three-sixteenths of an inch wide they will form, when fitted together, masks one-eighth of an inch smaller each way than the plate, the corners crossing like an Oxford frame. When dry the corners are trimmed square with the scissors. The masks made in this manner will bear any degree of rough usage within reason without breakage, and they form the best means of packing either plates or negatives that I have ever tried. In the course of a single evening a sufficient number may be made to pack a gross of plates. I have timed myself and find that, having the composite sheets ready to cut up, I can easily cut the strips and put together six dozen masks (sufficient for a gross of plates) within an hour and a-half; so that however complicated the description may look on paper there is but little trouble in practice.

With regard to the completion of the packing of the plates: I place them in pairs face to face with a mask between, and these are wrapped in half-dozens, two such packets (sometimes three if the plates are thin) being enclosed in one of the cardboard boxes in which commercial plates are issued. For convenience in unpacking and repacking when away from home only one thickness of orange paper is placed round each packet inside the box; and for protection from light I trust to the box itself and its outer wrapper of brown paper. If commercial plate-makers would expend more of their energies in wrapping the boxes and less in wrapping the plates they would, I think, save a good deal of dark-room bad language.

For convenience of packing in absolute darkness, or by the feel as in a changing-bag, I put the plates direct into the box without wrapping. The first plate is laid face upwards and on it a mask, these being pushed into one angle of the box, the two containing sides of which act as guides; the second plate follows face downwards, and so on until the box is full. The ordinary commercial boxes will be found to allow sufficient room for the insertion of the finger to pick out the plates; and this extra space, when the plates are packed, can be filled up with a wedge of paper to keep the plates firm.

In conclusion: I can recommend this method of packing to all who study comfort in travelling. I also apply it myself to the storage of negatives, which, if kept in the usual grooved boxes, take up sadly too much room. I keep mine in the ordinary boxes in which the plates are sent out, with a memorandum of the numbers of the negatives pencilled outside for reference. C. Beckett Lloyd.

THE NEW STANDARD OF LIGHT.

Writing of the International Conference upon standards, whose conclusions upon the light standard we described in our last issue, *La Nature* speaks of the great stress it lays upon the subject. "Up to the present time," it says, "the quantity of light emitted from a given source was estimated by means of arbitrary units. In France it was the Carcel lamp, and in England and Germany the candle. Other standards have been proposed—the Schwendler, Girond, Vernon Harcourt, Siemens, &c., standards. None of these lights satisfied the conditions that ought to be fulfilled by a representative standard. These conditions are indeed numerous. The standard must be constant, it must be able to be reproduced at any time and any place, it must be of a convenient size relative to the quantities to be measured, and, in fact, it must lend itself to an exact comparison with those quantities. The last condition involves a requirement particularly difficult to satisfy—that of colour. The standard itself ought to possess a sufficiently-white colour to be comparable with modern lights, and in all cases to show in the spectroscope the whole range of the scale of colours, so that light of any colour whatever may be compared with that of the standard in each part of the spectrum."

This, as our readers will see, has a most important bearing on the use of such a standard for photographic purposes; but it necessarily adds to the difficulties of finding an efficient substitute for the fused platinum. "This comparison," the editor continues, "is necessary in exact measurements. All natural lights being formed from the superposition of different simple lights, the intensity of each of these simple lights should be measured by comparison with the corresponding portion of the spectrum."

M. Violle had proposed to the International Congress, in 1881, a scale satisfying all the required conditions. It is the light emitted by a square centimètre of fused platinum at the temperature of solidification. This temperature is very great (1775° C., according to M. Violle's measurement), and, in consequence, the light emitted is whiter than that of the Carcel lamp or a candle; it most nearly approaches that of an incandescent electric light. The radiation, like the temperature, is absolutely constant during the whole period of solidification, and it can always be repeated exactly similarly, since it is derived from a natural phenomenon unvarying of itself. The light is the same from all points of the radiating surface—a very valuable quality which enables any desired multiple of the unit to be obtained in a moment by taking a surface two, three, &c., times as large.

Some practical difficulties concerning the production and maintenance of this unit were the only obstacles in the way of the conference of 1880 immediately adopting it. These difficulties have been cleverly surmounted by M. Violle in a series of experiments carried on for the last eighteen months in the cellars of the *Ecole Normale;* and the conference of 1884 has definitively adopted his unit.

SOME EXPERIENCES OF A BEGINNER.

[A communication to the Leeds Photographic Society.]

The use in the dark room of light which has passed through ruby glass is attended with many disadvantages, and a yellow light is far preferable. The light from a small benzoline lamp, after passing through one thickness of "canary medium," exerts a considerable effect on a gelatino-bromide plate if the latter be exposed directly to it; but this light can be used with safety if care be taken to keep the plate covered up during development, and to expose it to the light no more than is necessary for proper examination.

Development.—Any method of development in which the whole of the ammonia is added to the pyro. at once gives the operator very little control over an over-exposed plate, and indeed throws away the principal advantages of pyro. development. The ammonia solution should be moderately strong and ought to be added gradually to the pyro. as the course of development indicates. The relative proportions of ammonia and ammonium bromide differ greatly in different formulæ. In some the amount of bromide is much too small; in a few it is too large. A solution containing—

Ammonia, ·880	1 ounce,
Ammonium bromide	½ ,,
Water	9 ounces,

forms a convenient stock solution for all makes of plates. One drachm of this solution added to one ounce of water containing two grains of pyro. will develope a properly-exposed quarter-plate.

When sodium sulphite is used with the pyrogallol in the developer the solution becomes much less highly coloured, and remains clear during development; hence the progress of the change can be more easily seen than with the ordinary developer. The shadows are kept clearer, and there is much less tendency to fog. But the sulphite exerts a certain restraining action, and in order to gain good printing density the plate must be left in the developer much longer than is necessary when using plain pyrogallol. The amount of sulphite usually recommended is unnecessarily large; twice as much sulphite as pyrogallol is quite sufficient, and the solution should be acidified with sulphurous acid in preference to citric acid. My experience refers only to solutions which have been kept not more than a week, and does not extend to solutions which have been kept for a long time.

Intensification.—When intensifying by means of mercury the gradations of light and shade in the negative can be preserved if care be taken not to keep the plate in the mercury solution too long, and if in the subsequent treatment the ammonia be added gradually instead of all at once. Dr. Eder's uranium method usually gives satisfactory results, and has the advantage that uranium ferrocyanide is soluble in alkalies; hence, if the intensification have not been satisfactory, the deposit can be removed by treatment with dilute ammonia, and other methods of intensification can afterwards be applied.

Reducing Negatives.—In reducing negatives by means of ferric chloride it is best to use a moderately-dilute solution, and care must be taken not to keep the plate in the liquid too long. A convenient strength of solution is—

Ferric chloride	1 drachm,
Water	8 ounces,

and the plate should be allowed to remain in it for one, two, or three minutes, or longer, according to the amount of reduction required. The brown stain, which is usually produced, can be removed by means of alum and citric acid. This method of reduction diminishes the contrasts in the negative.

In all cases where processes are applied to plates which have been dried, and especially if they have been alumed, it is advisable to leave them to soak in water at least three hours, in order to bring the films into a homogeneous condition.

Reproduction of Negatives.—Negatives can be readily reproduced by making a transparency by the ordinary contact method, and then printing a new negative in the same way from this transparency. The new negative may be even better than the original, since contrasts can be increased or diminished at will by varying the proportions of pyrogallol, ammonia, and ammonium bromide in the developer.

Instantaneous Work.—Instantaneous photographs taken with very short exposures are valuable from a scientific point of view, but are frequently inartistic. Any impression received by the retina of the eye persists for about one-tenth of a second, and it follows that all motions taken place during this interval are compounded by the eye into one resultant motion. If the exposure be only one-fiftieth of a second, or even less, phases of motion are represented which are never actually seen as distinct positions; and to obtain artistic pictures the exposure should not be less than one-twelfth to one-fifteenth of a second. Very good pictures of such subjects as breaking waves can be taken with an exposure of this duration made with a simple drop shutter.

C. H. Bothamley, F.C.S.

ON THE CORRECT REPRESENTATION OF COLOURS BY PHOTOGRAPHY.

The task of all reproducing arts, to which photography belongs, is to represent the tones of the original in their proper proportionate values—that is to say, the light shall be represented by light and the dark parts by dark. That a photograph does not rightly fulfil this task, when dealing with a coloured original, is well known; it, indeed, often gives the opposite of the original. The light part, if it be yellow, often comes out dark, and the dark part, if it be blue or violet, white. This contrariety is most vexatiously distracting when paintings have to be copied, but that it also displaces values in portrait photography every photographer knows.

Until now negative retouching has been employed successfully to grapple with this drawback. Since Milster showed, eighteen years ago, what a distinguished artist could make of a negative after an oil painting, the reproduction of oil paintings has grown to be quite an important branch of German art industry, which has considerably injured the copperplate and lithographic branches, and has in the shortest time made the most striking masterpieces of modern time accessible to the whole world. But the progressive spirit of discovery is not contented with the present, however good it may be. The reproducing photographer sets himself new and great tasks—the replacement of the silver print by a mechanical process, and the substitution for retouched negatives of direct photographs upon plates specially prepared to offer sensitiveness to colour.

The first of these tasks has already frequently occupied our attention in these pages, and efforts to produce something resembling Goupil's photo-engravings have, as is now well known, been crowned with success. The second point, however, still merits a more particular description of the newest efforts which, in the matter of representing difficult colours, especially in old pictures, give astonishing results. We saw lately, at a meeting of the Association, two reproductions of an old Italian painting—one by Braun, of Dornach, and the other from a Berlin establishment. The difference was as between light and day. The Berlin one showed broad black spots, where Braun's one was full of details which a person could see were not owing to retouching on the negative. Equally astonishing was the difference between Braun's copy and that of a Münich firm of a Cornelius fresco, and, further, a copy of a choir stall with coloured interstices in the Berlin Museum, in which the values of the tones were most faithfully maintained. Here the problem of representing in almost their true proportionate value at least some colours was solved, and by the practical application of the principle, discovered by me eleven years ago, that bromide of silver can be rendered sensitive to the so-called chemically-inactive rays by the addition of substances which optically absorb these rays (*Mittheilungen*, vol. x., p. 233).

This discovery was at the time of its publication doubted by men such as Carey Lea and the late Monckhoven, and its alleged incorrectness was attempted to be shown by experiment. The British Journal of Photography also laughed at the whole thing, and it was not until a year after that Becquerel proved experimentally that these observations were correct. Still, men like Captain Abney continued to doubt as before. In 1875, on the occasion of the British expedition to observe the eclipse of the sun, Major Waterhouse, at Calcutta, saw my photographs of the red and yellow parts of the spectrum, taken on coloured collodion. A year later he repeated this experiment with the most complete success, and indeed added new dyes to the regions of his researches. Until that time the thing had only been worked out scientifically. But so far back as in 1873 I had the good luck to photograph a dark blue band upon an orange ground in the correct proportionate shades—that is to say, the blue dark and the yellow light.* Yet years passed away before any practical use was made of these observations. In 1877 Ducos du Hauron and Albert made a beginning. They aimed

* For corroboration of all these statements see *Mittheilungen*, vol. xi., p. 97; vol. xii., pp. 196 and 247; vol. xiii., pp. 16, 197, 223; vol. x., p. 257.

high. They not only wished to represent colours by monochrome, but colour by colour—an attempt which offered great difficulties, because in the latter case nature does not itself counterfeit its own colours, but these have to be selected by the printer. (See Vogel's *Lehrbuch*, 3rd edition, and *Mittheilungen*, vol. xiv., p. 176). Albert and Ducos used coloured collodions and coloured glasses. With the latter they cut off the access to the plate of colours, the action of which they did not wish. (I had already employed this means in *Mittheilungen*, vol. x., p. 237.) The labours of Cros, of Paris, were parallel with these experiments.

Lately, attempts have been made to apply the same principle to gelatine plates also. I published my experiments in that direction in *Mittheilungen*, vol. xvii., p. 15. The best medium of absorption for these plates proved to be eosine, which has also been used for collodion plates by most investigators who have experimented on this point. The eosine-gelatine plates of Clayton and Tailfer are already a commercial article. The action of eosine upon bromide of silver is explained in my *Lehrbuch*, and made clearer by an illustration. By it the sensitiveness to yellow is considerably increased, and that to blue lessened. The latter effect is also apparent when other dyes are used. This circumstance—the weakening of the sensitiveness to blue along with the increase of the sensitiveness to yellow—is of very great importance, since, were it absent, in photographing dyes the blue would act as powerfully as the yellow, and appear as light as the latter.

When I examined spectroscopically some of Clayton and Tailfer's plates I found that they were about twice as sensitive to yellow as to blue; their sensitiveness to red is, on the other hand, no greater than that of ordinary plates. The above-mentioned sensitiveness to yellow was, however, not sufficient to make it possible to take yellow pigments alongside of blue ones, and to represent their relative tone values correctly; for yellow pigments are very considerably darker than the yellow rays of the spectrum (Vogel's *Lehrbuch*, p. 157). I then tried whether it would not be possible to still further increase the sensitiveness of the plates to yellow, and, at the same time, to amend the faulty sensitiveness to red. *I have succeeded in doing both. I have prepared wet collodion plates which are at least eight times as sensitive to yellow as to blue, and, besides, exhibit a sufficient sensitiveness to red.*

The results are briefly:—1. Upon gelatine plates not only does eosine act, but also cyanine and methyl violet. Of fuchsine I have already said that it does so. These dyes, in accordance with the theory I propounded eleven years ago, render gelatine plates more sensitive to those parts of the sun's spectrum at which they show bands of absorption. But the sensitising action of dyes upon gelatine plates is very much less than upon collodion plates. The difference in that respect between bromide of silver sensitive to blue and that sensitive to indigo is the most striking (*Mittheilungen* for 1883, page 99).—2. The impression of light which many dyes suffer can be rendered developable. If, for example, fuchsine be exposed for a *very long time* to the action of the sun's spectrum, in the presence of nitrate of silver, the latter is reduced, and when treated with a physical developer (solution of ferrous sulphate) shows a distinct image. Since as yet there are but few substances which, like chloride, bromide, and iodide of silver, admit of physical development in presence of nitrate of silver, it would be interesting to see the range of such enlarged by organic substances. If one should succeed in rendering particularly sensitive to light organic substances available in this way, the basis of a new photographic process would be obtained. That fuchsine and other dyes exposed with nitrate of silver to the spectrum are only sensitive as above to the rays *absorbed* I merely mention as a matter of course. The correspondence which here shows itself between absorption and chemical action is wonderful, and offers the investigator a sure guide in further experiments. He who knows the absorption and how to judge of the spectrum can measure the action of the dye in advance.—3. Only dyes of high absorbing power act as sensitisers on the silver salts. The conditions under which a dye stuff acts as a sensitiser are different for each substance, and must be determined for each substance separately by experiments with the spectrum. Apparently it will prove on further experiment that many dyes which have until now been considered nactive are capable of acting. H. W. Vogel, *Prof.*
—*Mittheilungen.*

THE TEMPERATURES INSIDE GLASS STUDIOS.

Has the question ever been raised in the photographic world of the advantages and disadvantages of building glass photographic rooms with two surfaces of glass, the one twelve or eighteen inches within the other? Out here in Switzerland nineteen houses out of twenty, even the poorest habitations, have double windows, in moderate time the extra expense of construction being saved in the cost of fuel, less fire being then necessary to sustain the temperature of the room, in addition to the great extra comfort conferred and the freedom from draughts. The plan would somewhat lessen the light for photographic purposes, by giving four reflecting surfaces instead of two, and by giving two slightly absorbing layers instead of one; but in these days of quick gelatine plates these two objections may not be of practical optical importance. If, however, they were of importance, portions of the inner layer of glass might be made to slide away temporarily, during the time only of the taking of a portrait.

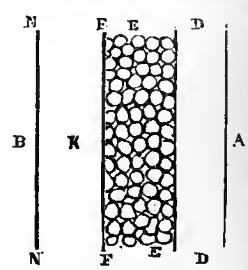
The extra cost of fuel with but one layer of glass is astonishing to those who have never tried the difference. If a glass door in a public Swiss café is not made double like the windows, but opens directly to the outer air, the seats near it are deserted by the frequenters, the temperature there being so much lower than in other parts of the room, for which reason a kind of double entrance is commonly constructed. In hotel bedrooms when the inner window is opened in cold weather a sudden chill is felt, because of the layer of cold air between that and the outer one. The distance between the two is usually about one foot, and in some few houses the intervening space is utilised as a small greenhouse, the lower part being filled with mosses, ferns, and flowers. One reason of this superior building here is that the Swiss house-dwellers are their own landlords, and land is a free article of commerce. Hence the houses cover more space, and the people have no interest in possessing "jerry" buildings—to tumble down as near the end of a lease as possible; they build solidly, and the bulk of the population have homes far more comfortable than are generally known in England. In England the people are overcrowded and squeezed into a very limited space in towns, so that it is not so easy to get extra room for the larger glass studios herein suggested.

Another item in the saving of cost of fuel in Switzerland is the stoves, in which all kinds of fuel can be burnt—but coke most economically. There is no smell from the stoves, this being avoided by giving them a much larger heating surface than is usual with us; the heat being spread over a larger area in the stove, the surface of the latter has a lower temperature than our small ones.

A Swiss room with double windows—the size of that in which the Photographic Society of Great Britain holds its meetings in Pall Mall—can be kept comfortably warm with coke by a Swiss stove at a cost of from one penny to twopence a day, although fuel is dearer here than in England.

The larger stoves are usually cylindrical, some of the old-fashioned ones for burning wood being as large as locomotive boilers placed on end, but the size of the modern ones is not so excessively large. Their chimneys consist of concentric thin iron rings, and are bent about near the ceiling in elegant curves, like the scaly tail of a dragon, so that by their great length they may give up all their heat to the room before they enter the stone chimney proper of the house. Here again, in the power of using large stoves, the Swiss feel the advantage of their great space inside towns and houses. There is a very thick lining of fire-brick between the iron exterior of the stove and the fire; in fact, after the large stove has been well heated it will warm the room long after the fire has gone out. The stoves have intelligently-made air and smoke valves, by which the combustion of the fuel is regulated more than by poking. The poker, in fact, is scarcely ever used, but is available if wanted. These stoves have also an arrangement for warming air inside as well as outside themselves, and of discharging the air so warmed into the room.

The accompanying diagram represents the side of one of a Swiss cylindrical stove, as manufactured by Herr Weltert, of Sursee, in which town he has the largest manufactory of the kind in Switzerland. In this cut A is the interior, or place of the burning fuel of the stove, and B the exterior. The inner wall, D D, is of fire brick, about three inches thick. Then comes a layer of small, rounded river stones, E E; these stones are a peculiar local variety, which will bear much heat without crumbling to pieces under it. F F is the inner iron skin of the stove, and N N the outer iron skin; between them is the air space K, in which fresh air from outside the house is warmed before entering the room. In the morning the stove is half filled with coke, on the top of which a small coal fire is lit to ignite the upper part of the coke below. The doors of the stove are then closed, and throughout the day the amount of combustion is governed by regulating the quantity of air supplied to the fire. The coke being lighted at the top, the fire consumes its own smoke and burns slowly. Several minor scientific details might be added, but what has been stated will give a general idea of the construction.

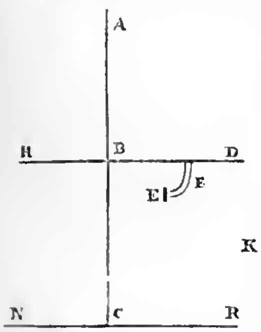


Another advantage of more household space, if it were as obtainable in England as on the continent, would be that those studios would be more numerous in which it is possible to use lenses of long focus. There is no doubt that lenses of short focus will not do, generally speaking, such good work as the others, especially in these days of quick plates. The best photographer in Milan scarcely ever uses his portrait lenses, although they are made by the best opticians of England and Germany; he finds that he obtains better pictures with an aplanatic doublet, partly because it has fewer reflecting surfaces. If ever I had to do with portraiture I should really try quick plates with a long-focus single landscape lens made to cover a plate much larger than that in use, employing at the same time a large stop. It would be a good thing if the brilliancy given by a single lens with only two reflecting surfaces could be utilised in glass-house portraiture. Besides the focus of a lens should always be as long as the distance at which the portrait will be held from the eye by any person viewing it, to give the best results.

All this implies the power of building a long and large glass house. One objection in England is the dirty air of cities caused by the fuel wasted in the form of coal-smoke; also the deterrent photographic influence of fogs when they enter long rooms. Interruptions of work from such causes would be infrequent, and it is possible to apply a remedy. The public could enter by one pair of double swing doors at the bottom of the stairs, and another pair at the top, so that they would only momentarily let in a little of the outside air on entering; whereas the bulk of the air in actual use in the room could be drawn through another channel, and be filtered from the dirt it had been carrying outside. Cotton wool is the best and cheapest material for filtering air. The air might enter the room through a pipe two feet long and one or two feet in diameter, loosely stuffed with cotton wool, and then be passed through the air-warming part of the stove before it escapes into the room. This plan would baffle the fog and dirt demons. The late Mr. C. F. Varley, the electrician, used to filter the air breathed in his earlier private residence, Fleetwood House, Beckenham, Kent. The house was subsequently purchased from him by Captain Halpin, of the Great Eastern steamship; I do not know if the apparatus be still there, but cotton-wool was the filtering medium employed.

As at present constructed nothing can be worse for temperature than a glass photographic room. It gives the heat of a greenhouse in summer, and is kept warm in winter by great expenditure of fuel, but with a layer of more or less chilled air near the glass. If constructed with double layers of glass it would be one of the best rooms in the world for temperature, air being such a bad conductor of heat. It is not the fabric of our clothing, for instance, which keeps us warm, but the air entangled in the interstices of the fabrics. Blankets are, therefore, so very warm because of the large quantity of air they entangle; and fur dresses, with the fur inside instead of outside, are about the warmest to be had by travellers in polar regions.

A double-surfaced glass house offers facilities for being kept cool in summer by cooling the air as it enters through the artificial channel. The English Houses of Parliament are the best-ventilated buildings in Europe, and the air for them is chiefly cooled in summer by means of the lowering of temperature produced by the evaporation of water. The principle may be explained by the aid of annexed diagram, in which A B C is the wall of the house; D B C R cloisters opening into a courtyard at K, and H B C N is a room for temperature-regulation beneath the floor of the house. A B H is the house, and the hot or cold air enters it from below through its perforated iron floor, on which is a string carpet of wide mesh. The foul air escapes at the top of the house, and is discharged through a shaft in the Victoria Tower, the draught being caused by a fire constantly burning at the bottom of the tower, on the colliery-ventilation principle. E is one of a series of metal buttons in the cloisters, against each of which a jet of water is driven through the pipe F. This water is driven with great force, so that it bursts into spray by impact on the button, which spray evaporates to some extent in the damp cloisters.



At B C are large sheets of very coarse canvas, through which the cooled air passes, and on which it deposits some of its London dirt, so that the canvas requires frequent washing. It is long since I examined these arrangements, but I have no doubt they are still in use, as the building is constructed to harmonise with them. Sometimes, in hot weather, unscientific members of Parliament open windows to cool themselves, forgetting that they are already supplied with cooler air than obtainable directly from outside.

To get artificially-cooled air into a glass room in summer it would be necessary, in the absence of a fire, to set up artificial circulation. This could be done by a long iron pipe, three inches in diameter, rising from the roof, with a gas-jet burning at its lower orifice inside the house. This plan of ventilation is common in Switzerland for public smoking rooms.

W. H. Harrison.

Werthenstein, Switzerland, May 1, 1884.

ON THE DETERMINATION OF THE DURATION OF THE EXPOSURE.*

II. Regular Circular Motion.—In order to produce a regular circular motion which can be photographed various means are employed :—

(*a*) *The Movement of the Index Hand of a Clock*, the pendulum of which has been removed. As one will immediately perceive, such an arrangement can only be used when the index is moved rapidly enough; but that would never be the case with an ordinary clock for really short exposures, because, even if the progress of such a one becomes sixty times faster owing to the removal of the pendulum, still the minute hand would only go round the dial once in sixty seconds, and one would not be able to demonstrate fractions of a second thereby. But if a second hand were there which would now pass round the dial in one second, if it stood out white upon a black ground it would be sufficient to demonstrate an exposure lasting from about one-sixtieth to one-hundred-and-twentieth of a second. For shorter exposures even that would still not be sufficient.

(*b*) *The Revolution of a Spindle Set in Motion by a Weight*, where a wind-sail serves as regulator.—Perhaps for the purpose now in view such a spindle running easily on a pivot, and furnished at one end with an indicator and also with a wind-sail, is the best instrument, because by the heaviness of the weights and the size of the wind-sail one has complete control over the duration of the revolution, and can accelerate it at pleasure. Of course the index must be white here also, and must pass before some kind of black dial upon which the divisions of a circle are marked off, from which the duration of the exposure can be distinctly read. The length of the exposure can also be easily ascertained even without such a division, since, if the indicator be as long as r, if it go round the dial n times in a second, and if during the exposure its tip have described the course d, then the duration of the exposure t is equal to—

$$t = \frac{d}{2 r \pi n}$$

c. The Course Passed Over During the Exposure by a White Rod Swung Round Regularly by a Man in Front of a Dark Background, or a White Ball Fixed to a String and Whirled Round in the Same Way.—Also by this method it is necessary, when determining very short durations of time, to swing the object round as rapidly as possible; each revolution should, indeed, not last longer than a second. The calculation is then made by means of the formula already given.

d. With the Help of Attwood's Falling Machine.—A powerful top weight is placed upon it, and when it has gone a considerable way one causes it to be raised by the ring, and photographs during the regular motion now produced.

e. The Movement of a Ball Running Downwards in a Groove of Known Inclination, and then proceeding in a horizontal direction.—This method is much less exact than the preceding. If x be the angle of inclination of the groove, then the accelerating force is $g \sin x$.

As Heavy as Possible a White Ball is Allowed to Fall from an Exactly-Known Height in Front of a Dark Background, and an Exposure is Made During the Fall.—The instantaneous shutter must be set free very quickly after the ball is allowed to fall. Now, if from the picture one ascertains that on the shutter being opened the ball had already got as far as s, and when it was closed as far S, then one knows that for the corresponding times t and T give the equations :—

$$t = \sqrt{\frac{2s}{g}}; \; T = \sqrt{\frac{2S}{g}}$$

From which, as the time of the exposure, we obtain—

$$T - t = (\sqrt{S} - \sqrt{s}) \sqrt{\frac{2}{g}}$$

This method is, perhaps, the most suitable for determining the length of very short exposures, especially if a great height be available for the fall. A very excellent ball is secured by filling a glass globe, silvered on the inside, with small shot, and letting it fall in front of a dark surface upon which the sun shines. The globe will then reflect an image of the sun of small diameter.

B.—The Objective or the Sensitive Plate Moves, or Both Move Simultaneously.

It is evident that by this method the time of the exposure can be determined if one take a bright, white rod or a similar circular spot in front of a dark background. Yet the two first methods of proceeding are hardly to be recommended, as it would be extremely difficult to endow either the plate or the objective with a regular, exactly-known, and well-isolated movement. It is otherwise with the third case. A camera can very easily be placed upon a pivot and made to revolve with a constant rapidity round a perpendicular axis. For this purpose a special camera stand will have to be constructed, the top of which can be made to revolve by means of a hand-winch. For less exact determinations it is also possible to take hold of the camera by one's hand and so turn it round; or, finally, one can suspend it to a cord revolving by being twisted, or to one of the revolving show-frame contrivances. Now, if the focus of the objective be f, the number of revolutions in the second n, and the distance traversed in the picture d for the time of the exposure t, one gets—

$$t = \frac{d}{2 f \pi n}$$

This method is, as one sees, very convenient, because it is not necessary, as in A b, first to settle the actual movement from the picture, because that is given almost directly by the measuring off of the picture by the aid of a short division. But, on the other hand, since it is difficult to make the revolution so regular and certain by this method as by that, it cannot, therefore, compete with it in respect to

* Concluded from page 512, vol. xxx., 1883.

exactitude; yet the ease with which a single person can, without other apparatus than a light camera, determine the duration of the exposure, makes this method seem especially worth recommending for most practical purposes. FRANZ STOLZE, Ph.D.

—*Wochenblatt.*

FOREIGN NOTES AND NEWS.

AWARD TO PROFESSOR VOGEL.—A NORWEGIAN PHOTOGRAPHIC SOCIETY. —THE BEHAVIOUR OF IODIDE OF CADMIUM TO ETHER.

AT an extraordinary general meeting of the Berlin Association for the Cultivation of Photography, held on the 16th ultimo, it was resolved to found a prize of 1,000 marks (say £50), and to award it to Professor H. W. Vogel as an acknowledgment of his discovery of the collodion process as sensitive to colour and in recognition of his services to photography in general and to this Society in particular, both as founder of the Society and as its guide and President. The process of which mention is made above is not a method of photographing in colours, but of representing colours photographically in their true values. A detailed description of the process, which Dr. Vogel has not patented, appears elsewhere. [See page 327.] It seems that for photographing paintings or other coloured objects the collodion process is far superior to the gelatine, but that the collodion plates had better be dry than wet.

In Norway a photographic society has been founded under the name of the *Del Fotographiske Selskab.* The office-bearers are—*President*, L. Szacinski; *Vice-President*, Fr. Klein; *Treasurer*, C. Wichman; *Secretary*, H. Abel.

In the *Chemiker Zeitung* Herr Georg Buchner calls attention to the very peculiar behaviour of iodide of cadmium towards the so-called "pure ether" of commerce, as it furnishes an easy and rapid means of testing the purity of the ether, and has also special merits in the case of ether which is intended for the preparation of iodised collodion for photographic purposes, as iodide of cadmium is also employed for that purpose. Herr Buchner observed the reaction in question once when he was preparing an etherial solution of iodide of cadmium. In a quarter of an hour the solution became yellowish, and by the end of a day it had become a brownish-yellow, while, at the same time, the solution first became turbid and then deposited a small quantity of a white precipitate. As the ether used did not discolour litmus-paper, and therefore seemed free from acid, and, as there did not appear to be any other impurities present, he at first thought the cause of the phenomenon must be that an etherial solution easily absorbed oxygen, and that that would give rise to the reaction observed by simultaneous separation of the iodine and formation in the ether of insoluble iodide of cadmium oxide. But, as every ether did not give the same amount of reaction, and as one sample of ether afterwards procured hardly gave any reaction at all, he became convinced that the cause must lie in some impurity in the ether itself. He then observed that the strongest reaction of all was given by a sample which had been supplied to him as the very *purest* absolute ether, and by another sample which he had himself rectified over chloride of calcium. A small quantity of ether distilled over iodide of cadmium furnished a distillate which remained perfectly indifferent to iodide of cadmium, even when heated on the water-bath, which otherwise accelerated the reaction. 22·0 grammes of absolute ether were distilled over iodide of cadmium. The distillate was colourless, and the almost dry residue was a brownish-yellow. The residue was flowed over with alcohol, when it dissolved, assuming a brownish-yellow colour, and throwing down a white precipitate. The precipitate was washed with alcohol and dried. It weighed 0·103 of a gramme. The brownish-yellow solution, containing the iodine thrown off, combined with the washing water, gave, when subjected to volumetric analysis, with one-tenth of normal sodium thiosulphate, 0·06096 of a gramme of iodine. This quantity corresponded to 0·17 of a gramme of decomposed cadmium iodide, from which one would find by calculation that there had been 0·118 of a gramme of iodide of cadmium oxide (of which, as shown above, 0·103 of a gramme was actually found). Though Herr Buchner is, for the moment, unable to give more exact details regarding the substances on which this reaction is produced in commercial ether, yet from the foregoing it is seen that the quantity is not inconsiderable, and that by rectification over iodide of cadmium the iodide can be purified from it. He thinks it is apparent that this impurity is the reason why iodised collodion often becomes so rapidly red. To test ether take about 0·2 of a gramme of iodide of cadmium in a test-tube, then add ten c.c. of ether, and place it for an instant in the water-bath. Should the ether be impure it will become coloured in a few minutes, the depth of the colour varying from pale to golden yellow. It will then become a brownish-yellow and turbid, and throw off a white precipitate of iodide of cadmium oxide. Under the same circumstances pure ether remains perfectly colourless.

EASTER MONDAY WITH THE CAMERA.

PORTSMOUTH is never at any time a dull place. The coming and going of men-of-war and of transports, the large garrison, the crowds of "blue jackets," and the annual fashionable influx into Southsea—all prevent its ever becoming so. When the town is *en fête*, however, and puts up her triumphal arches, decks herself with gay ribbons, and assumes her other coquettish airs, she is as lively as any Spanish city in carnival time. Those who had the good fortune to see her last Easter will not readily forget her attractions.

From Saturday to Monday the main streets of the borough were a gay spectacle. Above, every variety of flag and banner were festooned across from house to house, or fluttered from window or roof. Mottoes, devices, and illuminations glittered and glanced on every side. The pavements were crowded with uniforms. Blue marines and red marines, linesmen and dragoons, royal artillery and blue jackets, volunteer artillery and engineers, spruce London Scottish and grey Artists, riflemen, black, blue, red, and grey from the metropolitan corps—all swarmed and jostled and pushed from one end of Commercial-road to the other. Very serviceable the citizen soldiers looked, with bayonet and water bottle, blanket and haversack—ready apparently to go anywhere and do anything, more particularly to drink. Considering that on Saturday night there were some fifteen thousand men in the town order was wonderfully well preserved. There was only one disturbance of any consequence which I observed, where some regular engineers having given offence to a few volunteers a free fight ensued, in which a couple of sailors joined, fighting apparently like Hal of the Wynd—each for his own hand and with the strictest impartiality. In this skirmish the volunteers had decidedly the best of it, and remained in possession of the field.

Easter Monday morning broke bleak and raw, and it became a problem of some difficulty to know how camera and stand and carriers were to be conveyed to the top of the Portsdown ridge, some three and a-half miles from the town. Vehicles were at famine prices, and even the 'bus companies had run up their fares in a way which prompted all public-spirited citizens to "boycott" them. As my two companions and myself included ourselves in the category we proceeded to put our principles into practice—a resolution which led to sore heels, blisters, and much dust and exasperation. As far as we can learn, our abstention had not any perceptible effect upon the market value of 'bus shares. We have given up "boycotting" large companies since then.

Trudging along three miles of very dusty road with a camera in one's hand is not the most blissful of human employments, more particularly when the crowd upon the footpaths the whole way is so thick that you have to regulate your pace by that of others. You tread on the heels of those in front of you, and, while they are expressing their opinion of you and of your proceedings in flowery and scriptural language, you are yourself trodden on by those behind. Vehicles of every sort and description clattered along the causeway, and as no rule of the road appeared to be observed it was dangerous to go off the footpath for a moment.

The lines of Hilsea having been passed, the first sign of warlike operations became visible in the shape of a pontoon bridge thrown across the canal by the engineers to allow the garrison to make their sortie. A little further on in a bye-road there stood a commissariat waggon of the London Scottish, with a guard of half-a-dozen men smoking round their stacked rifles—a pretty little warlike "bit" for the photographer; but the hurrying, remorseless crowd prevented any possibility of taking it. We were glad to reach the prettily-decorated village of Cosham, and gladder still to get a glass of bitter beer, for we were coated with dust and as dry as if we had swallowed Paley's *Evidences of Christianity.*

The battle was to begin at twelve o'clock, and as we were anxious not to miss any of the slaughter we made a forced march so as to get on the ridge before that hour. There is not a finer natural theatre in the world than the Portsdown hill and the country around it, nor any place where such a large number of spectators can follow operations upon a large scale and grasp the drift of them. On one side beneath you is the village of Cosham and the little town of Portchester, with its historical castle, and on each side the broad stretches of Portsmouth harbour and Langston harbour. In the background lies the great Hampshire seaport itself, and beyond it the silver streak of the Solent, bounded on the horizon by the long, well-wooded shores of the Isle of Wight. On the other side the declivity is as sharp, and the spectator looks down on an undulating, fairly open country, rolling away for some twelve miles to Butser Hill and the Petersfield district. The main roads stand out like lines of chalk—as, indeed, many of them are—upon the landscape. Both views, to the north and to the south, make splendid photographs, but we had already done them justice and were in quest of rarer game.

To understand anything about the manœuvres it was necessary to have a highly-trained imagination. To grasp them thoroughly argued an immense power of fancy, only to be obtained, as one of my companions declared, by the aid of stimulants. The great forts which line the summit of the ridge, and command the country round for miles, are to be supposed not to exist. This is out of consideration for the wives and families of the invading army. Then the sea is also abolished and put out of the question. For the day Portsmouth was an inland town, defended by a garrison of some two thousand men. A reinforcement of four thousand or so are on their march from the westward to strengthen the place. An enemy, however, numbering ten thousand or so, comes down from the north in a highly-reprehensible and vindictive manner, and interposes itself between the town and the relieving column, and endeavours to prevent its getting into the town. This was the cause of all the trouble.

Looking down at the wooded country to the north and west it was difficult to believe that some fifteen thousand troops were within a radius of a few miles. The mystic hour of twelve arrived, and whereas we civilians had fondly imagined that that moment would be the signal for a roar of firing, for hidden troops to rush out of ambuscades, and for a general lively time, to our intense disappointment nothing whatever occurred. The landscape was as placid as before, and not a human being to be seen in the north valley except an occasional staff officer or umpire galloping furiously along.

Presently a couple of Middlesex Yeomanry, with their carbines unslung, came trotting along the ridge, followed by twenty or thirty of the same corps. These were the extreme advance guard of the northern force. Almost at the same moment a brass-helmeted body of men, looking like a mounted fire brigade, came galloping up from the other direction. These were the scouts of the western army. There was the material for a pretty little cavalry skirmish, and the crowd's flesh began to creep; but no gore was shed, for the Middlesex men scampered back to their supports and the Hampshires dismounted and occupied some broken ground in mounted infantry fashion. We tried a plate over this manœuvering of cavalry, but it was not a success. The dim weather necessitated a somewhat long exposure, and it was no easy matter to keep our camera on its legs, or to get a clear foreground in front of the lens.

By this time there was a glitter of arms away to the eastward, and column after column of troops—black, grey, and red—appeared in sight marching up the valley, with a double line of skirmishers in front of the leading brigade. This was the attacking force. Their advance was directed towards the relieving or western army, but a rattle of musketry in the distance showed that the garrison had made a *sortie* and were engaging the flank of the invaders. At the same moment the head of the western force began to appear near Fort Southwick, and very shortly the skirmishers of both sides were hard at work. The sight in the valley now was a pretty one. Two long lines of smoke showed the position of the hostile skirmishers. Behind these on both sides were regiments hurrying up in open order to join in the fray; behind that again was the main body coming up in columns of companies, while the cavalry, finding the situation becoming somewhat warm, were slowly retiring. We would have found it impossible owing to the crush to have done any good work was it not for the kindness of a sergeant of mounted engineers, which corps was keeping the ground. Seeing our difficulty, he very kindly allowed us to come outside the line of demarcation, and so to work without having the apparatus broken or being elbowed off our legs. In this way we succeeded in getting a series of plates of the proceedings; but, as I have said, the weather was against any very brilliant results.

In the meantime there were terrible doings in the valley. The fighting line of both sides had been strongly reinforced, until it had absorbed the greater portion of either army. These two long lines were blazing away at each other with the greatest *sang-froid*, at distances which varied from fifty yards to two hundred. Occasionally a regiment would rise and make a rush forward or backward in a way which would have entailed a premature interview with their Creator had it been done in actual warfare. The reckless hardihood of these men was almost incredible. They were too brave to lie down, so they strutted about regardless of rifles and Nordenfeldts, with a cool contempt of danger which came like a revelation upon one of my companions, who had seen some real hard fighting in his lifetime, and who bore in his waistcoat pocket a certain piece of bronze called the Victoria Cross—as honestly earned as ever a decoration was. "Why," he remarked, "there wouldn't have been any of them left at all. They would have been utterly annihilated;" and we forthwith began planning out graveyards and arranging for the decent interment of the belligerents.

So far we had, all things considered, no reason to be dissatisfied with our day's work from a photographic point of view. When the "cease firing" sounded, however, and the march past was about to begin, we found the crowd so dense about the saluting point that photography was not only out of the question, but it was absolutely necessary for us to abandon our apparatus if we wished to see anything ourselves. Handing it over, therefore, to the care of a friendly sutler, we elbowed our way through the crowd—there must have been more than a hundred thousand people on the side of the hill—and eventually secured a position not very far from the staff, where were the Duke of Cambridge, Prince Edward of Saxe-Weimar, the popular Governor of Potsmouth, and many others of light and leading, including the French military *attaché*—a gaudy warrior in red trousers and sky-blue coat, who seemed, to judge by his expression, to think very small beer of our citizen army.

The march past began with the scanty force of yeomanry, and then for rather over an hour regiment followed regiment until the whole had gone by, some of the principal ones being cheered by the crowd. The local Hampshire corps, some eight hundred strong, went by in the opinion of experts in better style than any of the metropolitan regiments, which may be explained by the fact that belonging to a military town they have constant opportunities of imitating and competing with the regulars. The Victorias, the Artists, the London Irish and Scotch, the Westminsters, the Second Sussex Artillery, the Inns of Court, and the Tower Hamlets all did well. The Nordenfeldts—grim-looking machines, pulled along in the rear of the Victoria Rifles—created considerable curiosity among the crowd. "What's them?" asked one fellow near us. "Them's the regimental cookin' apparatus" another answered, with a look of superior wisdom. "For cooking the enemy's goose" we ventured to suggest, but that joke fell upon barren ground and was lost. Taking them all in all the general opinion seemed to be that, though there were a good many weedy men in the ranks, the average of physique was very fair—undoubtedly superior to that of most of the present short-service regiments.

There was one episode in the fight upon Saturday which was somewhat amusing. Among the defenders there was a troop of the 4th Dragoon Guards—the heroes of the Kassassin charge—and these slashing horsemen took a great delight in chasing and chevying any of the opposing yeomanry who came near them, thinking, no doubt, that it was capital fun to take a "rise" out of these amateur soldiers. One innocent-looking yeoman, after this game had been going on some time, rode straight towards the dragoons, and then, as if surprised at finding himself in the jaws of the lion, turned and fled. Away clattered the whole troop in hot pursuit, and rode right into a nice little ambuscade prepared by the Westminster Rifles, where they were all made prisoners. The innocent-looking yeoman had been a decoy duck, and the crestfallen dragoons rode back, sadder and wiser men.

With the conclusion of the march past the proceedings terminated, and the various regiments began to file off the ground in different directions. Our sutler had moved off with his cart containing the camera and carriers, and it took an hour's seeking before we discovered him. However, at last we unearthed the delinquent and recovered our invaluables, after which we turned our backs on the battle-field, where the carrion crow was already flapping its heavy wings over the empty ginger-beer bottles, and struck out for home.

Just outside Cosham we overtook an omnibus, which, for a wonder, was not full. We said nothing, but looked at each other. Should we be partners in bolstering up this monopoly—this indefensible overcharge? We had spent the last week in denouncing it. Were we to submit to it now? We got inside the 'bus while we were turning the question over in our minds, and arrived at Portsmouth before we had been able to come to any definite conclusion. A. CONAN DOYLE, M.B., C.M.

THE ROYAL INSTITUTION.

A LECTURE BY PROFESSOR DEWAR.

ON Thursday, the 15th instant, Professor Dewar, in the course of a lecture at this Institution on *Flame and Oxidation*, showed that platinum black would liberate iodine from iodide of potassium.

Professor DEWAR threw some platinum black into a solution of iodide of potassium and starch, and the liquid was coloured blue by the iodine thereby liberated. He stated that this was due to the oxygen which the platinum black carried down with it, and showed that platinum black taken from under boiled water to first get rid of its oxygen had not the same effect. By the same power platinum black oxidises alcohol into acetic acid. Professor Dewar also stated that the oxygen gas liberated by the leaves of trees under the influence of light does not appear to be ozonised. The enormous heat of burning magnesium is just strong enough to partially decompose carbonic acid; but how the leaves of trees do it under the influence of light is a mystery. The red rays of the spectrum are most active in setting up the decomposition by the leaf, and the action of sunlight is clearly a deoxidising one. The carbon is not deposited in a pure state, otherwise it could not be carried into the plant. It seems to be produced in the first instance as sugar, which afterwards changes to starch, or possibly starch is produced first and sugar afterwards. Starch cannot be carried about in the plant; hence the inference is that sugar is produced first. He then exhibited the liberation of carbonic acid gas from a liquid, under the action of the light from the electric lamp, but did not say what the liquid was.

DR. ODLING ON CURIOUS PROPERTIES OF HYPOSULPHITE OF SODA.

Last Friday evening Dr. William Odling, F.R.S., lectured at the same Institution on *Oxygen in Water*. Sir Frederick Bramwell occupied the chair. Among the listeners were Professor Tyndall, Mr. William Crookes, various other men of science, and a few members of the nobility. The auditory was a fairly large one. In the course of his lecture,

Dr. ODLING said that 100 volumes of water at 0° C. dissolve 4·11 volumes of oxygen, and at 15° C. dissolve 2·99 volumes. Bunsen was the first to determine this. At 0° C. 100 volumes of water dissolve 6886·10 volumes of sulphurous acid, and at 15° C. 4356·40 volumes; at 0° C. 114800·00 volumes of ammonia, and at 15° C. 78270·00 volumes. In some way these gases are reduced to the liquid state in the solution, and the bulk of the original water is thereby increased. At 45° F. one gallon of water dissolves 2·199 cubic inches of oxygen gas, and at 70° F. 1·797 volumes. By weight, water contains about four grains of oxygen per cubic foot in summer, and five grains per cubic foot in winter. Variation of barometric pressure causes a small fraction of a grain difference of oxygen in each cubic foot of water. Although these proportions may seem small, the quantity of liquefied oxygen carried in water in a short time over Teddington Weir, on the Thames, can be reckoned by tons. It oxidises the sewage lower down to some extent; consequently the oxygen in river waters tends to keep the streams pure and sweet. In explaining the methods now adopted by chemists to estimate the amount of oxygen in river waters he (Dr. Odling) said that hyposulphite of soda or of lime is used, but not exactly the hyposulphite of soda used by photographers, which is in reality thiosulphate. The salt used by him bleached the ammoniacal solution of copper, and deoxidised indigo, magenta, and iodide of starch. He showed, by experiment, that a solution of white indigo turned blue when mixed with water containing air, and that when a solution of hyposulphite of soda is added to such blued water it has the choice of deoxidising either the indigo or the air in the water; also that it deoxidises the water first, after which it decolourises the indigo. Thus the quantity of hyposulphite of soda added to the water before it decolourises the blue indigo bears a direct relation to the quantity of oxygen in the water, and affords a means of estimating its amount. In one experiment he (Dr. Odling) added just enough hyposulphite of soda to decolourise the liquid, and then poured it from one glass vessel to another. In its passage it took up oxygen from the atmosphere, and, consequently, fell into the second vessel as a blue liquid—a striking result which "brought down the house" in the way of applause. The lecturer then gave the results of various analyses of the water of the Thames, in relation to the proportion of oxygen it held in solution. At Richmond it had nearly its proper quantity, and as it came into contact with sewage the quantity gradually decreased. In London the quantity was very low, and off Erith the water contained but half a cubic inch of dissolved oxygen instead of two cubic inches per gallon. Near the mouth of the Thames the proportion of oxygen rose again to within ten per cent. of its proper amount. Although river water is a very weak solution of oxygen it must be remembered that it also contains but a small amount of sewage in proportion to its volume. Oxygen thus renders harmless a proportion of the sewage; but it is not certain as yet whether, in river waters, it destroys those minute living organisms which are the germs of certain diseases. On this point the opinions of scientific men at present differ greatly.

RECENT PATENTS.

PATENTS SEALED, May 13, 1884.

No. 5,204.—"Improved Method of Producing Surfaces for Mechanical Ink Printing by Means of Photography." HARRISON GARSIDE.—*Dated November* 2, 1883.

No. 416.—"Improvements in Apparatus for Storing and Applying Developing and other Chemicals for Photography." G. D. MACDOUGALD.—*Dated January* 2, 1884.

PATENTS APPLIED FOR.

No. 7,678.—"Apparatus for Washing Unmounted Photographs and the Like." A. McDONALD and T. W. KENDALL.—*Dated May* 14, 1884.

No. 7,746.—"Adjustable Instantaneous Shutter for Photographic Purposes." (Complete.) T. FURNELL.—*Dated May* 15, 1884.

No. 7,792.—"Instantaneous Shutter for Photography." W. HEATH.—*Dated May* 16, 1884.

No. 7,853.—"Retouching Photographs by Aid of Electricity." G. BROWN.—*Dated May* 17, 1884.

PRODUCING PRINTING BLOCKS BY MEANS OF PHOTOGRAPHY.

THE following is the provisional specification of Mr. W. B. WOODBURY.—*Dated October* 5, 1883.

My invention relates to surface blocks by the aid of which typographic prints may be obtained in the ordinary printing-press, and it has for its objects novel methods of giving to photographic negatives or positives the necessary qualities to produce from them such surface printing blocks.

These qualities have usually been obtained by breaking up the continuous half-tone of the negative or positive produced in the ordinary way by photography into a series of lines, simple or crossed, dots, or grain similar to that produced by a lithographic stone or by effects similar to network or gauze. From negatives or positives so produced printing blocks have heretofore been obtained either by making reliefs in the well-known way and pressing such reliefs into the surface of metal, or by transferring to zinc and then etching; also by exposing negatives so produced over a sheet of zinc covered with a substance having the property of becoming insoluble by the action of light, such as bitumen, or gelatine and bichromate of potash, and after removing the soluble parts etching the parts left bare. These processes are and have been for some time in ordinary use, and my invention consists in new or improved methods for the production of negatives or positives suitable for the purposes above described.

In order to put my invention in operation, I procure a series of negatives or positives from such objects as fine ruled lines, netting, gauze, dots, or a print from a grained stone. I use these as "resists" from which I make in the ordinary way what is well known as a carbon transparency, and I transfer the same by the ordinary method to the negative or positive and by then washing away the soluble portions I give them the necessary qualities. Or, sometimes I make a photolithographic transfer and I transfer the same to the negative or positive, and if sufficient density is not obtained I dust bronze or other opaque powders over the image, so increasing it in force.

In another method which I sometimes adopt, by means of what is known as the dusting process, I coat a sheet of glass with a compound of gelatine or albumen, grape sugar, and bichromate of potash, and after exposure under a negative or positive I sift over it suitable granular powders, or the material used for flocking paper, thus producing a grain negative or positive suitable for the purposes already described, or I coat a negative or positive with the same solution, and I treat it in the same way as the plain glass.

Or sometimes by means of what is well known as the Woodbury process I make a relief image from the combination of the negative or positive and any of the various resists mentioned, and by rolling or other convenient pressure I make a reverse relief of the same in a sheet of enamelled or glazed cardboard. This image I ink over carefully with an ink roller, and I transfer in the ordinary the image so produced to zinc for etching, or to stone for lithographing.

Or sometimes I take a gelatine relief, developed on glass by the Woodbury process in the usual way, and, having warmed the relief, I pour over it melted wax, paraffine, or similar suitable material, and on this I lay a sheet of plate glass, previously greased and warmed, and after squeezing out the superfluous wax I allow it to cool. When set I detach the glass, leaving a smooth and even surface of wax filling up the hollows of the relief. Over the surface so prepared I pass backward and forward a fine, flexible, and elastic V-shaped tool in the same way as in an ordinary planing machine, the tool cutting deeper or shallower lines according to the depth of the wax; the same operation is then performed in a transverse direction, giving a series of cross-lines varying in depth and thickness, and from this I take an electrotype, from which I take a second one, which forms the printing matrix.

APPARATUS FOR EXPOSING SENSITISED PHOTOGRAPHIC PLATES OR FILMS.

THE specification of Mr. JOHN EDWIN ATKINSON, of Greenwich, for the above invention is as follows:—

My invention relates both to indoor and outdoor photography, and consists in improved means or apparatus for holding and protecting sensitised dry plates or films either for transit or storage, and for enabling the plates or films to be readily placed in position for exposure in the camera and removed therefrom after exposure in open daylight, whereby a number of such plates or films are rendered more conveniently portable than in ordinary double backs, changing-boxes, or other costly and inconvenient apparatus as heretofore constructed.

My invention consists in the employment of envelopes made of cardboard, *papier maché*, or other light and cheap material in the form of a square or rectangular frame, constructed to carry one or two plates or films (preferably one plate or film only), having an opening at front rather smaller than the plate or film to be carried. This opening of the frame is closed by a sliding shutter, preferably flexible and sliding in grooves or otherwise, and the plate or film is introduced at the back of the envelope (when constructed to carry one plate or film) by being laid therein, face downwards, and the envelope is merely closed at the back by four loose flaps respectively attached to its four sides and merely folding down over one another, or by other suitable means whereby a light-tight closure is ensured.

The plates or films are carried preferably each in its own envelope, and the camera is provided with a "back," being a receptacle or box which is adapted to fit against the back of the camera, and is hinged thereto or fitted in slides thereon so as to be readily moved in and out of position to enable the operations of focussing and exposing to be expeditiously performed. This box or receptacle is of a size to exactly contain one envelope; it has an opening at front corresponding to that in the envelope, and a door at back at which the envelope is introduced, and a slot at one side to enable the slide or shutter of the envelope to be withdrawn.

The operation is as follows:—The envelope containing the plate is placed in the box or receptacle, the projecting portion of the slide or shutter of the envelope being passed through the slot in the side of the receptacle. After focussing the picture in the usual way the "back" is placed in position for exposure, and the shutter or slide of the envelope is drawn out through the slot in the "back." After the exposure is terminated the shutter is pushed in and the envelope removed from the "back," the exposed plate which is still contained therein being subsequently developed at leisure.

The focussing-screen is hinged to the camera, and the hinges are so constructed that the screen may be folded against the rear of the "back" in packing the camera for transport.

[The final specification is illustrated with three sheets of drawings, showing in what manner it is proposed to carry the invention into effect. We are led to inquire if the patentee be aware that dark slides or "envelopes" formed of paper, together with frames by which to adapt them to the camera, have for some time been manufactured and more or less extensively employed in this and other countries?—EDS.]

CHANGING BOX AND DARK SLIDE COMBINED. By Dr. HEINRICH KAYSER, of Berlin.

My invention relates to the construction of photographic exchange boxes, the object of which is to permit the removal of the exposed plates and to bring a fresh plate in its place in full daylight, without being compelled as heretofore to slide the box or case into a second case in order to be able to effect the said manipulation, *id. est.*, the exchange of a fresh plate for the exposed plate.

By employing my construction of exchange boxes I am able to exchange a series of twelve to fifteen plates when glass plates are employed, and expose them consecutively.

The front or foremost plate lies just behind the slide in suitable position for exposing, and is, after being exposed, withdrawn and placed behind the other plates which have not been exposed. For this purpose one end of the box or case is made to act as a door, so that the exchange can be readily effected by inserting the hand; as, however, the plates must be entirely withdrawn from the box or case, and it is necessary to exclude the light, I employ a sleeve of suitable material, capable of excluding the light, which is slid or pushed over the arm of the operator. A suitably-arranged spring or springs presses or press against the movable partition or false bottom of the box or case, and hold the series of plates firmly against each other when the outer or foremost plate is to be exposed, whereas a device is provided so that the pressure of the spring can be removed, and so that the plates rest loosely against each other and can be readily exchanged.

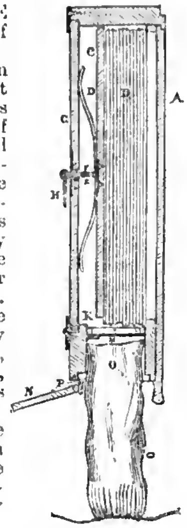
The accompanying drawings represent my improved exchange box or case in section.

A is the slide for closing the box or case, behind which the plates B, which are to be exposed, are arranged so that they rest against the frame of the box or case.

The single plates are separated by an intermediate layer of black or other paper through which the light cannot penetrate, which said layer is loosely attached to the back of each plate. The plates B are continuously pressed against the bearing surface of the frame by means of a suitable spring acting on the movable or false bottom, so that the front or foremost plate is kept in focus.

I represents the side of the box or case which is formed to act as a door, which said door lies snugly against the two ledges or rails K and L, and is movably connected with the box or case by means of a piece or strip of canvas, leather, or other suitable material which is glued or otherwise attached to the box or case frame and clamped tight by means of the ledge K or a suitable joint; hinge or hinges can be employed to the like purpose.

The ledges K L serve also to hold the sleeve O of suitable fabric which will exclude the light, which said sleeve can be folded up and carried in the space M of the box or case between the door I and the outer door N, to the exchange box or case, which said door is provided with suitable hinge or hinges I. The requisite play for enabling the plates to be readily exchanged, is attained by drawing back the false bottom or partition C towards the bottom of the said box or case, thereby compressing the spring or springs D, which can be effected by connecting a rod or spindle E to the false bottom C, which said rod E is provided with a suitable knuckle or other joint F and reaches through the bottom G of the box or case. The outer end of the rod E is provided with a ring H, so that by pulling this ring outwards the joint F is drawn to the outside of the box or case, the spring D compressed, and space or play for the exchange of the plates in the said exchange box attained, whereby the false bottom C can be retained in the position mentioned above by simply giving the outer end of the rod E a partial revolution of 45° around the knuckle or other joint, so that the said outer end of the rod E lies flush, or about flush, with the bottom or back of the box or case.



As soon as the exchange of the plates has been effected the rod E is returned to its original straight position by means of the ring H, whereupon the plates are again firmly compressed by the intervention of the false bottom C and the spring D. My improved exchange box or case for photographic plates possesses, in comparison with the ordinary exchange boxes, not only the advantage of the enormous reduction in weight, but also of being able to employ plates of various sizes; for which purpose it is only necessary to insert a suitable, adjustable, or readily removable ledge to lessen the length or width of the said box or case, but so as to leave the space next the door I free. My said improved box or case can be employed for the ordinary dry plates, but is specially adapted for dry plates in which the emulsion is not attached to glass, but to a thin flexible plate of suitable material, such as have already been the subject of various patents.

The photographic exchange box, as shown in the accompanying drawing, can contain about fifty of such said flexible plates, and when such said plates are about eighteen centimetres wide and twenty-four centimetres long, weighs, inclusive of the plates, only about four pounds.

The back or bottom of the case is also provided with suitable hinges to facilitate the introduction of the plates into the box.

Having now described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is—

1. The construction of a photographic exchange box or case, in which the plates can be changed in full daylight by employing a suitable sleeve O, of a fabric which will not permit the light to penetrate the same, thus rendering the employment of an extra case unnecessary, whereby the said box or case consists of the bottom or back G arranged to open on suitable hinges, the slide A, the movable false bottom or partition C, which said false bottom and with it the plates are pressed forward by means of a suitable spring or springs D, so that the plate to be exposed is pressed snugly against its seat in the frame, and of the door I formed in the one end or side of the said box or case substantially as described and shown in the accompanying drawings.

2. The movable false bottom C is provided with a rod E, which said rod has a knuckle or other joint F at about the centre of its length, and a ring H, or its equivalent, at the outer end, so that when the ring H to the said rod is pulled outwards the rod E is drawn out through a boring in the back or bottom of the box or case, the spring or springs D is or are compressed, the false bottom drawn back and the plates given free so that the exchange can be made, for which purpose the rod E is turned on its knuckle or other joint F and the false bottom held in its rear position, whereby the arm of the operator must be inserted in the said sleeve O of impenetrable material or fabric, substantially as described in foregoing specification and shown in the accompanying drawings.

3. The combination of the door N to the space at the end of the box or case to receive the sleeve O, with the said sleeve of light-excluding fabric O, and the door I to the inner space of the said box or case, substantially as described in the foregoing specification and shown in the accompanying drawings.

4. The general arrangement and construction of the parts of my improved photographic exchange box or case substantially as and for the purpose set forth in the foregoing specification and shown in the accompanying drawings.

Improvements in Obtaining Relief Printing Surfaces.

Abstract of Specification. By Henry Rafter, Artist, Lee, Kent.

The principle of this invention, the prior conception of which I claim, consists in combining "process" for relief printing surfaces with "wood engraving."

In the first place, the surface of an ordinary wood block, metal plate, or other suitable surface, undergoes a preliminary engraving either by machinery or hand, whereby it receives certain "tints and grounds" required for a proposed drawing or work of art.

After the surface of the block has been thus treated, the object of the process for relief printing surfaces is to raise up and create in these furrows and cavities, left by the preliminary engraving, certain matter, substance, or material, which being artistically disposed and distributed over the block will, in conjunction with the said "tints and grounds," represent in "proofing" the outlines, shadows, and general features of the drawing or work of art.

The "lights, clearing, and cleaning," are then executed by engraving.

I make use of, in part, of the process already patented in the two following expired patents as a factor in the practicability of my invention.

A.D. 1860, September 21, No. 2309. An improved mode of producing relief printing surfaces.

A.D. 1864, September 15, No. 2641. Producing relief printing surfaces.

The furrows or cavities already mentioned as being left between the ridges or reliefs by the preliminary engraving of the "tints and grounds" are filled, under pressure, with a material such as pulverised chalk, oxide of zinc, &c., which is forced into an exact level with the top of these ridges or reliefs, producing a "prepared surface" apparently similar with the original surface of the block uniform and polished.

This "prepared surface" is then ready to receive the "artistic work," which will principally consist of the outlines, shadows, and general features of the drawing or work of art, as distinguished from the "tints and grounds."

This is either drawn direct on the prepared surface or transferred, photographed, or otherwise projected on it, inks or other suitable mediums being used, which, wherever applied, will harden or protect the surface of the material pressed into the cavities.

The rest of the material in the cavities, not having its surface hardened or protected, can then be brushed or wiped away; whereupon the "tints and grounds" will appear in equal relief with the "artistic work" represented by the hardened or protected parts, the "tints and grounds" terminating, or rather being merged, in the "artistic work" wherever the latter crosses or covers them.

A thorough hardening of the material left in the cavities can now be made, with either fluid silex, wax, varnish, or any suitable medium.

If the "artistic work" is executed by "etching," intaglio engraving, photolithography, photozincography, or similar methods, it is necessary to procure an impression of the same in transfer ink on transfer paper, then coat the impression with an adhesive medium and lay it on the "prepared surface" under pressure until the adhesive medium has dried. Damp and remove the transfer paper, leaving the impression in transfer ink on the "prepared surface;" this ink will protect those parts that are not to be removed in the subsequent brushing or wiping. In this last operation the "material" will require damping.

By the means of the well-known effect of light acting on a film of gelatine sensitised by bichromate of potash, I spread a sensitised film of gelatine on the "prepared surface," and exposing it under a negative obtained from the "artistic work." I retain the parts acted on by the light, by brushing away after damping the film and "material" unacted on, thereby leaving the "artistic work" in equal relief with the "tints and grounds."

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
May 27	Bolton Club	The Studio, Chancery-lane.
,, 28	Bristol Amateur	Studio, Portland-st., Kingsdown.
,, 28	Photographic Club	Anderton's Hotel, Fleet-street.
,, 29	London and Provincial	Masons' Hall, Basinghall-street.
,, 29	Liverpool Amateur	Free Library and Museum.
,, 29	Oldham	Hare and Hounds, Yorkshire-st.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society, held on the 15th inst., the chair was taken by Mr. F. W. Hart.

A letter from Mr. F. C. Beach, of the *Scientific American*, was read. Mr. Beach stated that an Amateur Photographic Society was in course of formation in New York—the first of the kind in that city—and suggested an interchange of correspondence between the new Society and the London and Provincial Photographic Association.

The suggestion was approved, and it was considered that it would be best carried out by an interchange of copies of minutes. The Secretary was directed to write to Mr. Beach on the subject.

The death of Mr. H. Baden Pritchard, so well known and esteemed in photographic and literary circles, and a member of the Association, was referred to by the Chairman and several of the members, and a letter of condolence was ordered to be sent to the relatives.

Mr. W. M. Ashman inquired whether any of those present had tried "golden fabric" as a medium for dark room use.

Mr. A. Cowan replied that Mr. Mackie had, at a former meeting, given favourable details of his experience of its use.

Mr. A. L. Henderson showed a plate box made of tin. The grooves were intended to hold two plates each, and were formed of a single thickness of tin bent at a right angle and soldered to the side of the box. The entire thickness was much less than that of a box fitted either with paper or wooden grooving.

Mr. W. E. Debenham thought it objectionable that there should be sharp edges of tin, which would be apt to scratch the edges of the plates. If the grooving were made of thin sheet tin folded it would take scarcely any more space than in the box shown, and could be soldered against the side more quickly than the five separate strips could.

Mr. Henderson did not mind the scratching of the edges of the plate, and preferred the single thickness of tin.

Mr. Cowan said that with folded tin plate the metal need be only half the thickness of that in the box shown, and would then take up no more space.

Mr. Ashman remarked that particles of iron would cause black spots on the plate. These would be more likely to be given off from the raw edge of the metal than if it were folded.

The Chairman inquired whether, if plate and particles were both dry, there would be any action.

Mr. Ashman replied that there was difficulty in entirely removing particles from the surface of a plate, and if carried into the developer they would act, of course.

The Chairman said that he had recently made many inquiries as to how to avoid spots which appeared to be caused by particles on the surface of plates. He had suggested the use of chamois leather for wiping plates before exposure and development, and it had proved successful.

Mr. HENDERSON remarked that a pupil of his had had many failures from spots in plates, coated with emulsion, which he had prepared. The cause had been traced to a tube of grey india-rubber that had been used for the water supply; particles of sulphur were given off.

Mr. COWAN said that red or black rubber should always be used for the purpose.

The CHAIRMAN added that the cheaper kinds of red rubber were almost as bad as the grey.

Mr. HENDERSON said that a large professional plate-maker had used red rubber as a roller for coating, but had to abandon its use on account of the spots caused by it.

A question was read—"Why does a boiled emulsion fix out more than one prepared with ammonia?"

Mr. DEBENHAM said that this question was one of an objectionable kind, as it assumed something to be a recognised fact which had yet to be established.

Mr. COWAN remarked that the question should be—"*Does* an emulsion prepared by the boiling process lose more in fixing than one prepared with ammonia?"

Mr. HENDERSON said it was a fact that boiled emulsions did fix out more than those prepared with ammonia. He had prepared many emulsions both ways, and could speak decidedly.

Mr. DEBENHAM inquired whether in Mr. Henderson's experiments he had used the same quantity of iodide when making a boiled emulsion, and when using ammonia.

Mr. HENDERSON replied that he used eight times as much iodide when boiling as with ammonia.

Mr. DEBENHAM asked whether in that case the question might not as fairly be—"Why do plates containing a large quantity of iodide fix out more than those made with a small quantity?"

Mr. HENDERSON believed that when a large excess of soluble bromide was employed the iodide of silver was reconverted into bromide. He thought from the fact that the plates he spoke of were quickly fixed they did not contain a large quantity of iodide of silver, although a considerable quantity of soluble iodide was employed in making the emulsion.

Mr. COWAN produced two plates cut from the same plate originally, which had been exposed under Warnerke's sensitometer. In the one case, however, the plate had had three successive illuminations to the phosphorescent tablet; but it did not give numbers on the sensitometer indicating more than twice the sensitiveness or exposure. He thought it better, when using plates of high sensitiveness, to give only half the exposure rather than rely upon the higher figures of the sensitometer.

Mr. HENDERSON stated that there was a great difference in the intensity of sensitometers, some giving a higher number than others with the same plates.

Mr. A. MACKIE said that a gentleman had that day told him that he used with success the "leucine" solution in making emulsion, but had made a variation by allowing the silver to precipitate from it, pouring it off, finishing as in the precipitation method advocated by Mr. W. K. Burton.

Mr. HENDERSON said that that plan might prove very successful if the solution were used as it was, instead of being diluted with water, and in that case the same solution would, after filtration, serve repeatedly and be all the better for the accumulation of nitrates.

Mr. C. Ray Woods was elected a member of the Association.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

THE Board held their monthly meeting on Wednesday, the 7th instant, at 181, Aldersgate-street.

The minutes of the previous meeting having been read and confirmed, Mr. G. Haupt was elected a member.

This being the first meeting of the Society since the decease of their Vice-President, the Rev. F. F. Statham, a letter of condolence was forwarded to Mrs. Statham.

The next meeting will be held on Wednesday, the 4th June, at 8 p.m.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.

THE last ordinary meeting of the session was held in the College of Physical Science, Newcastle-on-Tyne, on Tuesday, the 13th instant,—Professor Bedson, D.Sc., occupying the chair. Messrs. W. C. Fletcher, P. Hall, and A. D. Fisher were elected members.

Professor HERSCHEL, M.A., &c., then delivered a lecture on *The History and Results of Improvements in Photographic Lenses*, which was followed with close interest by a good muster of members. Professor Herschel related particulars of the first aërial telescopes of long focus, and explained the principles of correction of chromatic aberration of single lenses by which Hall and Dollond, at the middle of the last century, and Dr. Blair, produced compound objectives of two-feet focus equal in magnifying power to the single lenses of 60- to 120-feet focus made and used by Huyghens. The non-agreement of the focus of red rays with that of blue rays in a single lens was illustrated with the lime light, as well as the different positions in the same lens of the foci, towards which it collected rays passing through it respectively near its centre and near its margin. The removal of this second defect, or spherical aberration of objective lenses, is connected with the subject of increasing the angle and flatness of field, and of lessening distortion of the image in modern combinations of photographic lenses. As it embraced a much wider class of corrections than that performed by methods of achromatising, further explanations of it were reserved; and, if another opportunity for describing them should occur, it would form the subject for a future lecture.

The CHAIRMAN proposed, and Mr. J. P. GIBSON seconded, a vote of thanks to Professor Herschel, which was carried.

Six photographic prints, size 18 × 16 downwards, were then balloted for and duly handed over to the successful members. These pictures were given by Mr. Ed. Geold and Mr. P. M. Laws. The former gentleman also presented a few to the Society.

Mr. Wm. Ridley was appointed Curator to the Society's album and portfolio, in place of Mr. Kemmish, resigned.

The Hon. Secretary showed an universal camera having revolving bellows and great length, the half-plate size extending to sixteen inches, and very light and portable; also, two of Guerry's pneumatic shutters (sent by Messrs. Proctor and Sons, of Newcastle). These were examined with much interest by members, and attracted general approval.

The meeting was then adjourned.

LEEDS PHOTOGRAPHIC SOCIETY.

THE ordinary monthly meeting of this Society was held on Thursday, the 1st instant,—Dr. Thorpe, F.R.S., in the chair.

Messrs. Dennison and Hirst were elected members of the Society.

Mr. C. H. Bothamley, F.C.S., then read a paper entitled *Some Experiences of a Beginner*. [See page 327.]

Mr. WASHINGTON TEASDALE, F.R.M.S., referring to Mr. Bothamley's remarks respecting the use of canary medium, said that, so far as he was personally concerned, he much preferred the use of that medium, and he had used the most sensitive plates in the market; but, by carefully shielding the plate during development, he could produce negatives free from all trace of light fog.

Mr. T. W. THORNTON (Hon. Secretary) said Mr. Bothamley spoke very favourably of the use of sulphite of soda. Some little time ago he had obtained from the Platinotype Company some of their sulpho-pyrogallol, but did not notice any benefit arising from its use. Since then, seeing the very favourable notices in the Journal, he had made up a solution by the formula given by Mr. A. Pringle, and, although it worked well immediately after preparation, in the course of a short time it would not develope a fully-exposed plate in any less time than forty minutes, and then the resulting negative was of a deep yellow colour. He knew of several members who had tried the same formula, and all had the same experience. This striking difference in results led him to suppose that the sulphite of soda used by him must be of a very different nature to that used by Mr. Pringle. He would add that both the solution made up by him and the one obtained from the Platinotype Company had turned a deep claret colour after standing for a few days.

Mr. TEASDALE said he had noticed the same appearance in the colour of the sulpho-pyro. solution, and in his hands it was most prolific in giving green fog.

Mr. F. W. BRANSON suggested the use of an American clock for timing the exposure given by an instantaneous shutter—first removing the pendulum.

The CHAIRMAN gave the results of an inquiry as to the changes brought about by adding alum to the ordinary hypo. bath.

Mr. H. RODWELL exhibited a series of views taken in Cork and the neighbourhood.

Mr. TEASDALE exhibited some platinotype prints and lantern transparencies from "instantaneous" negatives recently taken by him of moving objects, some plates being developed by pyro. and others by hydrokinone. He called attention to the general clearness and absence of light fog, in connection with the fact that all the plates were developed by the light of his usual lamp of canary medium, and that while printing the transparencies on plates of only moderate rapidity (nominally ten times) he had indulged in the warmth and extra light of a Fletcher's open gas fire in a small operating-room about ten feet by eight feet. Mr. Teasdale also exhibited two negatives which, on being put into the ordinary clearing bath of alum and citric acid, had immediately become overspread with a crystalline formation of most unusual and peculiar character, appearing under the microscope like a longitudinal section of vegetable tissue with fusiform cells circularly dispersed around the nuclei. These crystals gave no colour under the varied conditions of polarised light, which may have been due to the crystalline deposit being too thick.

NOTTS. PHOTOGRAPHIC ASSOCIATION.

A MEETING of this Association was held on Friday, the 9th instant, at the Morley House, Shakespere-street,—Mr. G. Shepperley, President, in the chair. There was a very good attendance.

The CHAIRMAN spoke on the rise and progress of photography in Nottingham, and the difficulties that had been encountered through various obstacles, but which had been successfully overcome. He advised the members to study nature as much as they could during their trips in the coming summer, for the more they indulged in such study the more would it reveal itself in its true and interesting character.

Mr. S. BOURNE (President of the Nottingham Society of Art), in moving a vote of thanks to the Chairman for his address, said that the subject of photography was an interesting one, which could not be exhaustively dealt with in one paper; and the degree of excellence at which it had arrived had not been brought about by one, two, or three men, but by a little army of workers. He might say that he was the principal founder of the old Nottingham Photographic Society that had been in existence twenty-five years ago, but which had died a natural death through the removal of one and another. He heartily wished the present Association great success, which it was sure to have from the evidence he had before him of modern apparatus; and the rapid shutters kindly brought by the members showed an interest which, if retained, was an indication of great success. They, no doubt, had heard of the Fothergill process. Plates prepared by that process required a long exposure, compared with the present rapid gelatine plates. He might say it was due to him as a member of the Nottingham Photographic Society that the Fothergill process became so universally adopted; for, although the process had been made public, no one took it up practically. He, however, prepared four dozen plates by it, took them to the English lake district, and brought home forty-five good negatives. This was a great success in the early days of photography, and this success was made known by him in a letter which appeared in *The Times*. As a result of that letter he was deluged with correspondence from all parts—so much so that the postal authorities of Nottingham had to give the exclusive use of a post-bag to deliver the letters, which numbered something like 150 each post. It was impossible for him to sit down and reply to all, but he replied through *The Times*, detailing the particulars of the process, and, as a result of that letter, he had met gentlemen in India and elsewhere who successfully practised it. Beautiful as that process was it is now slumbering as a process of the past, and has given way to its rival, the gelatino-bromide process. The march of progress places its stamp upon all processes, and one by one gives way to that which is more excellent.

The motion, having been seconded, was carried *nem. con.*

The members proceeded to the investigation of the apparatus, &c., after which the proceedings terminated.

The next monthly meeting of the Association will be held on Thursday, June 12th.

Correspondence.

RAPID *VERSUS* SLOW DEVELOPMENT.

To the Editors.

Gentlemen,—In Mr. E. Brightman's paper on the above subject, read at the meeting of the Bristol and West of England Amateur Photographic Association, and reported in the Journal of May 9th, I see he omits sodic sulphite from his developer. As I am anxious to know *why*—more especially since none of the members present seemed struck by the omission—I should be obliged by the information through the Journal, should this catch the eye of Mr. Brightman.—I am, yours, &c., Curious.

May 19, 1884.

Notes and Queries.

W. Brown inquires if it will do any harm to a photograph on albumenised paper if it receive a coating of spirit varnish previous to its being painted upon.——In reply: We have a vivid recollection of similar treatment having been strongly recommended as a preparation for painting upon the photograph.

Donald Fraser says:—"I have some photographs I highly prize which were mounted on cardboard some years ago. Now I wish, if possible, to have them taken from their mounts and placed in a loose scrap-book. Can this be done? If so, how best can I do it?"——In reply: Place the picture in warm water for a few minutes, and a separation of the photograph from the mount can soon be effected.

W. says:—"In working instantaneous photography with rapid shutter I find the plates are, as a rule, considerably under-exposed. How would you recommend me to develope these plates?"——In reply: Let "W." adopt the formula given by Mr. H. Y. E. Cotesworth on page 310 of our issue of last week. If this do not effect the desired end, let him employ either more sensitive plates or a shutter that does not act quite so rapidly.

"Which is the denser, from the point of view of optical refraction—water or alcohol? And what relation do these bear to glass and other substances? Your reply will oblige, yours, &c., John P. Richards."——We reply that alcohol exceeds water in this respect—the former having 1·372 and the latter 1·336 as its refractive index. That of ordinary plate-glass is 1·540, which, however, is only approximative, as the refractive index varies with different samples.

"My studio is a ridge roof, having glass on one side only of the same, and glass down to within four inches of the floor on the same side—that is, the south side—consequently the sun is shining on it all day, and I have great difficulty in getting soft shadows. All the glass is covered with white blinds, and I have tried black over these at the sitter's end, but without much success. Will any readers help me by offering their experience or suggestions, which will be gladly tried by—Strong Light?"

A. McKinnell writes:—"I want to prepare some pellicle, and should feel much obliged if you would enlighten me a little by answering the following query:—After preparing an emulsion, if, instead of washing it when set, I were to pour over it enough alcohol to cover it, would the ammonium nitrate be eliminated from the emulsion as well as the water." ——In reply: By treating the emulsion with alcohol in the manner described the ammonium nitrate would be eliminated along with the water.

"I find that a portion of my studio which is much exposed, and which has to be put together with glue, gives me no end of trouble owing to the action of the weather. Can you suggest any means by which the glue may be rendered impervious to this atmospheric action? I have thought of alum and also of bichromate of potash, but ask your advice previous to adopting any decided steps.—Fred. Nelson."——In reply: Obtain some of the strongest Scotch glue and dissolve it in the smallest possible quantity of water, afterwards adding linseed oil and stirring well together. This is said to be very strong and well adapted for such a purpose as that indicated.

"The best remedy I can suggest to 'W. M. H.' is to glaze with ground glass (the ground face outwards) the whole of the sashes through which the wall can be seen *from the sitter's point of view*. He may try the effect by pasting tissue paper inside his present glass. If he can whitewash the wall it will add to the light. If the top light—that is, light from the sky—has not been reduced materially by the erection of the wall he will, I believe, be agreeably surprised at the result obtained by the use of the ground glass.—J. M. Young."

"To whom are we indebted for the first symmetrical lens employed in photography and what is the date of its introduction?—Historicus."——In reply: The first symmetrical doublet of which we have any account was described by Mr. G. Cundall in the *Philosophical Magazine*, in 1844. It was composed of single (or non-achromatic) meniscus lenses, one being mounted at each end of a tube, the length of which slightly exceeded the diameter of the lenses. This gives forty years as the period which has elapsed since the invention was first introduced.

E. U. inquires:—"1. Is it necessary or compulsory that unmounted copyright photographs should bear any words or notification to the effect of their being copyright?—2. If I buy an unmounted photograph at a shop or from dealers do I run any risk in copying it and selling copies, supposing there is no intimation of any copyright on it?"——In reply: 1. It is not necessary that a photograph shall bear upon it any announcement of the fact of its being copyright; hence—2. Any person who copies and sells under the circumstances described does so at his own risk.

Geo. Sanderson writes:—"One of the sides of the front lens of my large portrait combination has got a dark stain or series of stains over it. It does not seem to affect the definition; but I feel quite convinced that it must cause the lens to work much slower than it once did. Is there any method by which I can dissolve out the stain? I have rubbed it with precipitated chalk spread upon a soft wash-leather without producing any effect."——In reply: Mr. Sanderson must obtain some putty powder, and, having carefully and thoroughly washed his hands, dip the point of his finger first in water and then in the powder, and rub the stains very smartly with the finger thus prepared. This will effect their removal.

Lens writes:—"Are there any means whereby a tall person can be made to look shorter in a *carte-de-visite* full length? I fancy there are, but am not certain. I have tried tilting the camera, raising and lowering the front, &c. I have seen other people's full lengths, same size print, yet a larger face and plenty of room to spare at the top and bottom of the figure. I get distortion from somewhere."——In reply: If "Lens" has a studio of sufficient length he may with great ease reduce the photographic longitude of his tall friend to any required extent. Let him raise the camera (not the camera *front*) to a height nearly on a level with the breast or neck of the subject, and place it at such a distance as to give the required dimensions upon the focussing-screen. If, however, the studio be not sufficiently long to admit of this, then a lens of shorter focus must be obtained. If the camera be kept square—that is, without being tilted—our querist may depend upon obtaining a portrait in which there will not be any distortion, but everything in harmonious proportion.

Pembroke Marshall (New York), referring to a letter in our issue of February 15th, respecting the United States as a field in which to establish a lantern business, states that such an enterprise demands mature consideration before being embarked in, because (he says) "the price of labour here, the inferiority of native materials, and extortionate and almost prohibitory tariff on any foreign production render a mere comparison of English and American prices decidedly misleading."——We imagine that Captain Marshall, in speaking in a detracting manner of the quality of the "native materials" of his adopted country—such materials, at anyrate, as are requisite in the production of photographic transparencies and lanterns—does so with an insufficient acquaintance with these, as all photographers of experience attest the excellence of American chemicals and apparatus; and in this connection we do not perceive what other "native materials" are requisite, unless it be the glass and the paper for binding the edges. Neither do such specimens of brass and tinware (employed in lantern construction) as we have seen indicate the inferiority alleged. The high price of labour referred to is, doubtless, a consequence of the tariff on foreign productions; but with a more intimate knowledge of the lantern trade than our correspondent can be expected to have acquired he would know that the prices quoted in American catalogues leave, *to those who understand the business*, emoluments considerably in excess of what is hoped for by dealers on this side of the Atlantic, and this after making all allowances for high labour and prohibitory tariff.

Exchange Column.

Answers to Correspondents.

Correspondents should never write on both sides of the paper.

Photographs Registered.—

Frederick Argall, High Cross, Truro.—*Seven Photographs of Dr. Wilkinson, Bishop of Truro.*

John Thornbury, Brunswick-road, Gloucester.—*Photograph of Reredos in St. Michael's Church, Gloucester.*

William Lawrence Wildy, Dumfries House, Armley, Yorks.—*Photograph of the Interior of a Siemens' Furnace after Melting 2,000 Tons of Steel.*

Peter Davidson, Eglinton Photographic Studio, Eglinton Toll, Glasgow.—*Three Photographs of the English and Scotch Draught Team—One Photograph of the English, One of the Scotch, an One of Both Together.*

Dr. E. Liesegang, Ph.D.—Received: *Die Collodion-Verfahren* and *Der Silber-Druck.* In our next.

A. Z.—We shall bear the subject in mind, and may possibly devote to it an article or two on some future occasion.

Darkness.—Well-seasoned pine will answer quite well for a box for storing dry plates either before or after exposure.

F. F.—The crown masks and discs are only to be obtained through agents or dealers. The manufacturers do not supply them retail.

W. C. (F. Hill)—The stains appear to be due to the prints adhering together while in the hyposulphite bath. See answer to "P. P."

W. J. Blagden.—Your orthographic lens is incomplete if, as you say, the back compound consists of only one glass. No wonder it does not perform satisfactorily. You had better take it to the optician whose name the instrument bears.

F. S. L.—Better send us a negative or two to see the effect. From what you say, however, we surmise that light finds its way through the leather hinge and produces the effects of which you complain. Examine the slides carefully in strong sunlight.

Bartholomew.—You would do better to purchase the material than to make it yourself, unless you have some little knowledge of chemistry. We imagine that any photographic chemist can supply it. Messrs. Wratten and Wainwright, we know, keep it in stock.

Warwick.—Your best plan will be to advertise in the columns set apart for the purpose. Judging from your specimens, if they are a fair sample of your work, we should say you will have but little difficulty in obtaining employment as assistant operator at a moderate salary.

W. H. H.—The neutral sulphite rapidly oxidises into sulphate both in the crystals and in solution. The acid or bisulphite is more permanent, and, from the fact that it contains a larger proportion of sulphurous acid' is better, and retains its properties longer as an adjunct to the developer'.

Wm. G. Bateman.—The cause of the blurring is not that the exposure was not rapid enough, but that the camera moved during the exposure—perhaps from the jerk of the shutter. If you examine the negative closely you will find that the buildings and stationary objects are quite as much blurred as the moving ones.

S. J. Y.—If you read the article again you will see that, when the ivorine was simply soaked in cold water, and then applied, the picture was not allowed to dry first. If the picture be dried, then we advise its being made warm before the ivorine is squeegeed upon it. When this has been done perfect adhesion will, undoubtedly, be secured.

F. Ashton.—All will depend upon your ability. You must bear in mind that a business is not established and a good connection secured at once, some time being necessary for the purpose. Doubtless, if you advertise well, and issue good work, you will succeed. Possibly the vicinity of London would be the most desirable position in which to commence business.

Studio.—It is almost impossible to answer your query, as you have failed to include in your drawing any more than the actual roof of the house, and nothing below. If there be a room below what is shown in the sketch—say nine or ten feet high—then all you have to do is to put in a glass side; also remove a portion of the slates and substitute glass in their place.

P. P.—1. Imperfect fixation is the cause of the stains. Either the fixing bath was too weak in the first instance, or too many prints had been fixed in it. The stains may, however, have been caused by the prints sticking together while in the hyposulphite solution or in the first washing water.—2. The meaning is that with a large aperture the lens will cover the smaller size, and with a small stop the largest-sized plate.

G. Withers.—The marking on the varnished negative is due to the hyposulphite of soda not being thoroughly removed by washing; consequently it has crystallised out through the varnish. If a negative contain hyposulphite of soda no varnish will prevent its coming through to the surface.

G. E. L.—By merely looking at a sample of gelatine it is impossible to pass any reliable judgment on its merits for dry-plate making. All thin gelatines of the best kind are so much alike in outward appearance that we cannot say, from the examination of a piece a few inches square, who is the maker of the particular sample you enclose. This, however, we can say with certainty, namely, that this particular sample is one of excellent quality as a gelatine. As you do not succeed with it for dry-plate work try another sample.

Photographic Society of Great Britain.—The next monthly technical meeting of this Society will take place on Tuesday next, the 27th inst., at eight o'clock p.m., at 5a, Pall Mall East.

Photographic Club.—At the forthcoming meeting of this Club, at Anderton's Hotel, Fleet-street, on Wednesday next, the 28th inst., the subject for discussion will be—*The Preparation of Lantern Slides.* This being the last lantern night of the season, members and visitors are invited to bring slides.

A Caution.—The following may be interesting to many photographers:—An order has, it is stated (according to the *Standard*), been issued from the Home Office to "Royal tradesmen" throughout the country, calling upon them to produce the letters patent permitting them to use the designation. The order has caused considerable flutter in Aberdeen, where, by reason of the proximity of Balmoral, there are some thirty tradesmen who, having been appointed to purvey to the Queen's household, use the word "Royal." The letter points out that if the persons are unable to produce letters patent there are certain heavy penalties to which they have subjected themselves for the trading under a false title.——There are many photographers, both in London and the provinces, who are employing the royal arms without any further right than having on one or two occasions photographed members of the royal family.

Improvements in Head-Rests.—Notwithstanding the reduction in the time of exposure that has been effected by the employment of gelatine plates, and the less liability there is to move on the part of the sitter, no photographer who values his reputation will care to forego the all-powerful services of the head-rest, which ever since the application of photography to portraiture has rendered most important aid to the artist in obtaining stability and consequent sharpness. Our attention has been directed to several improvements recently effected in this important studio adjunct by Mr. E. E. Emmerson, engineer, Leeds, who for many years has made this piece of apparatus such a favourite study as to have arrived at as near an approach to perfection in its construction as we ever expect to see accomplished. The characteristics of the latest mechanical efforts of Mr. Emmerson are extreme rigidity combined with great facility of movement and adjustment to the figure. Our readers will remember that we had occasion a few years ago to eulogise very highly the Emmerson head-rest. Since that time the special features to which we then directed attention have been still further improved.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician,
For Two Weeks ending May 21, 1884.

These Observations are Taken at 8.30 a.m.

May	Barometer.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max Shade Temp.	Min. Tem.	Remarks.
8	30·03	W	56	51	90	62	47	Cloudy.
9	30·23	SW	53	50	110	67	48	Cloudy.
10	30·28	W	59	53	114	75	48	Bright & Clear.
12	29·99	NE	63	55	110	79	55	Bright & Clear.
13	30 02	E	55	52	99	70	51	Overcast.
14	29 84	W	57	50	101	59	48	Cloudy.
15	30.15	W	53	48	96	62	48	Cloudy.
16	30.07	WNW	60	56	115	72	51	Cloudy.
17	29.85	SW	56	53	115	75	52	Overcast.
19	29.90	E	55	49	96	63	49	Overcast.
20	30.07	W	54	47	100	66	47	Bright & Clear.
21	30.46	SE	55	48	102	67	45	Hazy.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1256. Vol. XXXI.—MAY 30, 1884.

FREE SILVER AND SENSITIVENESS IN GELATINE EMULSION.

Writing on the subject of Mr. W. K. Burton's method of forming an emulsion by precipitation and subsequent removal of the decomposition products of the operation, we some months ago suggested the possibility which this process seemed to afford of utilising the sensitising action of free nitrate of silver upon the bromide without bringing into force the fogging effect that salt usually induces by its combination with the gelatine.

It is somewhat surprising, considering the important *rôle* that free silver played in rapid collodion emulsions, that something more should not have been done to extend its use to gelatine; but the neglect in this direction has, no doubt, been mainly due to two causes:—First, the deleterious action of the free silver on the gelatine; and, second, the fact that a large excess of soluble bromide in the emulsion, while safe-guarding it from fog, exerts no injurious influence on the sensitiveness of the resulting films if completely removed by washing. In the case of collodion emulsion the result is different; for every fraction of a grain of free bromide employed in the preparation of the emulsion produces an effect upon its final sensitiveness, however thoroughly it may be removed. To secure the highest sensitiveness it is absolutely needful to have an excess of silver nitrate—a condition of things usually adopted in spite of the necessity it brought for increased precautions against fog and the greater delicacy required in all the manipulations. When, therefore, it was found that free bromide exerted no slowing action upon a gelatine film under certain conditions, while it preserved it from fog during preparation, it is scarcely to be wondered that experimentalists should turn away from free silver with its concomitant troubles—far greater in connection with gelatine than with collodion.

It is true that some of the early formulæ for gelatino-bromide provided for, or even attached special importance to, an excess of silver over soluble bromide; but it may be questioned whether the modes of emulsification then adopted really secured an excess of silver, or, in any case, whether films so prepared possessed even the most ordinary keeping qualities. During the earlier days of the gelatino-bromide process the emulsification only extended at the most to a few hours, and the full strength of twenty grains of gelatine to each ounce of emulsion was present during that period. Under such circumstances it is probable that, though according to the equivalents of silver and bromide employed the former might be in excess, yet, in consequence of the shortness of the emulsification and the viscid nature of the vehicle, that complete combination might not have taken place and that both silver and bromide remained in the free or uncombined state. In this latter case the beneficial action of the excess of silver upon the sensitiveness of the emulsion could not arise, though its injurious combination with the gelatine would be proceeding all the time; and though the effect might not be immediately evident, being masked by the action of the uncombined bromide, it remained nevertheless to make itself visible in a very short time after the removal of the soluble bromide.

Thus, Mr. Herbert B. Berkeley, some five years ago, exhibited at one of the meetings of the Parent Society a number of plates prepared in the earlier experimental days of the gelatine process with excess of silver, and which had been kept only a few weeks before they turned red from the action of the silver upon the gelatine. The emulsion was thoroughly washed to free it from the excess of silver, and the plates when freshly made worked perfectly; but, after a short time, the spontaneous decomposition of the gelatino-silver compound set in and ruined the plates completely.

It was a well-known fact that with many of the old and obsolete dry-plate processes very sensitive films (in those days) could be obtained by using a preservative containing a trace of silver nitrate, or (which amounted to the same thing) by not removing the whole of the free silver from the film before applying the preservative. But such plates possessed very poor keeping qualities, and were, moreover, far more prone to fog and other defects than those entirely free from silver. Similarly, it has been proposed on the continent to increase the sensitiveness of our present gelatine plates by treating the dried films with a dilute solution of silver nitrate or other soluble silver salt; but, though the effect sought is in a measure gained, the plates will only keep for a few hours, or, at the most, a few days.

We will revert to collodion emulsion with a view of showing the analogy between gelatine and collodion films in connection with free silver. An emulsion made with a decided excess (not necessarily a large one) of soluble bromide possess considerable keeping powers whether in the unwashed or washed state, but never attains to the highest degree of sensitiveness. Here the soluble silver salt, having a comparatively feeble attraction for the organic matter of the collodion, is monopolised, so to say, by the bromide; no organic compound of a fogging nature is formed, and the excess of soluble bromide acts as a restrainer to any fogging tendency that might arise.

If, however, the conditions be reversed and the silver be in excess we have an emulsion which up to a certain point works well and will attain a sensitiveness greater than in the previous case; after this it commences to become foggy, grows worse and worse, loses its sensitiveness, and finally becomes utterly worthless. If it be used for coating plates, or be precipitated in the form of pellicle just when it has reached the proper stage, the resulting films (or pellicle) retain the good qualities which the emulsion possessed at that stage. This stage—that is to say, the point at which the highest sensitiveness and the least tendency to fog are best combined—may be presumed to arise when exact neutrality has been reached, when the whole of the soluble bromide has been taken up by the silver nitrate. From that moment, though the sensitiveness may go on increasing (by the action of the excess of silver nitrate upon the silver bromide), the injurious action of the free silver exerts itself upon the organic constituents of the emulsion, and, sooner or later, according to the degree of excess, the whole becomes useless.

But let us go a step further. In addition to the excess of silver mentioned in the last instance let us add a certain quantity of nitric acid; the exact amount will depend upon the quantity of silver in excess and other conditions. Now we shall find that when the neutrality point is reached—that is, when the whole of the soluble bromide has been converted—the emulsion goes on increasing in sensitiveness, but retains its good qualities, instead of "going back," as in the previous case. By a suitable adjustment of the quantities of silver and acid an emulsion may be made which possesses the property of keeping, if not indefinitely, at least for a very long period—extending to months at anyrate—and the sensitiveness of which becomes very great.

The first inference to be drawn is that the acid prevents the combination between the silver and the organic matter; but this is, we think, disproved by the progressive alteration in the character of the structure of the collodion as well as of the image produced by the emulsion as the length of action is prolonged. The action appears rather to lie in the power of the acid to prevent the formation of *an insoluble* organic compound. While the free silver goes on producing its accelerating effect upon the silver bromide it is, also, in conjunction with the acid, acting upon the cellulose. In the absence of acid a "pyroxylate" of silver or some similar compound of an insoluble character would be formed which, remaining in the collodion film after washing, produces fog. In the presence of a suitable acid, however, the organic compound, whatever it may be, remains, if not permanently, at any rate for a considerable time, in a soluble condition, and in that state is removed when the films (or pellicle) are washed, and so the fog is eliminated.

Such, at least, is the most plausible theory that suggests itself in explanation of the action of acids in emulsions containing free silver. For instances of an analogous character we need not go beyond the bounds of photographic practice. The addition of acid to the developer for wet plates is simply made for the purpose of arresting or delaying the formation of a precipitate when it comes in contact with a solution of silver. In the case of the iron developer the organic element is absent; but with gallic or pyrogallic acid we have conditions nearly identical with those that prevail in the case of an emulsion containing free silver.

Watch a solution of plain pyro. while a few drops of neutral solution of silver nitrate are stirred in. It instantly becomes black, muddy, and opaque, and in a very short time a dense deposit is formed. Into the same solution of pyro. now stir a little solution of silver acidified with acetic, citric, or, better still, nitric acid, and note the result. At first there is no change; then a slight discolouration, which gradually deepens through various shades of yellow and red until the solution becomes opaque from the intensity of the colouration, but remains clear, and if diluted becomes again clear and transparent. In the presence of acid the formation of the muddy, opaque deposit is delayed for a considerable time, even when the proportion of acid is small; and if nitric acid be employed the time is prolonged to hours.

It is not difficult to conceive that the acid added to an emulsion may perform a strictly similar function; indeed, it is by no means difficult to prove the case if argument by analogy be accepted as proof. But this part of the subject we must leave until next week.

SUBORDINATING OBJECTS WHILE BEING PHOTOGRAPHED.

In the last issue of the American *Photographic Times* we observe that our friend the editor of that well-known journal describes a method by which any one object situated on a different plane from another—and, from its nature and configuration, apt to have its characteristic outline lost by becoming merged into the other—may be dissociated from it so as to preserve its individuality in a photograph. For example: a tree backed by other trees of similar form and colour; a piece of architecture backed by edifices into which its *tout ensemble* becomes merged—such subjects, when photographed, would lose their identity in those situated immediately behind.

The means recommended by our contemporary for discriminating between them is the introduction of an extemporised atmospheric perspective, which would act very much in the same manner as if a huge white screen had been dropped behind the chief features of the view which was being photographed, and allowed to remain there, perhaps, two-thirds of the time of exposure, and then withdrawn. The method by which this "artificial atmosphere" (as it is termed) is obtained is by the igniting of any smoke-producing material between the tree, monument, or whatever other object is to be photographed in its individuality and those objects situated at a greater distance from the camera, but still sufficiently near to mar, by their presence and force, the completeness of the *piece de resistance* of the picture.

Having lately tested the system to which we have referred, we can vouch for its efficacy, especially when the circumstances of the composition lend themselves to this method of obtaining an artificial atmosphere; but in many cases it is not convenient to accomplish, nor, if it were, is it at all times expedient to adopt, such means of improving upon nature. We, therefore, propose here to describe a purely lenticular method by which the same end may in some measure be achieved.

This system is based upon the fact that dissimilarities in the anterior conjugates of a lens of long focus and large aperture exist, and are of so pronounced a character in their bearing upon definition that when an object situated on one plane is made sharp everything else is quite out of focus. The object may be a tree, a garden shrub, a monument in a cemetery, or any other object having a position on a plane removed in a greater or less degree from that upon which are situated the objects at each side of the composition and behind the chief subject here under consideration. Under ordinary circumstances lenses are well diaphragmed down in order that they shall have great penetrative power, or "depth of focus," as it is sometimes designated; but in the case now contemplated an effect of a totally opposite character is sought to be produced. We require to have the individual tree sufficiently sharp to stand out isolated from its forest companions, which must all remain in such complete subordination to it as to form mere accessories to a picture in which it plays the chief part.

Every portrait photographer is well aware that a large portrait combination of (say) ten or twelve inches focus possesses so little ability to represent different planes with an equal degree of sharpness as to render it difficult, when working with full aperture from a near standpoint, to get the nose, eyes, and ears of a sitter delineated with an uniform degree of sharpness; and this discrepancy is still more strongly marked when the focus is longer. We here subjoin a few instances of effects obtained out of doors by working with certain lenses at full aperture.

A tree situated at a distance of fifty feet, having other trees of similar form and colour as its background at a distance of three hundred yards, was projected on the ground glass of the camera by a lens having a diameter of three and three-quarter inches with a focus of thirty inches. When this tree was in sharp focus those at greater distances were represented as a confused mass. For scientific purposes, a correct picture of the tree being required—one in which its individuality would not be interfered with by the intrusion of the details of those behind—this condition of lens and aperture fulfilled the requirement in the most perfect manner. To get the more distant objects delineated with the same sharpness as that of the principal tree a stop of half-an-inch had to be employed, but under these circumstances the outline and individuality of the foliage of such special tree were quite lost.

The position of the camera was now shifted so as to bring within the line of central sight a second tree standing about sixty feet behind the primary one to which reference has been made. When working with full aperture there was a proper degree of distinction between the sharpness of the two, but not sufficiently so to get one tree thoroughly isolated from the other. As this appeared to be a good subject for trying the *Times'* method of effecting a separation of the two by the introduction of the "artificial atmosphere" we inserted a diaphragm sufficiently small to render both equally sharp, in which state their identities became completely merged in each other. A friend who was in attendance to aid in the experiment now ignited some damp hay between the two trees, and the day being calm and well adapted for the experiment a thin film of smoke was soon perceived to spread throughout the space intervening between the trees; the nearer one was shown as being clear and brilliant against a smoky background, in which, however, the second tree was plainly to be seen, but through a hazy medium. At this juncture an exposure was made, and the photographic effect of the intervening "atmosphere" was of even a more pronounced character than that presented to the eye without the camera. The success of the scheme was unmistakable.

A standard rose tree was brought directly against an iron gate having thick vertical bars and an ornamental design at the top, this arrangement having been selected in order to render the subject as confused as possible. The tree was photographed by the full aperture of a whole-plate portrait lens at a distance of eleven feet from the camera, and its outlines were exceedingly well defined. The gate, on the contrary, was so blurred by being out of focus as to be quite indistinguishable as regards its details. From a scientific point of view this photograph possesses interest; pictorially it is offensive. By inserting a diaphragm sufficiently small both gate and tree were brought into an equal degree of sharpness, and a second photograph was taken, in which the gate is so decided in its angular outlines as to destroy the pictorial beauty of the tree. A third one was then taken, and during the exposure a few chips of resinous wood, which had been ignited to an extent sufficient to emit smoke, were laid on the earth between the tree and the gate. On developing the resultant negative it was soon found that an astonishing difference had been effected; for the gate, although sharp as before, was now seen as through a misty veil and subordinate to the tree to an extent greatly exceeding the anticipations of those present during the experiment.

The conclusion at which we have arrived from these and numerous other similar experiments is this—that for such scientific purposes as the delineating of a monument or tree for placing upon wood to be engraved, for isolating it from its surroundings, so as to be made readily amenable to the touching-out brush or for being examined in the interests of science in contradistinction to those of art, a lens of long focus worked with a large aperture fulfils the condition sufficiently well for such purposes. But in all cases where great penetrative range is to be secured by the employment of a small diaphragm, recourse will have to be made to an artificial atmosphere, such as that obtained by the means here mentioned, unless the natural atmosphere be at the time sufficiently dense to effect the isolation, in whole or in part, of the object required to be photographed.

THE NEW COPYRIGHT BILL.

Last week we promised to refer again to the projected Copyright Act, there being one or two points in connection with it, if the Bill pass without amendment, which will prove very inconvenient to many portrait photographers. We allude to those contained in clause 10, which prohibits the exhibition of portraits without the sitters' consent. Some two years back, it may be remembered, we directed attention to this matter, and some discussion on the subject took place in our columns at the time. But the same clause, without alteration, is, we find, included in the Bill now before Parliament.

In this clause nothing is said definitely as to the absolute ownership of a portrait negative taken in the ordinary course of business. By implication, however, it is clearly to be, as it is at present, according to the custom of trade, the property of the photographer Although there is no mention in the Bill to this effect, the clause is very stringent with regard to the use that may be—or, rather, may not be—made of it, thereby implying the ownership in the photograph. It stipulates that in connection with any portrait taken on commission it shall be unlawful for the photographer, whether he owns the copyright therein or not, to sell, offer for sale, or exhibit in public, or in any shop window, "or otherwise," any copy of the portrait, unless he has previously obtained, in writing, the consent of the sitter. This clause will, of course, render it illegal for anyone to exhibit portraits in show-cases or reception-rooms without first obtaining the sitters' permission.

This clause enacts, if it become law without amendment, that anyone infringing it, by making use of the negative without the consent of the sitter (and in writing, too), may be summoned before any court having summary jurisdiction—such as a police court, for instance—when the judge will have the power to order all copies to be given up to the sitter; and not only the prints, but the negative also. Very stringently framed is this clause, for it enacts that, in the event of the copies and negatives not being given up as ordered, or "upon the evidence of one credible witness" that all of them have not been delivered up, the court may grant a warrant to search the photographer's house or any premises belonging to him or that may be suspected of containing them, and, if any be found, to seize them precisely as if they were infringements of a copyright, as in clause 17, which gives power to search premises suspected to contain pirated copies.

The Bill, if it pass, will press heavily on those photographers who, when they happen to obtain an exceptionally-good picture, or the portrait of some well-known or illustrious individual, scruple not to utilise the negative for producing specimens for their show-cases—perhaps, even for sale—whether the sitter acquiesce or not. At the present time if this be done it is, perhaps, questionable if the sitter have a legal remedy, except, perhaps, by process of injunction in chancery, which, to say the least of it, is an expensive and, in this instance, for want of a precedent, a somewhat dubious proceeding. Certainly, at present sitters have not a remedy by summary proceedings, but under the new Bill all they will have to do will be to summon the offending photographer to the nearest police court, when the magistrate will compel him not only to discontinue the exhibition or sale, but to hand over to the complainant sitter all the prints in his possession, as well as the negatives, which will then become his or her property.

We are aware that many show-cases would present a very different appearance to what they do now if it were imperative that portraits should not be exhibited without the sitter's permission first being obtained. In such instances as this the new Copyright Bill, if it become law, will prove very inconvenient. But, after all, we can see no legitimate ground for complaint. If the exhibition of a portrait be not unpleasant to the sitter permission can easily be obtained. If, however, permission be not accorded then the exhibition would certainly be distasteful, and thus cause annoyance.

This same clause will also materially affect the returns of many photographic establishments who do a considerable business in making enlargements without previously obtaining the sitters' permission, simply on the speculation that they may eventually be purchased, or, if not, will serve for specimens. Such pictures, when made, are often purchased, rather to prevent the chance of their being publicly exhibited or disposed of in a manner distasteful to the sitter than because they are actually required; or, in some cases, as we know, even approved of. Under the new Act—if it become an Act—this system of trading will become illegal, and sitters, instead of being compelled to purchase pictures in order to ensure themselves from annoyance, can summon the offending photographer before a magistrate, who will compel him to hand over the enlargement, and not only the enlargement, but the original negative, the enlarged transparency or negative (if any), as well, without payment.

Looking at the matter in an impartial spirit, it will scarcely be disputed that the photographer who has been paid for taking a portrait, in the ordinary course of business, has no moral right whatever to afterwards make use of the negative for his own purpose—whether it be to produce from it copies as specimens for his show-case or reception-room, for sale, or to make an enlargement speculating on its being eventually purchased. He has been paid his price for the work he was commissioned to do, and should, therefore, be content with the transaction.

As the question now stands there appears to be very little chance of this portion of the Bill being amended in favour of the photographer, nor can we see any legitimate ground for amendment in this respect, as it is apparently framed for the purpose of giving protection to the public from the improper use occasionally made of portraits, as well as to secure a copyright in his work to the photographer.

As clause 10 at present is framed, we can, however, foresee one or two legitimate inconveniences that may possibly arise and give occasion for litigation. Although a photographer is prohibited from selling copies of portraits without consent, nothing is said about the negative itself; but it is clear that that is intended to be included as well as the copies from it. If this be the case—and there is no reasonable cause for doubt—how will a photographer have to arrange when disposing of his business? In accordance with the pro posed Bill it would appear that he will have to obtain the consent of each individual sitter before he can dispose of his negatives, which, of course, are part and parcel of the goodwill of a portrait business.

Again: it frequently happens that a photographer may possess a egative, produced in the ordinary course of business, of some one who has, since it was taken, brought himself—or it is suspected he has—within the pale of the law, and copies from it are required to facilitate his apprehension. It is clear that, as the Bill is at present framed, it will be illegal to supply them, even in the furtherence of the ends of justice. However, a short clause may possibly be introduced nto the Bill to meet these and similar slight difficulties, if the matter be brought before the notice of its promoters.

CAN A SILVER PRINT BE PERMANENT?

We return to the subject of the possibility of permanency in silver prints, as opened in our last number. In the course of our remarks we put the question in the following light:—We stated that it was "twofold in its aspect. * * * It is unquestionable that many prints may now be seen toned by the old method of toning and fixing in one operation which, though twenty or thirty years' old, are yet beautiful and apparently unfaded. There are also a large number of photographs still to be found which owe their tone to alkaline toning, and which are equally beautiful and apparently as free from fading as upon the day on which they were first produced." Herein lies the key to the enigma if only it were known how to apply it.

In the first place, it is to be noted that the older toning methods were applied to a great extent to plain paper, while modern toning introduced an era in which albumenised paper was all in all—the delicate beauty of a plain paper print being quite a rarity. Most of the old prints which have remained unchanged are on plain paper. This difference, also, may affect the prints in two ways. Firstly, the solutions made use of will far more readily permeate plain than albumenised paper, and hence permit of a more rapid action of the hypo. upon the silver salts contained in its texture. Secondly, the image instead of being confined to a thin section of the paper, so to speak, as in an albumenised print, is engrained almost into the entire substance of plain paper—facts which have an important bearing upon another consideration shortly to be discussed.

Next, we have the processes themselves to consider, and at once a very striking peculiarity is seen. MM. Davanne and Girard's classical researches upon the cause of fading pointed out the need for using hypo. in much larger quantities for a given number of prints than had ever before been considered necessary, and the full benefit of their recommendation was only felt by those who had adopted alkaline toning—a vast advantage in favour of the latter. Our readers will bear reminding that these experimenters showed that chloride of silver exposed to the action of weak hypo. solution led to the production of an unstable and insoluble silver hyposulphite, which, when contained within the texture of the picture, gradually decomposed and resulted in staining or fading. The recommendation to use a far larger quantity of hypo. than had hitherto been the custom was strongly pressed by ourselves and others, and we believe that in the hands of conscientious workers the plan is and has been generally adopted, thus removing in the main one prominent cause of fading.

Owing to the instability of solution of hypo., especially when containing dissolved chloride of silver, fresh hypo., made daily, was shown to be a necessity where permanent results were desired. In the old method the same bath was used for fixing and toning day after day, week after week, and, in fact, the older it was the richer were the tones it gave. The condition of the relation between the hypo. and the chloride of the image were naturally the same as in alkaline toning, and it is obvious that, in its earlier stages, the "mixed" bath must have been fully equal to the proper fixing of the prints, while after a time it would be both unequal to proper fixing and in that decomposed state which has usually been considered most favourable to fading. Is it not, therefore, a perfectly legitimate suggestion that the unfaded prints which have been left to us from those times have been produced in the earlier period of the bath's existence, when, at anyrate, its fixing powers were not impaired? This would be a very simple way of accounting for the still unfaded prints made by the old process, at least when conjoined to other conditions equally affecting both classes of prints.

Coupled with the use of fresh hypo. (as so prominently recommended in the early days of alkaline toning) was the more complete and thorough washing of the finished prints; and here, again, the new process in a double way had all the advantage in its favour. Prints done by the "alkaline process" have had more chance of surviving on account of that extra washing, and, further, the solution to be removed by such washing would in all probability contain far less of unstable salts, so that, even under imperfect washing, less injurious matter would be left in the one case than in the other. Again the gain is in favour of modern toning.

From this point we are naturally led to consider the question of hypo. in the print. Experiments during the last year or two have, comparatively speaking, been so numerous that the statement can scarcely be doubted that a print may contain large quantities of hypo. and yet remain uninjured after the lapse of one or two years. We think, however, it will be found that prints so experimented upon have been kept dry, and it is a truism to say that many chemical changes require the presence of moisture before they can be initiated; we may instance the well-known fact that in the absence of moisture bleaching in the presence of chlorine does not occur.

We are inclined to believe, however, that the evil due to the presence of hypo. is less the result of the action of the hypo. itself than of the silver salts accompanying it, so that when a finished print is dipped into new hypo. solution and dried without washing there is presumably no unstable silver salt left in the print. On our supposition it should not, therefore, be much acted upon if the print be kept dry—a condition, however, not very likely to occur in the everyday life of a print.

Finally: we have to consider the fading of prints admittedly produced with the observance of every precaution considered desirable to ensure permanence. It is our conviction that in all such cases the fading is due to the action of the atmosphere. We will not now pause to consider whether it is the normal constituents of the air including moisture, or their adventitious accompaniments, the products of combustion, &c. The action arises, and we take the results as seen.

We have, today, opened a packet of old *cartes de visite*, which have been entrusted to us for examination by a photographer whom we know to have been always a most careful worker, and which have been kept wrapped in the same paper in a desk during the greater portion of the period since they were taken (at various times in the year 1866). Some of them are almost as rich as they must have been when first attached to their mounts; others are faded in parts, but not all over. A careful examination, however, soon shows that the fading all starts from the edges; in no one case does the whole of the print show signs of fading. We cannot see any but one conclusion to be drawn from this examination—that the fading has occurred in those portions to which the air has obtained easiest access, namely, the edges, and that when by reason of the pressure of card against card the circulation of air must have been but slight the pictures, carefully made and eighteen years' old, remain in their original state, and, possibly, would do for scores of years longer.

We have found another proof of the same theory. A photographer of our acquaintance keeps a register of all his negatives, a print from each being pasted in a series of books. An examination shows that each of the earliest prints are faded in those parts where air would have the most ready access, but have remained unfaded in other portions. An exception is to be seen at one period embracing a short time only—some of the prints are faded all over. The gentleman in question puts this down to some unknown irregularity in the printing department, as with these exceptions the pictures are uniform for about a dozen years or more.

Now, it is obvious that a plain paper print, with the image penetrating almost the whole substance of the paper, must offer more resistance to the action of the air than the thin film which contains all the image in an albumenised paper print; and so, seeing that in addition the total amount of image-forming silver salt in a plain paper print far exceeds that in an albumenised print, we must, *cæteris paribus*, expect less permanence in the latter.

To sum up our conclusions: we should say the evidence proves that as—at anyrate for a score of years—a silver print kept from atmospheric influences often remains unchanged, a close approach to permanency is a reasonable expectation. As to the relative value of the old and new processes as regards permanency the question is an open one, which will not be solved till further experiments are made; and, as an albumenised paper print possesses a character and a beauty *sui generis*, we think benefit would accrue by a systematic trial and investigation of the old toning system under modern lights.

THEY manage this sort of thing better in "the States," and the hint may possibly be useful to secretaries of scientific societies on this side of the Atlantic. The following announcement is reproduced *verbatim et literatim* from the Chicago *Eye:*—"The secretary of the State of Illinois Photographic Association informs Mr. Ferguson, and *all fools like him*, that no notice of his communications, or others of the same tenor, will be noticed or read to the society." The italics are "the secretary's" own. Happy Mr. Ferguson! To have made such a palpable impression upon the mind of a secretary is more than some people have succeeded in doing; but we rather fancy that, if secretaries on this side adopted the Chicago system of publicly conferring gratuitous characters upon full-aged and able-bodied "Mr. Fergusons," the impressions made would be subsequent rather than anterior to the publication of character, and would be corporeal rather than mental in their application.

"FOR the information of THE BRITISH JOURNAL and others," the same number of the *Eye* gives the following explanation of the pyro. and salicylic acid developer mentioned at one of the meeting by Mr. Edgeworth, and to which we recently alluded in this columns The solutions are composed as follow:—

No. 1.

Pyro.	1 ounce,
Water	60 ounces,
Salicylic acid	10 grains,

which must be dissolved in half-an-ounce of alcohol, as it is very difficult to dissolve in water.

No. 2.

Sulphite of soda—saturated solution.

No. 3.

Lewis' lye—half-an-ounce to 30 ounces of water.

To develope take equal parts of Nos. 2 and 3 and a few drops of a solution of bromide of potassium (twelve grains to the ounce) and mix, and of this solution take in the proportion of one ounce to one of No. 1.

But "Lewis' lye" is an "unknown quantity" here.

APROPOS of the permanency of silver prints, a most interesting example lies before us as we write. It is a very richly-toned print on plain paper—a copy of a chalk drawing—and is so rich and full in colour that it can have altered little, if at all, since the day it was produced; and this, a manuscript note on the back informs us, was in 1856, nearly thirty years ago! It is difficult to believe that, if carefully kept, it will be any different when a century old.

THERE is, however, in connection with this picture another very striking manifestation of a phenomenon which apparently is less known than might be expected—we mean the action of light upon wood. The print is framed in the ordinary way with a plain pine back-board, and upon it is strongly marked in brown a negative reproduction of the print. Our first thought was that some gaseous matter from the decomposition of the image had gradually permeated the print and its mounting, and so acted upon and discoloured the pine wood. A closer inspection, however, quickly showed the cause to be simply the action of light. The print had not been mounted upon cardboard at all, but was simply stretched across the circular cut-out mount, and, being thus kept close to the back-board, the long-continued action of light had printed the image upon the latter in a most decided manner.

WITH a singular effect like this before us it is not difficult to imagine how easily paper made from wood might, when exposed to light, discolour sufficiently to give rise to the imputation of fading when carbon prints were developed upon them.

WE called attention a little while ago to a new patent process for producing bichromates, and from the advertising columns of the *Chemical News* we learn that the soda salt, under Potter and Higgs' patent, is to be had from the manufacturers. They advertise that "it is supplied in large or small lots to suit consumers," though we rather imagine the phrase to allude to manufacturers' rather than photographers' quantities. But the same salt can, doubtless, be purchased in the shops, and there is every probability that it may become an article of constant use on account of the advantages it possesses. It is very soluble in water, which will take up its own weight, and it is lower in price.

M. LÉON VIDAL writes to *La Nature* to expose the perpetual photographs-in-natural-colours craze, which has of late again seized hold of the public. There has recently been quite a noise, he says, about a pretended new invention destined to revolutionise the photographing of colours, and he deems the moment opportune for explaining how the feat may at anyrate in one way be performed. A weak print is made from a negative, and after finishing is well washed. This print is then tinted by flat washes of the colours desired, which are diluted with salted albumen instead of water. The print so treated is next floated on a sixty-grain bath, dried, and placed under the negative, care being taken to ensure its proper registration. The rest of the operations are as usual. Another method consists in painting a weak proof with water-colour pigments let down with salted albumen. It is then coagulated with alcohol, recoated with salted albumen, floated on silver, printed, and finished as usual as just described.

BLACK surfaces can also be so treated, according to M. Vidal, so as to obtain a print more in accordance with the old and faded original when a dark oil painting has been copied. There is nothing new in all this, he says, and he only describes it so as to put people on their guard from accepting as a miracle what is nothing but a *tour de force*—ingenious, doubtless, but of no value, artistically or scientifically.

THE days of iodide of cadmium for collodion purposes have passed their perihelion, we should imagine, though large quantities of collodion are still being made; but we hear of a new use for the metal—a well-known firm of nickel refiners, Messrs. Henry Wiggin and Co., of Birmingham, having invented a new metallic alloy of cadmium, which they have registered under the name of "silveroid." It is said to be of great whiteness, brilliancy, and tensile strength, and producible at comparatively small cost.

THE beautiful coloured afterglows have still another explanation. Signor Aloise G. Moceingo describes them as extra-telluric, interplanetary, or cosmic conditions recurring at long intervals, possibly never before having arisen since man's advent upon earth!

OUR readers may possibly remember the life album designed by Mr. Francis Galton, of photographic-average fame—a book in which was to be placed the life history of the owner, with details about his grandfather and grandmother, with their progenitors for some number of "great, great, greats." A valuable prize was to be awarded to the compiler of the best series of records, which were to include photographs at various ages. Mr. Galton writes that he has received upwards of one hundred and fifty good records of different families.

WE learn that platinum has been found in New Zealand in a quartz vein—a most unusual occurrence. We do not, however, think it at all probable that the "find" is likely to lessen the value of this refractory metal, nor, as a consequence, reduce the cost of platinotype printing.

THE total number of applications for tickets for the British Association this year is 772, and the Council have resolved not to receive any more prior to the meeting at Montreal, when members and associates will be elected as usual.

A NEW use for collodion is found as a fixative for microscopic sections. The method of using it is to mix the collodion with oil of cloves (one to three) and paint the microscopic slide with it by means of a fine brush at the time of using. Then the sections are placed upon the slide when painted, and the oil driven off by heat. Guy recommends the collodion and oil to be applied separately, the microscopic slides to be coated just like the collodionising a plate, and kept in stock. When required for use they are moistened with the oil of cloves, which is afterwards driven off by heat.

HARDWICH ON LIME-LIGHT EXPLOSIONS AND THEIR PREVENTION.

In the following experiments with flame extinguishers, or "safety tubes" as they are sometimes termed, the tubes were attached to the taps of the lantern jet when the contrary is not specified. The explosive ethoxo gas was forced through them by means of small india-rubber balloons, and was burnt at the orifice of the jet. To make the article complete the experiments should have been repeated with *oxyhydrogen* gas, but I am not sufficiently at leisure at the present time to be able to do this.

No. 1. A Hemming's safety tube, half-an-inch long by half-an-inch wide, made with 360 of Kirby's S.W. pins packed in tightly side by side. The pressure of gas reduced about thirty per cent. The flame passes through the tube and shatters the balloon on the other side.

No. 2*a*. A piece of cane one inch long. Pressure reduced thirty per cent. Result: same as No. 1, balloon being blown to pieces.

No. 2*b*. Pieces cut out from the centre and best part of the cane carefully fitted into a tube three-quarters of an inch long and three-quarters of an inch wide. Pressure reduced about twenty per cent. Result: same as No. 2*a*.

No. 3. A column of fine shot (sold as "dust shot") two and a-half inches long, and reducing pressure of gas about thirty per cent. Flame passes readily, as in No. 1 and No. 2

No. 4. A Broughton safety chamber consisting of a tube $\frac{7}{13}$ths of an inch long and $\frac{3}{8}$ths of an inch internal diameter, filled with granulated pumice, previously screened by means of two sieves, the top sieve containing forty-eight meshes to the inch and the bottom sixty meshes. This tube reduces the pressure of the gas about twenty per cent. The flame does not pass it, and the balloon on the other side remains intact.

No. 5. Same as No. 4, but the pumice chamber is separated from the jet by a piece of stout vulcanised tubing eighteen inches long and a-quarter of an inch internal diameter, in order to increase the volume of explosive gas. The flame now passes through the pumice with a loud report and bursts the balloon.

No. 6. Same as No. 4, but with a Chadwick back-pressure valve attached to the pumice chamber on the balloon side. Flame passes through and destroys both valve and balloon.

No. 7. Same as No. 6, but with the valve on the *jet* side of the pumice chamber. Flame passes through the combination exactly as before.

No. 8. A Broughton safety chamber, $\frac{7}{13}$ths by $\frac{3}{8}$ths, emptied of its pumice and filled with filings of "soft solder" (two parts of tin to one part of lead), sifted by means of two sieves—one containing thirty-six and the other seventy meshes to the inch. Pressure of gas reduced about twenty per cent. Flame arrested, and balloon intact.

No. 9. Same as No. 8, but eighteen inches of quarter-inch tubing between the jet and the safety chamber. Explosion more violent than before, and balloon jerked upwards into the air, but not injured.

No. 10. Same as No. 8, but chamber filled with sifted scrapings of slate pencil instead of filings of soft solder. Pressure of gas reduced about twenty per cent. Result as in No. 8. Flame intercepted and balloon saved.

No. 11. Same as No. 10, but eighteen inches of quarter-inch tubing between the jet and the safety chamber. Result as in No. 9, balloon being thrown upwards into the air but not broken.

No. 12. A Broughton safety pumice chamber, same as No. 4, but larger, being three-quarters of an inch deep and three-quarters of an inch wide, not attached to tap of jet, but separated from it by a tube eighteen inches long and quarter-inch internal diameter. Pressure of gas reduced about twenty-five per cent. Result satisfactory, flame being intercepted and balloon saved.

No. 13. A tube three-quarters of an inch deep and half-an-inch wide, filled with zinc filings, and screened as before. Pressure of gas reduced about twenty-five per cent. Flame arrested as in No. 12. In this experiment I examined the gas remaining in the balloon, and found it strongly acid and contaminated with the products of combustion, which appear to pass through the tube, although the flame is extinguished.

In tabulating the results of the above experiments the first thing which strikes me is that the safety tubes in which the channels for passage of gas were *straight*, so that you could see the light shining through on holding them up to the light, all failed; whereas the tubes which had zigzag passages, as originally proposed by Mr. Broughton, of Manchester, succeeded (with the exception of the shot, which was evidently too coarse). The pumice, however, seemed to require a longer column than the others, and this I did not at first understand. On opening the Broughton chambers, however, the reason was obvious, for they had been a long time in use, and the granules had sunk down, leaving a portion of the upper part of the tube empty.

Metal filings (of which, perhaps, filings of pure *tin* would be the best) have this advantage—that they are better conductors of heat, and must, therefore, tend to cool the flame. They are also not liable to disintegration and dust; on the other hand, the chlorine contained in the oxygen gas would be more likely to affect a metal than to act on a substance like slate or pumice.

The screening of these granules is a very simple operation. All that you have to do is to cut two squares of wire gauze of the right degree of fineness, and then to lay the filings on the top piece and tap it gently with the handle of a knife. All that passes through the first sieve and remains *in situ* on the second should be retained for use. The fine dust will pass the second sieve, and must be rejected.

Flame extinguishers should be carefully made, and should also be examined from time to time to see that they are quite full. Sift out the whole of the fine dust from the pumice, or it will be blown through into the flame, causing it to flicker. Fill the chamber to the top, tapping it gently until the pumice has well settled down; then remove the excess with a straight edge, and keep it in position by a circle of wire gauze seventy meshes to the inch. The tube should be made to open easily, with the top nozzle screwing upon a leather washer to make it air-tight.

As regards the proper position for the safety tubes: I suggested, in my paper read before the Edinburgh Photographic Society, that they should be placed on the nozzles of the ether tank. I now see, however, that this would be too low down, and that the volume of the exploding gas in front would be dangerously large. The nozzles of the dissolver would be better, but the taps of the jet would be best of all, unless the jet could be made purposely with a safety tube between the mixing chamber and the nipple, which is *theoretically* the right place for it to occupy.

Taking into account the number of experiments I have made, and the repetitions of the same in cases where any doubt remained, I think I am in a position to say that a safety chamber three-quarters of an inch long and half-an-inch wide on each tap of the jet will give complete security. Some, however, have thought that a back-pressure valve should be added to prevent *suction* when a weight falls off from the bag. This at first was my own opinion, but I now see that I was mistaken, and that the falling of a weight does not produce that strong suction which is usually supposed. When there are *two* bags no doubt the gas passes rapidly from the one to the other in such a case, but that is explained by the loaded bag *forcing* it into the bag from which the weight has fallen. With a single bag, as in the ethoxo process, the compressed gas expands and regains its original bulk, but it has no power to draw in either fresh gas or liquid. To prove this you have only to take an empty wash bottle and connect it on one side with a bottle of the same kind containing water, and on the other with a loaded bag of air. Now, remove the weights suddenly, and you will see that the level of the water is not disturbed, and that the empty bottle remains dry. If there had been suction to an appreciable extent some of the water would have been drawn from the one bottle into the other.

So satisfied was I with the result of this and a few similar experiments that I did not hesitate to fill a pig's bladder with explosive gas and to pull the forty-pound weight off it whilst it was blowing a strong, hissing flame at the orifice of the jet. The flame passed back into the jet with a report, but it stopped at the pumice chamber and did not enter the bladder. I tried the same experiment a second time with the same result; there was either no suction at all or not enough to interfere with the protective power of the safety tube.

Back-pressure valves, however, although not so urgently needed in the ethoxo lime light, are most useful in the oxyhydrogen process when two bags are employed with separate boards and weights; and it is not easy to see how an explosion could happen in such a case, even without safety tubes. The two together—tubes and valves—would give absolute security, but the pressure of gas would be much reduced, and heavier weights would be required.

I have been in correspondence lately with the North British Rubber Company, of Charlotte-street, Manchester, and they have sent me a sample of vulcanised sheeting, $\frac{1}{16}$th inch in thickness, which I find to answer admirably for Chadwick's back-pressure valves. They have also recommended the "pure grey rubber" tubing, as less liable to tear or crack than the red or any other variety. T. Frederick Hardwich.

COLOURED AND NON-ACTINIC LIGHT.

It is a pleasure to find the pen of so able a writer as Mr. Lewis Wright engaged, as it was in your issue of the 16th instant, in the consideration of this subject; and I should not have felt disposed to comment upon that gentleman's remarks if it were not that, as it appears to me, he has somewhat overlooked an essential factor in the question, which I believe only requires to be pointed out to be admitted.

Mr. Wright says that we must proceed by "finding the *least* actinic bands in the actual spectrum on the actual plates to be used, and by finding, with the prism, coloured glasses or other media which correspond with these bands. Any other method is a kind of 'hit or miss' that is sometimes necessary, but which, when better methods are accessible, is like groping in the dark."

The method recommended by Mr. Wright is certainly that which has been adopted and advised pretty generally; but there are several reasons why the result thus arrived at may not be the true one. The first and principal objection to it is that it takes no account of the different *illuminating* powers of the different parts of the spectrum. Suppose it to be found that the lower down the spectrum the less is the photographic action, it would follow as a matter of course that deep crimson red or magenta is the proper colour to use in the laboratory. As a fact, however, the red possesses very much less illuminating power than the yellow, yellow-green, and yellow-orange; and the question should rather be—Which part of the spectrum possesses the least effect upon the photographic film in proportion to its illuminating power? Now, although various portions of the actual spectrum *could* be actually isolated and their luminosity compared, I am not aware of its ever having been done in this connection. Moreover, the nature of the source of light would so greatly affect the luminosity of the various portions of the spectrum produced from each particular radiant, that a number of tables would have to be made.

Another reason why visual comparison through a spectroscope might fail to indicate the safest medium to use is that the ultra-violet rays which have such a powerful photographic effect would escape notice altogether.

Yet, again: of the media which are available there are none that permit the passage of light from one portion of the spectrum only, and to have to calculate the effect of small and constantly-diminishing quantities of photographic effect would render the problem extremely difficult, and probably cause the answer to come out incorrectly. Further: there appears to be great difficulty in obtaining definite results with spectrum photography. The observations of the same experimenter made one day may not accord with those produced upon another occasion, and great differences occur in the statements of different experimenters.

Captain Abney states that the effect of the addition of iodide to a bromide emulsion is to make it so much less sensitive to the orange that plates containing iodide, as plates now made generally do, may be safely manipulated in an orange light; whilst pure bromide ones are sensitive as low down as the orange, and require to be worked in a red light. Dr. Eder has quite recently stated that the addition of iodide renders plates *more* sensitive to the yellow, which is close to the orange; and his statement, therefore, may be taken as opposed to that of Captain Abney and more in accordance with the later experiments of Sir J. Herschel, who considered the addition of iodide necessary in order to obtain sensitiveness in the lower portion of the spectrum. In any case the actual difference is much less than the photographer, reading of the results of experiments in spectrum photography, would be apt to believe.

In photographing a sheet of bright-coloured ribbons with rapid emulsions of three varieties—one containing only bromide, one with five per cent. of iodide, and one with ten per cent.—the difference of sensitiveness to the different colours was so slight that it could not be absolutely affirmed. If there were any difference I incline to think that the result was slightly in favour of Sir J. Herschel's and Dr. Eder's views—that the sensitiveness with the iodide added was a little greater in the orange than with the pure bromide; but the amount of difference was so small that, as I have said, I should not like to affirm it as a fact.

I think it must be admitted that a simple and better manner of ascertaining the comparative safety of any two is to find some distance at which a certain visual power exists—by reading, for example—and then to expose a plate for a certain time at that same distance.

Mr. Wright, in speaking of the necessity for ascertaining the least actinic bands in the actual spectrum on the actual plates to be used, doubtless assumes, as anyone would do from what has been written on the subject of spectrum photography, that slight differences in the composition of the plates—such, for instance, as that which has been referred to, namely, the addition of a small quantity of iodide—will cause considerable difference in comparative sensitiveness to different parts of the spectrum, and that this will correspond with a proportionate difference in the behaviour of the sensitive compound to the coloured light given off by natural objects or passing through tinted screens. That this is not the case I believe I have shown.

There is another point upon which Mr. Wright appears to have been misinformed. He says:—"It appears well established that some *small* amount of exposure in preparation is actually essential to sensitiveness itself." I suppose the ground for this is the fact first demonstrated by Mr. W. K. Burton, that preliminary exposure does make a film more sensitive to faint traces of light, as shown in the higher figures of the sensitometer; but any apparent sensitiveness thus gained is of very doubtful utility in the camera, and, certainly, it cannot be stated as a general fact that light in preparation is essential to sensitiveness. That would imply that there is no sensitiveness without it.

Mr. Wright suggests glazing a lantern with strips of differently-coloured glass, so as to produce a composite white light. I showed a lantern on a similar principle at the meeting of the Photographic Society of Great Britain on the 13th inst. In this lantern the light from two paraffine lamps—one glazed with "stained-red" glass and the other with a yellowish green—was projected upon a white card and then passed through tissue paper. The light given, compared with daylight, was somewhat yellowish; but not so yellow as when the coloured glasses were removed and the lamp turned down to give about the same luminous effect to the eye. Nevertheless, whilst with the latter arrangement—low lamplight reflected from card and passed through paper—a strong image was given upon a plate held for a minute's time at a reading distance. From the composite white light the image was so faint that it could scarcely be said to be visible at all, and would not have shown as fog if there had not been a sharp edge to the mask covering the remainder of the plate.

No one need expose a plate to the light that he is working so much as to be equal to being held full square to that light for the space of a minute at a reading distance; and, therefore, with ordinary precautions, such a light may be safely used for developing purposes, although not so absolutely safe as a yellow light.

There is a point in my experiments upon which an explanation from such a lucid and careful writer as Mr. Wright would, I think, be welcomed. The stain in the glass known as "stained-red" is one which, when in a thin layer, is yellow, and is due to silver. By increasing the thickness of the layer the colour to the eye passes first from yellow to orange, then red, and lastly ruby or crimson. A gold stain, when thin, appears pink or pale purple red; but upon increasing the thickness of the layer the colour appears to incline less and less to the magenta, and finally tends more to the orange-red than the piled-up silver-yellow. The ordinary ruby glass stained with copper undergoes no such changes. W. E. Debenham.

PHOTOGRAPHIC INDUSTRIES.

THE LANTERN FACTORY OF MESSRS. W. H. OAKLEY & CO.

However correctly it may be asserted of certain retail tradesmen that they display their entire stock in their shop windows, such cannot, at anyrate, be said of Messrs. W. H. Oakley and Co., who do not put themselves to the trouble of displaying any of their lantern or philosophical appliances either in their window or, for that matter, in their shop. In good truth it must be said that the outside of the premises in Grange-road, Bermondsey, affords not the slightest clue as to their being connected either directly or indirectly with the philosophical, not to say fine, arts. For this there is a good reason as will soon be perceived.

Established about forty years since as an operative engineers' factory, it is only of comparatively recent date that a photographic and lantern branch has been grafted on the original engineering business; but this department has already grown into large proportions, more especially that devoted to lanterns and lantern appliances, and to which we purpose confining our notice on the present occasion.

The more purely engineering department of this establishment is situated on the ground floor—a fact of which the visitor becomes immediately aware as soon as he passes the threshold, the shelves on his right groaning under iron pipes intended for gas or water purposes, those on the left with numerous and varied appliances cognate to mechanical engineering, while straight ahead and in the distance appear turning lathes, work benches, and the paraphernalia of a large workshop, which are propelled by two steam engines of six- and ten-horse power respectively. According to the pressure of orders these are worked either singly or conjointly. With this portion of the establishment, however, we have nothing to do at present, but proceed into an upper room crammed to repletion with what we may designate lantern stock in every stage of progress, from the separate pieces which comprise the elements of an outfit to the completed lantern outfit itself.

When, twelve years ago, the determination was arrived at by this firm to enter into the lantern business, the intention was formed to keep as much as possible out of the well-worn and beaten paths in which such a branch of business had previously been conducted; and in adopting lantern making as a speciality, Messrs. Oakley and Co. resolved to apply their powerful mechanical appliances and resources to this end, and to manufacture everything except lenses and slides, thus taking a new departure in their business as far as such was possible. This, it will be remembered, was soon after the period when the lantern had slowly emerged from its quondam position as a toy into the *rôle* of a scientific instrument, and when there was a tolerably wide field before any ingenious and enterprising aspirant who chose to enter into that business.

Among some appliances possessing a degree of interest more or less historical, we were shown the original slide adapter from which arose, or sprang, others of the adapting class; that is, those by means of which slides of various dimensions can be brought into a central position in the axis of the condensers. The notched adapters (if such a term be admissible), now well known from the publication of their structural details in THE BRITISH JOURNAL OF PHOTOGRAPHY and elsewhere, seem to owe their inception to the unpretending slide submitted to our inspection.

Knowing the importance of system when exhibiting lantern slides, we were interested in a box cheap and of somewhat unassuming appearance which was presented to our notice. It bears the not very poetical name of a "consecutive box," and we think a brief description may be useful to some who, like ourselves, have never before become acquainted with this useful piece of apparatus. It consists of a box in which the slides are laid in proper consecutive order. It has a bottom and sides, but no top—at anyrate while in use. The sides, however, are formed of corner pieces so arranged as to render it quite easy to pick out one slide after another for transference to the lantern. The simplicity of this is almost ludicrous—the value unmistakable; and after this we shall not willingly be without a "consecutive box" when exhibiting photographs by the lantern.

Another appliance with which we were much pleased was a portable screen elevator. This piece of apparatus is not only quite portable, but can be adapted to the dimensions of any screen which the exhibitor thinks it prudent to adopt—anything, for example, from five feet square to twenty feet square, beyond which it is not considered necessary to go in the usual course of such exhibitions. We do not intend to describe this apparatus here, but content ourselves with saying that by an ingenious and very simple adaptation of rods, which fix into each other by something similar to fishing-rod joints, the dimensions of the supporting frame may be adjusted to suit any particular size of screen adopted under any special circumstances.

We were much pleased, also, to see a simple method by which the tap of a gas-bag could be so locked up as to be placed beyond the tampering propensities of any curious or prying spectator. Those who have had experience in lantern work know the feeling of insecurity engendered when leaving an oxygen or hydrogen bag fully charged under the control of inexperienced or ignorant persons, who, without intending any harm, might amuse themselves by turning the taps in order to hear the gas rush out. In the protected tap immunity from such a course is secured by a metallic belt being passed round it, so as to prevent the tap being turned round or tampered with, a small padlock securing it when in position.

We could perceive that Messrs. Oakley and Co. did not look with much complaisance upon the supply of oxygen from metallic chambers in which the gas was compressed as when gas bags formed the reservoir. The objection seemed to lie in the constant changing and diminution of the pressure, which rendered it necessary to have a continuous supervision of the tap, whereas with the bag this is unnecessary. The initial pressure in the gas tank is about 550 pounds, and from this down to the minimum the transition is very sudden. In the case of steam pressure, on the contrary, it can be reduced from fifty pounds to ten pounds with ease; not so, however, is this the case with an initial pressure so great as that in an oxygen cylinder.

The difficulty of getting a camera erected on a rail fence from which to photograph a race-course, or on the gunwale of a vessel, will be readily appreciated. We were shown an appliance specially adapted to meet such a case, and it was most effective.

As might well be understood, the preparation of oval or circular *shapes* in metal for cutting out mats for lantern mounts is, in a large factory such as that here under notice, a matter involving no trouble or difficulty. Accordingly, we saw many such shapes just as they were brought from off the oval chuck of the turning-lathe.

The machines for shearing and bending iron plates into lantern form, and also for punching into them the apertures appropriate to the various requirements of the business might here be referred to, but could not so easily be described.

Our readers would probably feel but small interest were we to attempt a description of the various operations connected with the woodwork of this lantern factory, which were carried on in an adjoining room; but the machines for grooving the wood for boxes and frames are of the most perfect order, and evince great ingenuity.

One of the most useful devices manufactured by this firm consists of a reading-lamp and desk. These are erected upon a slender pillar, the lower end of which screws into the floor. The height can be adjusted to suit the requirements of the lecturer, and the light emitted from the lantern is confined to the MS. of the lecture lying on the desk. A touch of a tiny bell, or the flashing of a signal, announces to the exhibitor the proper moment at which to change the scene.

Noticing the excellent quality of the india-rubber goods employed by this firm, we were informed that one of the family was connected with a large india-rubber factory, by which they were enabled to have just the class of goods made for them which they required.

In the stock-room drawer after drawer was pulled out, displaying a plethora of appliances for lantern manufacture, the season for which will soon commence; for in this trade the shadow of winter is cast long before the advent of that season.

In conclusion: we were much pleased with all we saw at this extensive establishment, and felt impressed with the fact that there was no fear of this country losing its *prestige* in lantern manufacturing so long as able mechanicians and philosophic instrument-makers like Messrs. W. H. Oakley and Co. are to be found engaged in the production of apparatus which are in modern life now found to be indispensable.

ON THE SENSITIVE-TO-COLOUR COLLODION PROCESS, OR THE CORRECT REPRESENTATION OF COLOURS BY BLACK PHOTOGRAPHS.*

I.—INTRODUCTION.

MENTION has already been made in these pages of the fact that I have succeeded, according to the principles laid down eleven years ago, in preparing collodion plates which are at least eight times as sensitive to the yellow as to the blue of the spectrum, and that it has, therefore, been possible to photograph the colour scale in my *Lehrbuch*, so as to give the blue, yellow, and green their proper values. The matter has excited the liveliest interest in scientific and photographic circles, and stress is everywhere laid upon its importance in reproduction by photography. Consequently, the Association for the Cultivation of Photography has resolved to acquire the process, and by its publication to make it public property.

According to the decision of the Association I herewith publish the process, and begin with the purely practical part, referring to articles in former years, and to that just published [see page 327], for the principles of the matter. Later on I shall give a more minute description of my experiments.

Ordinary portrait collodion shows its highest sensibility to the dark-blue parts of the spectrum, which are erroneously called "indigo blue." It is only after a very long exposure that a sensitiveness to green, yellow, and red appears. According to the principle first demonstrated by me, one can increase the sensitiveness to green, yellow, and red by the addition of dyes which absorb these rays.

* This is the process "crowned" by the Berlin Association for the Cultivation of Photography.

[There still prevails in many circles, even in those where one would expect better things, the most complete ignorance respecting the effect of these additions. For example: one could lately read in a trade journal that "the employment of cosine does not produce the slightest increase of sensitiveness to yellow." How far this contention flies in the face of facts will best be seen from this—that the collodion to be hereafter described already gives a representation of the yellow of the spectrum after an exposure of one second, while the same collodion *without* cosine shows but a slight trace of the action of yellow after an exposure of one minute. The sensitiveness to yellow is at least increased sixtyfold by the measured addition of eosine to that collodion. But should it be objected that that applies only to the spectral colour, and not to the ordinary pigment colours, one can easily convince himself that the sensitiveness to yellow pigments is also greatly increased by the addition of eosine. For example: one may photograph a colour-scale through yellow glass upon pure bromised collodion and upon collodion stained with eosine, and will at once recognise the increased sensitiveness of the latter to yellow. That by the addition of many dyes the sensitiveness to blue rays may also be decreased I have already mentioned in the third edition of my *Lehrbuch*, page 153. Wet eosine-stained bromide of silver plates are about two and a-half times less sensitive to blue than unstained bromide of silver plates. Any reader who may be interested in this point is referred to what I did in 1878, and to the chapter treating of that subject, pages 149 to 159 of my *Lehrbuch*.]

The great majority of these dyes act best upon collodion dry plates, as proportionately few are suited to the wet process. To these belong the dyes known under the name of "eosines." In commerce two kinds of eosine are known—eosine yellow (the scientific name, fluoro-tetra-bromide of potassium) and eosine blue (the scientific name, fluoro-tetra-iodide of potassium); besides methylated, chlorated, and nitrated products—all of which I have tried. Keeping back the details of the action of these for the present, I only remark here that these substances are produced as important dyes, but that they are not to be had pure commercially, and are often adulterated with dextrine, &c. These impurities have an injurious effect upon the silver bath.

The Joint Stock Analine Dye Manufacturing Company, near the Silesian Gate (Berlin, S.O.), has, at my request, undertaken to prepare purified dyes for photographic purposes. Of the two eosines—yellow stick and blue stick—the latter gives rather more intensity than the former. When united to alkalies both show a so-called fluorescence (shimmer—changing of colours like shot silk); in dilute solutions they dissolve with ease in water, but not so readily in alcohol, and they absorb very greedily the yellow-green and blue-green rays. When added in proper proportions to collodion dry plates they render them sensitive to these rays, and upon this their action in the matter of sensitiveness to colour is based. Beside these substances, a dye (not yet exactly determined—cyanosine), which I owe to Dr. Martius, has proved a very active sensitiser of wet plates for yellow rays. It indeed surpasses the eosine, since its absorption region extends further towards the red of the spectrum, and, consequently, it not only gives rise to a sensitiveness to yellowish-green, as eosine does, but also to a sensitiveness to orange.

Unfortunately, this material, as sent into the market, is not pure enough for photographic use, and as yet the Aniline Dye Manufacturing Company only make a special preparation for photographic use of the yellow-stick eosine, which, by my directions, they re-crystallise twice. This I recommend provisionally to all who may desire to experiment with stained collodion. Afterwards, erythrosine is to be specially prepared for photographic purposes, and then, of course, it will be preferable to the eosine. If this dye be tried upon gelatine or collodion dry plates, one will soon see that the former plates can be rendered by it, at most, twice as sensitive to the yellow of the spectrum as to the blue of the spectrum. This would practically be of little advantage, since the yellow of pigments is so dark compared to the yellow of the spectrum that, as I have already mentioned, the sensitiveness to yellow must exceed the sensitiveness to blue by twenty-five times in order to its representing the pigment yellow as really lighter than the blue. Collodion plates furnish much better results. At the very first attempt I succeeded in preparing plates which were from eight to ten times as sensitive to yellow as to blue. I am, therefore, quite justified in turning for the solution of this interesting problem direct to the collodion process.*

The action of the dyes, however, depends greatly, as I have shown both above and on former occasions, upon the composition of the collodion. If about five per cent, of a 1:400 solution of eosine or cyanosine be added to some ordinary iodised collodion, one will observe but little sensitiveness to yellow on taking an ordinary photograph. I, therefore, made experiments with iodised collodion containing various proportions of bromide, and these showed that the *sensitiveness to yellow increased the more the richer the collodion was in salts of bromine.* This experiment at once pointed to the use of a *bromised collodion.* It proved, however, that a slight proportion of iodine had a favourable effect upon the general sensitiveness. If the silver bath, by long continued use, already contains iodine, then a sufficient quantity of iodide of silver will be precipitated by it upon the plate, so that pure bromised collodion can be used; but when the silver bath is freshly prepared and poor in iodine it is as well to add five per cent. of pure iodised collodion. Generally, it may be assumed that the sensitiveness to white light of the bromised collodion plates stained with eosine and sensitised in a bath containing iodide of silver is three times less than the sensitiveness of ordinary portrait collodion.

II.—Formulæ.

Solutions of Dyes.—For the present—that is, so long as other sufficiently-pure dyes do not find their way into the market—eosine-blue and eosine-yellow are recommended. Dissolve half-a-gramme, by prolonged agitation, in 160 c.c. of alcohol of 95°. Let what remains undissolved settle down, and then pour off the clear liquid.

Collodion.—Dissolve two grammes of bromide of cadmium in thirty c.c. of alcohol; filter, and mix one volume of the filtrate with three volumes of neutral celloidin collodion containing two per cent. of cotton. For many purposes a thicker film is preferable. Such may be obtained by dissolving two and a-half grammes of bromide of cadmium in thirty c.c. of alcohol, filtering, and mixing in the above proportions with a two and a-half (instead of a two) per cent. collodion. Such a collodion flows with difficulty and silvers more slowly. To ninety-five c.c. of the above collodion add five c.c. of the above eosine solution and shake well. The collodion is best kept in yellow bottles and exposed as little as possible to daylight. (An increase of the proportion of the eosine solution does not increase the sensitiveness to yellow. It only lessens the general sensitiveness of the plate; but lessening the proportion of eosine does lessen the sensitiveness to yellow. The above proportions were arrived at by numerous experiments with mixtures of various proportions.)

The Silver Bath.—Crystallised silver salt 50 grammes, water 500 c.c., 1:100 solution of iodide of potassium 13 c.c., acetic acid until a distinctly acid reaction is observable (at most six drops). Nitric acid does not recommend itself for sensitising, as it acts too strongly upon the dyestuff. It must be expressly mentioned that eosine destroyed by acid will be converted into a yellow dye which no longer exercises the desired reaction of increasing the sensitiveness to yellow, and, therefore, an excess of acid is to be avoided. Keeping in view the danger of the silver bath being contaminated by the impurities which are added to the existing commercial dyes, I do not consider it advisable to silver the stained collodion plates in the same bath in which portrait plates or other plates for reproductions are to be silvered; therefore, in order not to use too much bath solution I use a flat bath and not a dipping bath.

Developer, Intensifier, and Fixage.—For these the usual solutions used in the ordinary wet process may be used. The plates are treated just as in the wet process. It is one of the advantages of this process that it does not necessarily entail any change in these operations, and that anyone acquainted with the wet process can at once work with stained collodion. The pyro., corrosive sublimate, uranium, and lead intensifiers can all be used just as upon ordinary collodion.

III.—Mode of Working.

It is best to gelatinise the plates. Dissolve one gramme of gelatine in 300 grammes of warm water, filter, and when cold add to it 6 c.c. of a 1:50 solution of chrome alum, prepared cold. (Clean the plates with acid, wash them, lay them on a flat dish amongst distilled water, and then coat them twice with the gelatine solution. The first coat only serves to drive off the water, and what runs off should not be collected. This operation is best performed in a room that is not too cold.) Coat with collodion as usual, but silver a much longer time, as the bromide of silver forms very slowly, taking at least five minutes. The stronger the silver bath the more rapidly does the formation of silver take place. *The bath should be tested with litmus for acid and the requisite acetic acid added before beginning work.* With regard to the lighting of the dark room one does not need to be too anxious. I recommend a lamp with an orange-coloured lamp chimney. Eosine itself renders the collodion but little sensitive to light. If the plate be held as much as possible in the shade, even yellow light may be used for the dark room. When I have to work with the bare yellow light I hold the plate so that it is canted away from the light, and thus there is no danger to be dreaded.

Exposure.—As already mentioned, the sensitiveness of the eosine-stained bromide plates is about a third of that of ordinary iodised collodion plates. From that the length of the exposure can be measured. In taking coloured pictures, such as the colour scale in my *Lehrbuch*, the increased sensitiveness to yellow does not appear so strikingly as many might expect. But on the other hand it does come out very distinctly in the case of rose-coloured dyes, as the madder lake of the colour scale. These stand out with their proper values. But for other tones (as green) the action of the eosine also appears very positively. If it be desired to still further diminish the action of blue, recourse must be had to *yellow glass slides.* The accompanying* scale was photographed through a yellow slide. In the choice of these

* My experiments with gelatine plates will be described afterwards. I shall only remark here that even the Parisian isochromatic plates of Mr. Clayton and M. Tailfer were only twice as sensitive to yellow as to blue.

* This allusion is to the illustration which accompanied the article in the *Mittheilungen.*

some care must be exercised. A slight want of sharpness is observable in this photograph, the cause of which is that the only piece of yellow glass at my disposal was not plate-glass, but foggy, yellow window glass. Through plate-glass one would get faultlessly sharp pictures. It is also very important to get the right shade of yellow in plate-glass. If it be too dark it prolongs the exposure too much; if too light it does not sufficiently counteract the blue. I distinguish the proper shade by the use of the spectroscope. To be able to use a spectroscope will soon be a matter of necessity for those who wish to take up such experiments; but he who cannot use the spectroscope may test for the tint photographically.*

I do not, however, say that every picture must be taken through yellow glass. There are many pictures which can be best photographed without it, but he who has much to do with copying coloured pictures will soon learn by practice if a picture would be best copied with or without the yellow glass, or if not a few experiments will eventually bring him to it. It must, however, be borne in mind that the yellow glass always increases the length of the exposure—often even three times—as even the best yellow plate glass absorbs not only blue light, but some yellow also.

In using stained collodion I usually employ an aplanatic which gives a picture sharp enough even with the full aperture. When the exposure is likely to be long I use a dark slide that has a sheet of plate glass let into the front, in order to prevent the plate from drying, and if required this might be yellow.

The Second Silver Bath.—After the exposure the plates may be developed just like any other wet plates, if the bath be not much affected by the impurities inherent to most dye stuffs, and which cause so-called organic bath flaws to appear after a few plates have been sensitised. These consist partly of crescent-shaped streaks extending from the edges towards the centre. These may be avoided, or at least diminished, by diligently moving the plate about in the bath. If, however, the bath be strongly affected by organic matter, then the only remedy for these impurities is the second bath, which may be called the "developing bath." After exposing, and *before developing*, dip the plate in the following bath:—Silver salt, 50 grammes; water, 500 grammes, nitric acid of 1·22 spec. gravity, 4 to 8 drops. Move the plate about steadily in this for a couple of minutes; the adherent impure silver will be rinsed off by it, and the eosine will be decomposed by the strong nitric acid. The development may then proceed without any risk of the above-mentioned faults showing themselves.

In time, of course, the developing bath will become dirty; it may then be taken into use as a sensitising bath after it has been neutralised, and then acidified again with acetic acid. *This bath also must be tested for acid with litmus before it is taken into use.*

The Development.—The plates are, as a rule, developed with the ordinary developer for wet plates; but the alkaline developer may be used with equal success, and with this advantage—when organic impurities are present fewer stains show with it than with the acid developer. With the acid developer *only one* silver bath is used. The exposed plate is washed first with distilled water, then under a tap for about five minutes, rinsed again with distilled water, and then developed—preferably in a flat dish—with the following developer:—1 to 6 solution of carbonate of ammonia, 2 c.c.; 1 to 4 solution of bromide of potassium, 0·50 of a c.c.; 1 to 10 alcoholic solution of pyrogallic acid, 1 c.c.; water, 30 c.c. With too short exposures the quantity of carbonate of ammonia (which must be dissolved fresh from the glass-like condition) may be increased. —*Mittheilungen.* H. W. Vogel, *Prof.*

(To be continued.)

* In order to make the matter easier to photographers Beyrich, of Berlin, has undertaken to supply yellow plate-glass which I have tested spectroscopically, and also an arrangement for affixing the yellow slide on the inner side of the lens, and also all the other requisites for the process.

THE SPECTROSCOPE AND DEVELOPING-LANTERN SCREENS.

Now that photographic operators learn that they have been unnecessarily injuring their eyesight for years, by the unscientific nature of the coloured screens hitherto in general use for the lantern or window of the developing-room, an apalling reaction has set in, so that in some cases the accuracy of the first principles of science is being denied, spectroscopic facts are cited as untrustworthy, and before long we may hear the zodiac spoken of with disrespect and the equator declared to be a humbug. A spirit of irreverence is abroad in the photographic land.

The well-proved principles of photo-spectroscopy and optics have in no case been in the slightest degree invalidated by any of the changes going on in developing-room illumination, so far as I can see. For instance: let the general avoidance of green light in the past, because of sweeping assertions founded on spectroscopic facts, be first considered.

In the first place, the maximum actinic power of the spectrum does not lie in the green; in the second, a little actinic light in the developing-room does no harm, and may do good if the plates are sufficiently good to have a reserve of the anti-fogging power spoken of by Mr. George Smith; and, in the third place, attention can be advantageously given in developing to the law that the intensity of light diminishes with the square of the distance from its source. So far as I know, none of the persons who have worked with spectroscopic cameras have printed some required detailed tabular results of painstaking experiments, which would have been of special value in photography.

For instance: tabulated experiments as to the spectra produced by differences of time of exposure, all other conditions being the same, would be of value to show how much photographic action is set up in the most active part of the spectrum before the rest of the field produces a developable image, and to show what are the times necessary to drive a developable image through the green and ultra-violet regions. A standard light would have to be employed. The same experiments should be repeated and tabulated, with standard lights of other degrees of intensity. Then some of the series of experiments should be gone through again with sets of plates of varied make and rapidities; for it is only from such data as these to work from that opinions can be formed for practical purposes bearing upon many questions in photography.

With a pure spectrum how long an exposure is necessary to produce a developable image in the red, as compared with those of the green and blue? A bald statement that certain parts of the spectrum produce certain effects on photographic plates is practically almost valueless without tabulated information as to times, intensities of lights, variations in the make of plates, and so on. The effect is comparatively feeble in the green, and if that little require a long exposure to bring up well, one point is unravelled explaining why recent practical results are not at variance with the indications of the spectroscope.

By turning his back to a candle at the end of a room of moderate size the operator can develope a dry plate by candle-light, yet this development by the light of all the rays of the spectrum does not nullify the results of spectroscopic research; it means only that another law has been called into use, namely, that the intensity of light varies inversely as the square of the distance. With a sheet of white tissue paper round the candle the operator might turn his face to the candle at the opposite side of the room and develope the plate, for the tissue paper would but have the same practical effect as if the candle had been removed to a greater distance. A plate of transparent, colourless glass would not have the same effect, for then the photographic differences between transparent and translucent screens come into play. If the operator next put proper colour into his sheet of tissue paper be can work very much nearer the candle; and with properly-selected green and yellow tissue paper—one thickness of each—he can develope ordinary gelatine plates within seven or eight inches of his tissue-paper lantern. A bright paraffine flame in the lantern, instead of a candle flame, or a badly-selected sample of green tissue paper would fog plates under these circumstances; so a little care is necessary in thus obtaining a bright light for developing purposes. W. H. Harrison.

ON THINGS IN GENERAL.

I was very much interested in the perusal of Mr. Lewis Wright's paper on *Coloured and Non-Actinic Light* in this Journal for May 16th. He puts the question of actinic illumination in a manner easily understood, and his dicta, being those of an exceedingly practical man of great scientific attainments, should be well received by the general body of readers of "ours." He points out very properly that there is no such thing as a non-actinic light; yet, I think it may be quite permissible to speak of a non-actinic illumination, the former having a more rigidly scientific import than the latter, which one may refer to the practical effect under given conditions. This discussion, initiated by Mr. W. E. Debenham's valuable papers, which threw an entirely new light upon an old subject, has been most interesting, and if it have done nothing more it will have caused photographers to think about subjects they have hitherto looked upon either as truisms or as out of the bounds of controversial consideration.

Is there any photographer living who (being a user of gelatine plates) cannot cordially re-echo Mr. C. Beckett Lloyd's remark—"If commercial dry-plate makers would expend more of their energies in wrapping the boxes and less in wrapping the plates they would, I think, save a good deal of dark-room bad language." What is more provoking, when closely pressed for time and not a single moment to spare, than have to remove cover after cover from a dozen plates before the slides can be charged? Possibly a piece or two of string has to be cut in addition—a piece of string just too strong to be broken by the hands, which, in the effort to do so, may themselves be very readily frayed and cut in lieu of the string. Dry-plate makers take notice, and do not pack up all your plates as though they were to be used by idiots.

The reports of the lectures at the Royal Institution, given from time to time in these pages, are often very interesting. That by Dr. Odling, the other day, describing some curious properties of hyposulphite of soda, was particularly so. By-the-bye, how confusing to read of hyposulphite of soda as spoken of in a photographic journal and in a chemical journal, two entirely distinct salts being referred to! No doubt many of my readers know quite well what is meant in either case, but with photography under its present scientific aspect the *mélange* should not exist, and might cause considerable confusion under some circumstances. I note that, as a rule, the Editors in their leading articles use the term "hypo." rather than the photographic word in full. If this be done of set purpose the plan is excellent, and may pave the way to the use of the the term "thiosulphate," which is the name given by chemists to the salt used by photographers under the name of "hyposulphite of soda." The latter, indeed, is a developing rather than a fixing agent, and I see no reason why experiments made with it in that connection should not be attempted. Nothing has been done since Mr. Saaman's trials made several years ago, and published in the pages of this Journal. At a meeting of the Parent Society the other day it was very pertinently remarked that some samples of "hypo." contained a considerable amount of sulphite of soda. I believe this to be quite true. I have seen a cask of hypo.—which certainly was kept in a rather warm place, but some of whose contents were being removed daily—show before it was half empty a considerable amount of effervesced salt, which in all probability would be either sulphite or sulphate. Quite possibly it might, in these days of sophistication to meet the demand for cheap goods, be sulphate purposely added as an adulterant.

Mr. Debenham's lecture on photographic optics was particularly interesting, and calculated to impart a large amount of information in a small space, if only it were read. Unfortunately, however, there are such a number of photographers who don't read—that is, in the sense of studying; yet, after all, one ought not to grumble, for there is a far larger proportion of good men (really intelligent, educated men) in the ranks of photography than there were even ten years ago, not to speak of the period when photography eclipsed school-keeping as a refuge for the mentally halt and maimed, and was the thing to fly to when a man had failed in every other walk of life. However, there must be a beginning to all things. It would be rather disappointing to hear, at the above lecture, Mr. Cadett's remarks that, after all, mathematics were not found to be of much actual value, seeing that Mr. Warnerke, who had purposely qualified himself in optical mathematics, found his knowledge of no use—practically, I presume, found the system of trial and error the best to work by. At the same time I take it that the leading opticians, though they may be aided by such a system, do not make any fresh departure without the aid of elaborate theoretical investigations, and, if I mistake not, we shall see the outcome of such investigations in the very near future.

Much sooner than I expect to see any result from Mr. Matthieu Williams's amusing hypotheses. That gentleman has recently been writing for the *Gentleman's Magazine* a disquisition on phosphorescence and illumination, in which he indicates that he looks forward to the time when we shall get something in the nature of extract of glow-worm-light without heat—a pound of wax candle to be converted into a phosphorescing mass that shall not waste ninety-five per cent. of its available energy up the chimney. "Never prophesy unless you know" is Mark Twain's most excellent advice; but I think one might hazard a prophecy that Professor Radziszewski's *Pelagia noctiluca*, which shine so brightly in the ocean, will be without a rival in this respect during the lifetime of any of my readers.

Mr. Norman Macbeth delivered a capital lecture before the South London Photographic Society early in the month, and made one or two very good points. I can cordially endorse his recommendation to study Burnett's work on composition, if my readers can get it. It has long been out of print. I have rarely come across the work in a bookseller's second-hand catalogue, and there are few libraries where it is to be found. I do not know how long the copyright in it exists, or whether it may have expired, but I have seen advertisements of American reprints which could not legally be imported if the copyright still existed. The work was originally published in four parts, one or two only of which would be needed by the photographer. Mr. Macbeth's remarks upon the various subjects known under the name of "composition"—a rather far-reaching term—contain much instruction; but, as usual with artists, he was rather foggy about angle of view and straining a lens. By-the-bye, artists' printers themselves are far from perfect in their arrangements of light and shade. Any academy exhibition will contain a considerable variety of outdoor pictures, illuminated evidently by the lamp or the studio light. But any instruction from a talented man like Mr. Macbeth, who, as his acts show, is so entirely friendly to photography, will be received with pleasure by all true photographers. FREE LANCE.

THE ALBUMEN PROCESS AS APPLIED TO POSITIVES ON GLASS.

[Read before the Photographic Society of Philadelphia.]

BEFORE describing the practical details of the manipulation of albumen plates, it will be well to make the following classification of films prepared with (1) pure albumen and (2) collodio-albumen—the actual sensitive material, or iodo-albuminate of silver (if we may so term it), being the same in both cases.

The earlier experimentalists devoted themselves almost exclusively to the pure albumen film, believing that the presence of collodion injured both tone and delicacy of detail; but as time passed by this was seen to be an error, for collodio-bromide plates were found to possess every good quality, and to be decidedly easier of preparation and development. Nevertheless, we find an article, by Mr. Willis, in THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC, as late as the year 1875, giving full directions for the preparation of iodised albumen plates without the use of collodion, showing that the older process was still a favourite. The directions there given may be condensed as follows:—A mixture of the white of egg, water, and iodide of ammonium is beaten to a froth and allowed to liquefy again, after which it is applied directly to clean glass plates. A piece of broomstick, about a foot long, is tipped at one end with a small piece of gutta-percha softened by heat; this is applied to the back of the glass until it adheres, and the iodised albumen having been poured on the face of the glass and guided out to the corners by a glass rod, the stick is rapidly twirled between the palms of the hands so as to throw of any excess and leave a thin, uniform coating. The plate is now dried in a closed box, to prevent any dust from falling upon it, and is then sensitised in an aceto-nitrate of silver bath, after which it is washed, dried, and exposed. The development is conducted by pouring a saturated solution of gallic acid into a glass pan supported over a sand bath or other convenient source of heat, and immersing the exposed plate, previously adding a minute amount of nitrate of silver. The image appears in about twenty minutes, and the plate is fixed in hyposulphite of soda containing a little chloride of gold, which tones the image at the same time.

Here then, it will be seen, we have an albumeno-iodide of silver alone. The tedious development and troublesome coating of the plates—during which, by-the-bye, the greatest care must be taken against dust—have probably been the chief reasons why this process was never a universally-popular one. The process now to be described fulfils, I believe, all the desiderata in an albumen positive, and, so far from being troublesome to work, is remarkably easy. I may mention that it is not a dozen years since this process was sold to the professional photographers of Philadelphia at quite a high price, and was used by a number of them with great success. It was given to me shortly after by a friend. The directions are substantially as follow:—Glass is cleaned, coated with any good bromo-iodised collodion, and then washed under the tap. While still wet, it is flowed with iodised albumen, and then dried. It is then sensitised in aceto-nitrate of silver, washed, dried, and exposed. The plate is developed in the hand with acid pyro. and a little nitrate of silver, using a spirit lamp to keep the developer about blood warm.

Thus, it will be seen that, while identical in theory with the process as described by Mr. Willis, this one is far less laborious. The coating of the plate is easily and quickly done, and seems not to require any further precaution against dust than such as any good operator would instinctively take. The development is by no means as tedious, being complete in three or four minutes, unless the plates have been undertimed, or the developer allowed to get chilled. It is also simpler and more economical than the Taupenot process, from the fact of only one silver bath being used. Still, it has its drawbacks in being very insensitive when developed as described, and in the film being so nearly transparent that, in the event of over-timing, solarisation is almost sure to occur. Another trouble which sometimes makes itself painfully felt is blistering or slipping of the film. This, however, can be entirely got rid of by using no albumen substratum on the cleaned glass, and, instead, giving each plate a rub off with powdered French chalk, applying the collodion directly afterwards. A number of experiments recently made to test this special point prove it beyond doubt to my mind.

All things considered, however, the Taupenot process is the most generally useful for slide-making. Although the labour of preparing the plates is great, undoubtedly, still it has this in its favour, that the manipulations need not—indeed, ought not to—be done all at one time; and I feel safe in saying that anyone, after a few trials, will be surprised to see how naturally and easily the process divides itself up, as it were, into a series of operations that may be done at any convenient time.

Everyone knows the exquisite quality of the French slides—both in tone, in detail, and in brilliancy or perfect freedom from deposit. While I do not for a moment presume to place my own efforts in comparison with the work of Levy and other famed Parisian operators, I have still, in the course of some experiments very carefully made during the present winter, noticed a number of points in which my own work resembled the French so far that I feel convinced the latter are made on Taupenot plates and toned by mercury, followed after a careful washing by cyanide of silver. I have some reason to believe that the development, instead of being conducted with pyro., is done with gallic acid by the aid of heat, and the plates developed film side down. There are decided advantages to be gained by this method. In the first place, the development of an albumen plate of any kind, but particularly of those such as the Taupenot, where albumen is the principal constituent of the compound film, must be *slow* when compared to other plates if the finest result be desired. This is a cardinal point in the management of albumen films, both positive and negative. In the next place, the quantity of free nitrate of silver added to the developer must be very small, particularly at the beginning of the development. The solution being thus excessively weak, heat forms a useful adjunct to the process, which would otherwise drag along in a most tedious manner. Now, when plates are developed in the hand over a spirit lamp, the fingers get cramped when the development is so long, and the temptation to add a little additional silver is well-nigh irresistible. In the dish this, of course, would not apply, and I may here say that nothing but the impossibility of obtaining the proper kind of glass pan, with ledges on the bottom to support the plate, has prevented me from trying the older-fashioned method. Any article other than glass can hardly be recommended for gallic acid development; for the addition of the silver makes a fluid highly susceptible of decomposition by contact with the slightest impurity. This was alluded to as long ago as the year 1858, by Hardwich.

The blistering of the film, of which I have spoken before, is apt to cause the loss of many plates in the hands of a beginner. It depends partly upon the condition of the substratum (or, rather, of everything which underlies the albumen film proper) and partly upon the albumen itself. It should not be forgotten that the whites of eggs vary in glutinosity, some eggs yielding an albumen so thin that it may be filtered with ease, while that of others is a stiff, gummy mass that requires hard beating in order to become workable. Under any circumstances, however, when albumen dries it becomes a dense, horny, impenetrable pellicle of great contractility, so that it is not at all strange that the tension on the film, produced by its desiccation, should often be sufficient to blister the film, or even to draw it entirely off the glass. It will, therefore, always be well to add (say) sixty or eighty grains of white sugar, or an equivalent proportion of molasses or honey, to the iodised albumen. This modifies the horny structure of the latter, and will often be a complete cure for blistering. If the plates should be exceptionally obstinate, the application of French chalk, as before alluded to, will effect it. In comparing the process by iodised albumen with the Taupenot, it will be seen that in the former the collodionised plate is dipped *into water* before the iodised albumen is flowed on. Evidently, any substratum previously applied would thus be dissolved away, and might as well not be there at all. Some operators have doubtless depended upon the coagulation of the substratum by the alcohol in the collodion. This is a false idea, a layer of *dry* albumen not being susceptible of such treatment. The attempt has, indeed, been made to coagulate albumenised papers by dipping them into a dish containing alcohol, and partial success obtained; but the difference between a layer of albumen on a spongy body like paper, which could absorb and retain a large quantity of spirit, and a thin layer on glass, approachable by only one of its surfaces, is manifest. Now, in the Taupenot, or any other process where the plate is dipped into the silver bath before being washed, the silver salt—one of the most efficient coagulators of albumen known—has an opportunity of penetrating to the substratum and fixing it by rendering it insoluble.

To obtain the best results with any kind of albumen plates, they should not be kept long after sensitising in the aceto-nitrate. Three or four days in winter, or twenty-four hours in summer, would be an extreme limit. But it fortunately happens that we possess in gallic acid an agent which confers almost unlimited keeping qualities upon the film, provided that it be applied immediately after the aceto-nitrate of silver has been washed off. The washing in this case must be very thorough, any traces of silver which remain causing a red stain. The sensitiveness is decidedly lessened by the gallic acid—at least thirty per cent.

The sensitiveness of albumen plates will vary with the method of preparation, and the presence or absence of a final wash of gallic acid. As previously mentioned, pure albumen films, even without gallic acid, are very slow if developed with acid pyro.; and when gallic acid is the developer the process is so lengthy that it becomes impossible to do it in the hand. But a freshly-sensitised Taupenot plate is quite the reverse, particularly when alkaline pyro. is used at the beginning. Under favourable circumstances it would be quite feasible to take *quasi* instantaneous views on these plates—that is, street views and marine studies. This is also confirmed by M. Ferrier, the predecessor of Levy in Paris, who ranks Taupenot plates as the very best of all known forms of dry plate, suitable for both professional and amateur photographers, and unexcelled for keeping qualities when treated with gallic acid. It will be understood that the gallic acid wash is only intended for plates that have to be kept for a long time; but when lantern slides are to be made it is better dispensed with, and the plates used as soon as possible after sensitising, the tone of the image being finer without it. For negatives this is not of so much importance.

A deposit is apt to form on plates that have been long kept, or when the developer is over-heated or the process too much forced. This may easily be removed by gently rubbing the film with a ball of soft, clean cotton, thoroughly wet, holding the plate under the tap. The coagulated albumen is hard enough to bear this treatment perfectly.

Those who are familiar with the published formula for the Taupenot process will notice two differences in what follows:—First, the addition of white sugar to the albumen, the reason for which has already been given; and, second, the wash of fifteen-grain iodide of potassium, which is applied to the film immediately before the albumen. It might very pertinently be asked—Why is an aqueous wash of iodide, immediately preceding the application of the albumen, loaded with the same salt necessary? In order to answer this satisfactorily, it must be constantly borne in mind that the Taupenot film is *double*—that is, an albumeno-iodide of silver is superposed on a collodio-iodide. Now, in order that the alkaline iodide may enter thoroughly into the pores of the collodion film, it is necessary first to apply it in a form more capable of working its way in than the viscid, thick albumen, which always has more or less tendency to remain on the surface. Mr. Hewitt was the first to notice this fact, and to introduce the aqueous wash, and I consider it a very important improvement in the process. If the albumen were directly applied we would have to expect more or less irregularity in the film, and perhaps partial sensitiveness to daylight, which is not the case in plates prepared by the following formula; in fact, all the manipulations up to the second sensitising may be done in white light—a great practical advantage to the operator desirous of having clean, well-coated plates. The iodide wash completely obliterates whatever effect the white light may have had on the collodion film.

Before concluding I will give the formulæ for both processes. The iodised albumen may be the same in both, and I have found no reason to alter the formulæ which were given to me by Mr. Hewitt some years ago.

Iodised Albumen.

Iodide of potassium	35 grains.
Water	½ ounce.
Tincture of iodine	3 drops.

Dissolve and add to five ounces of white of egg, taking care that there is no yolk present. Beat to a froth, and let stand until liquefaction has taken place; then add from three hundred to four hundred grains of white sugar, and one-half drachm of ammonia. Keep it in small bottles filled to the neck and tightly corked, adding to each bottle a piece of camphor the size of a pea. If stored in a cool place it will be good after some weeks.

For the simple albumen process the plates are coated as before described, and well dried. For the Taupenot process the glass (cleaned and albumenised as usual) is coated with a rather thin and ripe collodion, dipped in the ordinary silver bath, and then washed free from silver; after which it is flowed with a fifteen-grain solution of iodide of potassium and drained. It is then treated with two portions of iodised albumen and dried.

Aceto-Nitrate Bath.

Nitrate of silver	400 grains.
Water	10 ounces.
Glacial acetic acid	1 ounce.
Nitric acid	2½ drachms.

The bath should not be exposed to daylight.

Development.

Pyrogallic acid	40 grains.
Glacial acetic acid	I ounce.
Distilled water	20 ounces.
Citric acid	15 grains.
(*a*) Nitrate of silver	10 grains.
Water	I ounce.
(*b*) Nitrate of silvor	20 grains.
Citric acid	30 ,,
Water	1 ounce.

Plain albumen plates are developed with the above solutions by the aid of heat. I rather prefer to use the second formula for silver solution (*b*), in spite of the large amount of acid. The development being lengthy, there is less risk of staining if there be a full amount of acid present. A few drops of the ten-grain solution may be added if more intensity be desired. It is well to provide each bottle with a dropping-tube, so as to be able to measure the amount exactly. A *single drop* of either is enough to start the development.

In the case of Taupenot plates the detail should first be brought out by a two-grain pyro. solution containing one drop of a saturated solution of carbonate of ammonia to each quarter-ounce, the strength being afterwards brought up with the acid pyro. and silver.

Fixing and Toning Bath.

Hyposulphite of soda	6 ounces.
Water	1 pint.

Dissolve, and add four grains of chloride of gold dissolved in two ounces of water, throwing in a small lump of white chalk to neutralise acidity. All traces of the developer must be washed off before laying the plate in this bath.

Toning and Intensifying.

(*a*)	Bichloride of mercury	1 ounce.
	Chloride of ammonium	1 ,,
	Water	4 ounces.
(*b*)	Cyanide of potassium (pure)	20 grains.
	Nitrate of silver	20 ,,
	Water	1 ounce.

Dissolve the silver and cyanide separately and mix, stirring until the precipitate redissolves. There must be a slight excess of cyanide in the solution.

The plate, after being fixed and washed, is flowed with the mercury (*a*), diluted *ad lib.*; then, after a *thorough washing*, followed by the cyanide of silver (*b*), and again quickly washed to prevent loss of intensity, which will occur if the solution be left on too long.

ELLERSLIE WALLACE, JUN.

FOREIGN NOTES AND NEWS.

DIFFERENCES IN READINGS OF THE PHOTOMETER.—A CHEAP SUBSTITUTE FOR GROUND GLASS.—A NEWLY-PATENTED LICHT-PAUS PROCESS.

IN the *Bulletin de la Société de la Photographie*, M. de La Noé said he had found that, when examining a photometer in the morning or in the evening, one would read off higher numbers than at midday, because at the latter time the eyes are more affected by the dazzling brilliancy of the midday light, and, therefore, are less sensitive than in the morning or evening. He also declared that an observer who had remained for a-quarter of an hour in the dark, and whose eyes consequently had been rested, could recognise the twentieth degree on an exposed photometer, while a person who had been working in bright daylight could only read as far as the fourteenth degree. He, therefore, considered photometers based on the recognition of the commencement of an impression of light as unreliable.

In commenting on the above, the editor of the *Mittheilungen* remarks that errors of six degrees, such as that cited, would certainly render the photometric quotations totally unreliable, since the intensity or quantity of light required to render the number twenty visible is five and a-half times as great as that required for number fourteen. The error is not, however, actually nearly so great. Surely it must depend a good deal on the eyesight of the individual observer. The editor has, however, often made the experiment of causing two persons—one of whom had been working for several hours in a darkened room and the other in a bright light—to read off the same photometer, and the difference between the two readings was at most one degree.

In the *Deutsche Photographen Zeitung*, Herr Schlechter, of Carlsruhe, suggests a simple plan for obscuring the glass of the studio, which he has seen used by gardeners for keeping off the too bright light of the summer sun from the contents of their greenhouses. He tried it on his glass-house and found that it answered very well. Some glass-houses, where the roof or sides require to be as transparent as they can be made in winter, yet require to be obscured at least during the height of summer; for this purpose many persons paste thin tissue paper upon the panes, and others get a house-painter to paint them. Herr Schlechter's plan is to pound down some chalk and mix it with milk to any desired consistency and then apply the mixture with a large flat brush. One coat would last the whole summer and be extremely cheap. The idea is very good, and the present writer has seen something similar successfully carried out—only in this case the coat of obscuring mixture was applied outside the glass instead of inside, and consisted of buttermilk and whiting laid on with a white-washing brush—outside the glass roof of a factory. The reason why it was put outside was obviously to save the great expense of erecting the high scaffolding that would have been required had the inside of the glass been coated or had blinds been put up. There was the further advantage that no trouble had to be taken to remove the whiting, as the sun and rain had effectually removed it before the dark days of winter set in; but, of course, as the photographer would need all the light he could get in winter he might give the weather a helping hand in the removal, with advantage as regards the appearance of his premises.

Herr Nickel, of Chemnitz, has patented a licht-paus process in the German Empire. The process is intended to reproduce by lichtpaus, in blue lines upon a white ground, any kind of a drawing by using the well-known licht-paus paper, which is sensitised by treatment with citrate of iron and ammonia, and red prussiate of potash. The process is based upon the production of a negative copy of the drawing to be multiplied, by using as follows a special licht-paus fluid:—Take some filtered gum arabic and mix it with acetic acid, in order to render it fluid and prevent it from spoiling; then add a little dissolved soap, in order that the lines drawn by this mixture may not be brittle when dry. Add Indian ink to this mixture until a drawing made with it is quite visible. Make a copy in the usual way, with this ink, of the drawing to be copied, drawing upon the rough side of the ordinary paper. Then with the finger rub upon the same side of the copy as much common, soft, black chalk as the paper will take on. The chalk had better be previously pulverised. When all that has been done the drawing is laid in water and then carefully rinsed. By this means the whole of the lines drawn with licht-paus ink dissolve out and disappear, leaving the drawing in sharp, white lines upon a black ground. If this negative-copy is to be often used, it is recommended that it should be fixed by brushing it over with a broad hair-pencil dipped in spirit varnish, or by coating it with a solution of gum arabic to prevent the black chalk from spreading over the white lines. When such a negative has been made one may proceed to throw off an unlimited number of licht-paus pictures by means of the sensitive blue licht-paus paper, which gives blue lines on a white ground, by which a further carrying out of the licht-paus by means of colours is facilitated.

RECENT PATENTS.

PATENTS APPLIED FOR.

No. 7,974.—"Producing Printing Plates or Blocks by Photography." H. J. HADDON; a communication from Henrich Riffrath, Gladbach, Germany.—*Dated May* 20, 1884.

IMPROVEMENTS IN THE CONSTRUCTION OF PHOTOGRAPHIC CAMERAS.
Specification by Messrs. SANDS AND HUNTER.

THE object of this invention is to render cameras adjustable in a superior manner and to afford increased facilities for working the same, by means of a double-swing action or cradle.

In carrying out our invention we so mount the cradle or swing action that it can be placed at any part of the base-board and at any angle thereto that may be required. The camera can be placed upon the cradle either horizontally or vertically. We use either a rigid base-board or one extending either at the front or back by means of a screw, rack, or clamp; upon this base-board is placed the cradle or double-swing action. To facilitate the rocking and swinging of the cradle or camera, we introduce a new double action rack-and pinion movement, one pinion working through the head of the other, or by two or more separate rack-and-pinion movements, or by screw movements. This is arranged in the following manner, viz.:—

The cradle or double swing is constructed of two or more slips of wood or metal, the top one being slightly rounded underneath. It is supported by means of two pins, one at each end, passing through a piece of metal fastened to one of the under-pieces; if the under-piece is of metal it is turned up at each end, to support the upper piece or rocker and receive the pins. The under piece of wood or metal may be connected with the base-board, or fixed to another slip of wood or metal made adjustable to the base-board.

These slips of wood or metal are made to move in their separate directions by a double-headed rack and pinion, one pinion working through the head of the other, the rackwork being attached to the upper and lower pieces. By turning the head of one pinion or screw the upper slip of wood or metal can be rocked backwards or forwards, thus giving the double-swing action.

The same action is obtained by means of clamps, one clamp being attached to the top rocker, the other to the under-moving piece, which enables them to be moved or fixed in any direction, the clamp passing through slots in the side brasses. This method of moving the cradle being in substitution for the pinion or screw movements.

The camera can be fixed on this cradle either horizontally or vertically, by means of a spring screw, nut, bolt, or any other convenient means, and can thus be made to swing in any direction. The front of the camera can also either be fixed or made removable to any part of the base-board, and the bellows is also so arranged that it will revolve on the front, or can be taken out and turned in any direction, for which purpose the front is held in position by means of a circular flange, which permits the rotary movement to take place as on a fixed centre. [Here follows a description of certain drawings.]

Our said invention can be adapted to any suitable camera.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is—

1. The method, means, and appliances of and for adjusting cameras by a double-swing action cradle, substantially as hereinbefore described and shown on the drawings.

2. The use of clamps and other arrangements for effecting such double-swing action as hereinbefore described and shown in *figs.* 1, 2, 3, 4, 5, and 6, or any mere modification thereof.

3. The use of the pinions, racks, and other arrangements for effecting such double-swing action as hereinbefore described and shown in *figs.* 7, 8, 9, and 10, or any mere modification thereof.

4. The several and respective arrangements and appliances to cameras, together forming our improvements in the construction of photographic cameras, substantially as hereinbefore described and shown in the drawings.

Our Editorial Table.

"DIE COLLODION-VERFAHREN" and "DER SILBER-DRUCK."
By E. LIESEGANG, Ph.D.

WE have received the eighth editions of the above two popular works. The mere fact that these little books have reached an eighth edition speaks much for their practical character, but a dip within the covers will show still more their real utility. It may be supposed by some that collodion processes are out of date and out of use, but such we know is not the case; and those who still employ wet collodion, or who wish to be instructed in its practice, will find in Dr. Liesegang's *Die Collodion-Verfahren* a safe guide in every department, even to collodion emulsion.—*Der Silber-Druck* is an equally valuable guide through all the different branches of printing, whether on albumenised paper upon opal glass or by development—by artificial light as well as by daylight. The surrounding operations—retouching, mounting and finishing—are also well treated, and notes on artistic matters make the work complete.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
June 2	West Riding of Yorkshire	Godwin-street, Bradford.
" 3	Sheffield	Freemasons' Hall, Surrey-street.
" 3	Halifax	*Courier* Office, Regent-street.
" 3	Bolton Club	The Studio, Chancery-lane.
" 3	Glossop Dale	Glossop Coffee Palace, High-street.
" 4	Benevolent	181, Aldersgate-street.
" 4	Edinburgh	Hall, 5, St. Andrew-square.
" 4	North Staffordshire	Town Hall, Hanley.
" 4	Photographic Club	Anderton's Hotel, Fleet-street.
" 5	London and Provincial	Masons' Hall, Basinghall-street.
" 5	South London	Society of Arts, John-st., Adelphi.
" 5	Bolton	The Baths.
" 5	Leeds	Philosophical Hall.
" 5	Coventry	Coventry Dispensary.
" 5	Yorkshire College	College, Cookridge-street, Leeds.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

At the monthly technical meeting of this Society, held on Tuesday, the 27th instant, the chair was taken by Captain W. de W. Abney, F.R.S.

Mr. T. Sebastian Davis said that for some time past he had been in a difficulty from the fact that his negatives had given much thinner images than before, and had required considerable intensification. The negatives even then wanted sparkle. This he attributed to a want of transparency in the shadows as well as to the thinness of the image. Someone had suggested that these difficulties were due to a want of thoroughly washing the emulsion. He had, therefore, washed more—very thoroughly, in fact—but found no gain from that proceeding. In answer to questions as to the formula used he (Mr. Davis) said that he used rather a large quantity of acid—equal to something more than half-a-minim of pure hydrochloric acid for each ounce of finished emulsion to be made. For a ten-ounce batch he used 200 grains of nitrate of silver, 150 grains of potassium bromide, and ten grains of chloride of ammonium. This he digested with eighty grains of gelatine for an hour at a temperature of 160°. Afterwards 220 grains more of the same gelatine (Heinrich's) were added. The emulsion was quicker than that he formerly obtained when he was getting greater density.

Mr. W. E. Debenham and Mr. A. Cowan remarked that they should have expected an emulsion so prepared to be decidedly slow.

Mr. Davis continued that he had got greater speed since he had adopted the method of mixing-in the silver solution drop by drop instead of the usual method. The gelatine was Heinrich's ordinary kind for photographic use—not an extra-hard kind, which was also made.

Mr. Léon Warnerke had tried both kinds without finding much difference.

The Chairman had made a long series of experiments, and found that with a digestion process the more gelatine was added the quicker were the plates, but this was not so with the boiling process. He asked if Mr. Davis's plates showed the image strongly at the back.

Mr. Davis replied that they did not with his usual development. If he much prolonged the development the image did appear at the back, but at the same time he got fog.

The Chairman remarked that there was an unusually large quanitity of hydrochloric acid employed, and that that acted upon the gelatine. He would recommend the use of a small trace of hydrochloric acid only, and the addition of free iodine to obtain clearness.

Mr. Warnerke considered that equivalent to using hydrobromic acid.

The Chairman said that iodine did not liberate hydrobromic acid. He had tried hydrobromic acid and did not like it at all.

Mr. Davis said that, hoping to obtain density, he had tried the addition of gallic acid to the emulsion; but it was not beneficial, as it had been in the collodion process.

The Chairman inquired how long Mr. Davis took to develope.

Mr. Davis replied that the development was rather rapid. The image began to appear in about twenty seconds, and development was complete in two minutes. He used two grains of pyro., two minims of ammonia, and half-a-grain of bromide.

Mr. Debenham suggested the use of a much larger proportion of bromide—at least as much as of pyro., if not more.

The Chairman said that he generally used half as much bromide as pyro., but he believed that the use of equal parts was safer. He inquired the sensitometer speed of Mr. Davis's plates.

Mr. Davis replied that they were 16.

The Chairman asked whether Mr, Davis had tried changing his gelatine.

Mr. Davis had used several kinds, which he mentioned—amongst others, Swinburne's isinglass.

The Chairman believed that that was a gelatine.

Mr. Warnerke inquired why so?

The Chairman replied on account of its price.

Mr. Warnerke said that at the recent Fisheries Exhibition isinglass was sold at eighteenpence per pound. That made from the bladder was expensive, but isinglass or fish glue was now made from the entire fish, and could be sold at the price mentioned. This cheap kind was not, however, adapted for photographic purposes. A test for isinglass, to distinguish it from gelatine, was its appearance when soaked in cold water. Gelatine sometimes became a little cloudy-looking, but isinglass acquired a characteristic bluish opalescence. The character of the gelatine used had a considerable influence upon the emulsion; but, unfortunately, it happened that two batches from the same maker professing to be of the same kind would differ considerably.

Mr. Davis inquired whether ammonium or potassium bromide was to be preferred in making emulsion.

The Chairman replied that the potassium salt was to be preferred, and gave greater density.

Mr. Davis said that, having been one of the committee to select the best process for awarding the Paget prize, he remembered that the successful candidate, Mr. W. J. Wilson, strongly recommended the use of a certain make of potassium bromide.

Mr. T. Bolas said that commercial samples of bromide of potassium varied much in their constitution. Most samples coming from Germany—at all events some time ago—contained traces of iodine. It was of importance to know precisely what were the chemicals one had to deal with, and he would recommend the preparation of a pure bromide by fractional decomposition of the salt. For ordinary commercial purposes absolute purity of the bromide was of no consequence, therefore one must not expect the makers to supply it as pure as it should be for photographic purposes.

The Chairman said that he had known bromide of potassium to contain as much as twenty-five per cent. of chloride. It could be freed from iodide by the addition of a very small quantity of nitrate of silver solution. The iodide contained would go down as iodide of silver, and the amount of silver solution being known, the strength of the bromide remaining would also be known. With bromide, as now supplied by English dealers, he thought no trace of chloride would be found.

Mr. Bolas considered the question of the purity of the commercial bromides, and the effect of what other haloids might be contained in them as impurities, was so important to photographers that the Society would do well to take the matter up.

The Chairman thought that the time had come for such matters to be taken up by sub-committees, and it was arranged that the proposition to deal with the question in this manner should be brought before the next meeting of the Council of the Society. He asked Mr. Davis whether he had examined the image on his present plates with a microscope?

Mr. Davis had done so, and found a grain.

The Chairman had found that in a dense negative the grain in the plate itself before development and in the developed image was fine, but in a plate which gave a thin image the grain was coarse. For examining the ten-thousandth of an inch an inch power was sufficient; but to see grain of the fineness of one-hundred-thousandth of an inch a quarter-inch power and high magnification wth the eyepiece were necessary.

Mr. Warnerke inquired whether there was any difference between the grain given with pyro. and that with ferrous oxalate.

The Chairman said that the ferrous oxalate grain was coarser.

Mr. Warnerke stated that in the March letter of the Chairman to the *Bulletin Belge* there was a riddle, which he asked the Chairman if he was prepared to solve. In that letter the reader was directed to dissolve some magnesium wire in oxalate developer, and then see what the result would be.

The Chairman was not prepared to say.

Mr. Warnerke said the result was that the developer was improved, and brought out details which would not be brought out without the magnesium.

Mr. Bolas remarked that ferrous oxalate solution always contained some traces of the ferric salt. The magnesium would reduce this to the ferrous state. Zinc would have the same effect.

The Chairman observed that ferric salt acted as a restrainer, and if some of an old, but unused, oxalate developer were added to a fresh solution the mixture might be employed without the addition of any bromide.

Mr. Warnerke referred to the tin tubes—such as colours and scents were sold in—and said that they were convenient for two photographic purposes. One that he employed them for was the keeping of developers air-tight ready for use; another use was for keeping ink in for collotype or other printing-press process. He (Mr. Warnerke) also inquired whether anyone could speak of an accelerator which bore an English name and was favourably known on the continent. He had tried it and found that it actually did what it professed to do. It had an acid reaction, and smelt of acetic acid. When a plate had had only one-third of the proper exposure it would, after immersion in the solution, develope as if correctly exposed, and gave, if anything, a brighter and better picture than with longer exposure without the accelerator.

Mr. Bolas referred to an experiment wherein plates exposed five hundred times too much were developed after an immersion in bromine water. This suggested the use as an accelerator of some absorbent of bromine.

After a short discussion on gas burners for heating purposes the meeting was adjourned.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society, held on Thursday, the 22nd instant, Mr, J, H, Hare occupied the chair.

A letter from the President of the Balloon Society of Great Britain was read informing the members of the first of the balloon garden parties, which was to be held on the 31st instant, and suggesting that some of the members should attend with their cameras to obtain photographic records of the occasion.

Mr. W. E. Debenham showed a contrivance for changing and developing plates when away from home. It consisted of a tin dish with slanting sides like a baking-dish, about thirteen inches by eight at the bottom, and an inch and a-half deep. A folding frame of stout wire covered by two thicknesses of black twill was placed standing on the bottom of the dish, and rising to a height of about ten inches. There were sleeves in the covering to admit the hands, and the wire frame was bent at each end into a curve so as to allow greater freedom to the movements of the arms and hands. The dark slide and the box for changing or the dish for developing were first placed in the tin tray or dish, and the cover then erected over them. A piece of elastic sewn into the hem of the cover served to keep it in place over the side of the tray. The hands were then introduced through the sleeves, and the changing or developing conducted in darkness. Mr. Debenham said that although a plate developed in darkness could not be humoured to suit under- or over-exposure, still it would come out properly if correctly exposed, and, if not, it would serve as a guide in exposing others. It was very desirable, when away from home, to know whether the exposures that were given were about right or not. He had recently used the appliance with success when photographing machinery in an engineering workshop. Having got the exposure by developing one negative, for the others, to be taken, he had merely used it for changing plates. Another use for the appliance was for demonstration before a meeting. To illustrate this a transparency was printed by the light of magnesium wire and the plate developed. The development was, of course, reckoned by time. With the solutions he was using and the temperature at the time a minute and a-half was right in this respect. When the wire frame and cover were taken down they were carried inside the dish.

Mr. A. L. Henderson thought that such a contrivance was unnecessary, as one should be able to judge sufficiently well the time of exposure required. He would rather take half-a-dozen plates with him than be hampered with such an arrangement.

Mr. A. Cowan pointed out that if there were several subjects to be photographed it would be inconvenient to have to carry half-a-dozen plates for each in order to ensure correct exposures. He thought it was desirable to have a test apparatus.

Mr. Henderson, commenting upon the differences existing between Warnerke sensitometers, said that a professional plate-maker had that day told him that the one in Mr. J. Cadett's possession registered two degrees higher than his (Mr. Henderson's).

Mr. C. Ray Woods said that a gentleman of his acquaintance had a sensitometer which registered several degrees higher still than Mr. Cadett's—he thought three degrees.

Mr. Henderson remarked that, at the risk of being thought unscientific, he would produce the results of some experiments he had made in the direction of dark-room illumination. He showed two plates, which he said had been cut originally from the same plate, and exposed under the same sensitometric screen for the same length to the same lamp-flame, covered with a screen of aurine. The one showed numbers indicating an action six times as great as that of the other. The difference was that in the one case the light had been made to pass through a diffraction grating, and in the other through two thicknesses of glass, with the same sized opening as that of the grating, and slightly obscured, to render the glass equally obstructive to the light, so far as the eye was concerned. To the interposition of the diffraction grating he attributed the great immunity from the effect of the light of the lamp upon the plate. At the next meeting the lamp and arrangements should be produced, and the members could repeat the experiments themselves.

Mr. C. Darker said that light might be manipulated in more ways than photographers thought. In answer to a question as to how large diffraction gratings could be made he said that Mr. W. G. Letsam had one of five inches square, but of that size they would be exceedingly expensive.

Mr. Ray Woods said that Professor Holmes had made several very large ones. There were some at South Kensington measuring six inches by two.

The Chairman showed an instantaneous shutter the opening of which was achieved by an elastic band, the hook engaging it being thrown out of gear when the slide was raised to the highest point. It then either reclosed by falling with the speed induced by gravity, or by means of a metallic spring which, being pushed in more or less, acted with more force and rapidity.

At the request of the members, for the purposes of demonstration, Mr. Debenham presented the Association with the changing and developing appliance that he had shown.

Correspondence.

SULPHO-PYROGALLOL.

To the Editors.

Gentlemen,—The experiences of Mr. J. W. Thornton and of Mr. Washington Teasdale, contained in the report of the meeting of the Leeds Photographic Society on the 1st instant, are so contrary to any of our own that we wish you to permit us to make this statement, since we consider that an erroneous impression would tend to be given of the quality of our manufacture were the remarks permitted to pass unnoticed by us.

We can only presume either that a trace of iron or some foreign matter inadvertently obtained access to the liquid at some time after the bottle was opened, or that the solution, as supplied, was diluted with water by the users.

A great number of your readers could report very differently of the sulpho-pyrogallol made by—Yours, &c., The Platinotype Co.

29, Southampton-row, W.C., May 23, 1884.

THE NEW DEVELOPER.

To the Editors.

Gentlemen,—I think that if my letter *re* the new developer has not become ashes, you will find that I added one *drachm* of the carbonate of soda, and not one *ounce*, as I am made to say in your last week's issue.

If anyone has tried the developer and used the ounce they will probably have been uncomplimentary in their language respecting new developers and amateurs.

I have today obtained some very good 10 × 8 negatives with the formula.—I am, yours, &c., W. Bassano.

Haden Cross, Old Hill, May 24, 1884.

A CORRECTION.

To the Editors.

Gentlemen,—A reference is made in one of the articles, in your issue of last week, to a contrivance for liberating a drop shutter exhibited by me at the London and Provincial Photographic Association, in which water takes the place of air.

I acted simply the part of the exhibitor, and whatever credit is due for this ingenious exchange of the elements should be given to Mr. Sands, of the firm of Sands and Hunter, Cranbourn-street, W.C.—I am, yours, &c., A. Mackie.

7, Goldhurst-road, N.W., May 21, 1884.

HEAT-RESISTING CAMERAS.

To the Editors.

Gentlemen,—Photographers in India are often confronted by a difficulty unknown to their brethren working in cooler climes—I refer to the splitting of the camera and dark slides. The latter, especially, become warped into all sorts of shapes directly the warm weather begins, and I find that instruments by first-class makers suffer as much as any others of cheaper make.

I have been told that cameras and slides are now made in England of compressed paper, which will neither warp nor split. Can you or any readers of your interesting Journal tell me who the firm is, that I may give them a trial? Perhaps the Willesden paper one hears of so much now might be made up into slides, or even into cameras, if sufficiently-thick sheets are procurable.

This difficulty of warped woodwork has bothered me more than all the usual troubles one expects in a hot country, and I should be most thankful for any information which would enable me to avoid it.—I am, yours, &c., H. G. S.

East Indian Railway, Cawnpore, May 3, 1884.

[Our information on this subject is at present limited to what we receive from our advertising pages.—Eds.]

Notes and Queries.

Frank Davidson suggests that it would be useful if we were to give one or more articles upon binocular photography and the preparation of transparencies for the stereoscope. We shall consider the matter.

In reply to "B. F. P.," who inquires which of two lenses is the better—one having a fixed stop of an inch and three-quarters, the fixed stop of the other being a half-inch less. We would say that if, when working with the apertures above mentioned, both define equally well, then the former is to be preferred.

Can our Editors or any correspondent inform me how the ink-photo. is produced? Is it a mechanical transfer from a negative? and, if so, is the process patented? Or is it a drawing on a grained surface?—Puzzled."——Perhaps some of our correspondents who may know all about this process will reply. We are in a position to say that it is not patented.

"What is the best way to photograph a somewhat frisky horse who *will* persist in tossing both head and tail when I desire to uncap the lens?—Charles F. Reid."——Let our correspondent try the effect of getting a friend to blow a loud and shrill whistle just when he is ready to expose. This will startle the horse for a moment, and cause him to remain perfectly still for the time requisite to make a good exposure.

"Would you kindly advise me as to the most suitable lens for outdoor work—to take animals, groups of children, or suchlike? I have a Ross's rapid symmetrical, but in our smoky atmosphere of Lancashire it is too slow.—G. MacG."——In reply: The lenses next exceeding the "rapid" class in rapidity of action are the "D" series of Dallmeyer and the "universals" of Ross and Co. If these prove to be still too slow, the ordinary portrait lens must be tried.

George Melcomb asks:—"What is a panoramic photograph?" and wishes that we would give him, what he pleases to term a definite answer. Well, this is a matter upon which a good deal may be said *pro* and *con.* If our correspondent desired to know the difference between plane and panoramic projection we should not experience much difficulty in replying; but to define a panoramic photograph is a very different matter. Roughly speaking, we might say that if, as some artists assert, an angle of sixty degrees is all that ought to be included in a picture, anything extending beyond that is entitled to be classed as panoramic, more especially if the top and bottom be removed to such an extent as to impart a decidedly elongated appearance to the photograph. If the angle included be over 100° we should unhesitatingly relegate the photograph to the panoramic class.

C. Jones says:—"The death of Mr. H. Baden Pritchard, of your weekly contemporary, prompts me to ask if it would not be worth while for any enterprising photographer to make a collection of a few dozen portraits of men whose names come before photographers with more or less frequency? Such a collection would be of great interest. It would, I think, sell sufficiently well to prove remunerative, and I do not imagine that any difficulty would be experienced in the compilation. What think you?"——In reply: We pass on the suggestion to our readers.

"I have often heard of a 'globe' lens; kindly inform me what it is, where it is to be obtained, and what are its functions.—Geo. Thomas."——In reply: The globe lens is not now manufactured. It may be designated the parent of the doublet species of lenses at present in general use, although we are aware that this distinction is open to be disputed. It is a symmetrical combination which was invented by Harrison and Schnitzer, of New York, and patented by them in 1862. It has been entirely superseded by improved forms and cannot now be obtained.

An Old Correspondent writes:—"I have access to unlimited supplies of lemon juice. Can you inform me of any method by which I can crystallise the citric acid contained therein so as to be able to retain it in the usual solid form?"——In reply: Saturate the lemon juice with chalk or whiting, and when the solution has become neutral to test paper wash the citrate of lime with hot water, and treat with dilute sulphuric acid, by which sulphate of lime is formed and citric acid set free. This is then crystallised. We have here given merely an indication of the principle underlying the preparation of the acid; there are details into we cannot here enter.

T. D. says:—"Will you kindly, through the Journal, inform me of the best keeping formula for chloride of gold stock solution? I have tried one lately published, viz., chloride of gold, 15 grains; acetate of soda, 1 ounce; water, 15 ounces. Also another:—chloride of gold, 15 grains; water, 2 ounces. In the former the gold deposited after a couple of days. The latter kept much longer, but eventually deposited the gold very freely. As I only use an occasional grain I find the stock solutions, as stated, to be very wasteful and disappointing."——In reply: Seeing our correspondent uses so little gold, and at such infrequent intervals, it will be better for him to keep his gold in some other than the stock form mentioned. If it be more convenient to keep the gold in the liquid form, then he must see that it be slightly acid; for, if neutral or alkaline, it will decompose in the manner specified.

Exchange Column.

I will exchange a whole-plate lens (Darlot's) for a half-plate lens.—Address, Studio, Frederick-street, Cardiff.

I will exchange a cottage window and large tree stump, suitable for photographing children. Wanted, large rolling-press.—Address, W. W. Winter, Midland-road, Derby.

I will exchange Dallmeyer's 2c *carte* lens, cost £15 15s.; instantaneous shutter, cost 21s.; another, 8s. 6d. Wanted, Ross's symmetrical lenses, or offers.—Address, T. L. W., 19, Beckenham-road, Penge.

I will exchange a half-plate camera, by Watson, all improvements—three backs, folding tripod, Ross's *carte* lens, and instantaneous shutter—for larger instrument.—Address, X., 7, Abbeygate-terrace, Colchester.

Wanted, a really light and perfect tent for changing plates up to 12 × 10 at least, in exchange for polished opal or flatted crown glass, 12 × 10 bath in mahogany case, or ormolu frames, 12 × 10, by Marion, never opened.—Address, W. Perry, Sandgate.

I will exchange a Lerebour's half-plate portrait lens, in good condition, with stops, for a Dallmeyer's patent wide-angle landscape lens, in good condition, for plates 7½ × 5.—Address, R. S. Bonnallo, 45, Scotholme Villas, Mosley-street, New Basford, Notts.

I will exchange any of the following for useful studio accessories or apparatus, namely, Burr's *carte* lens and camera, nine Victoria lenses, by Darlot, mounted on brass plate, tapestry curtain, with rings complete.—Address, W. Dakin, photographer, Nether-edge, Sheffield.

I will exchange a 10 × 8 camera and portrait lens, reversible, bellows-body, folding tail-board, nearly new; also, magic lantern, three and a-half inch condensers and slides, 10 × 8 dipping-bath; also, Victoria camera, four lenses. Wanted, a half-plate bellows-body camera with good lens, for any of the above, or offers.—Address, T. L. McCann, 49, Greenvale-street, Glasgow.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

Photograph Registered.—

William Butt, Southampton House, East-street, Blandford.—*Photograph of Triplets, Sons and Daughter of Charles W. and Jane Downes, of Blandford.*

W. S. B. S.—Without seeing an example it would be misleading to pass an opinion. Send us one.

E. H. Derham (Boston, U.S.A.).—We shall refer, and perhaps act on your suggestion. Thanks.

Erskine Beveridge.—If you forward a communication here we will transmit it to the gentleman. We cannot give private addresses in this column.

A. E. I.—The market value of the whole is, probably, not more than a couple of pounds. Possibly in the first instance it might have cost ten times the amount.

G. McKay.—We shall possibly have an article on the subject shortly. It would be impossible to give you reliable information in the limited space at our disposal in this column.

C. Clement Leigh.—The advertisement columns of the Journal and Almanac will supply the desired information. We cannot undertake to recommend any particular firm.

W. W.—The best work on retouching with which we are acquainted is that of Messrs. Burrows and Colton. It is now out of print, but you might possibly obtain a copy by advertising.

Wm. Baker.—Most persons have noticed the relief you mention. It will be a matter for you to experiment upon and see if you can secure it when dry. Many would like to know how it is to be accomplished.

Hants.—If you cannot succeed in the light we are now having we do not expect you will get on any better as the summer advances. Bear in mind that the light during the spring is more actinic, as a rule, than at any other period of the year.

Felix.—The lens named will be of too long focus to take a full-length portrait of cabinet size within the length of your studio. You will have to be content with one of shorter focus—say, the next size smaller. The first, however, will be better for half-lengths or busts. If expense be not a serious object with you we should advise your having both.

S. E. J.—The object-glass, though its optical and chemical foci do not coincide, may certainly be employed for the delineation of microscopic objects. All you have to do is to find out the correction necessary (according to the instructions so frequently given in these columns), and you may then rely upon getting satisfactory results—quite as good as if the two foci were coincident.

Hy. Sims.—There is very little doubt that the lens has been injured by the fall, as you say that it does not work so well as formerly. Your best plan is to get some practical optician—the maker of the instrument, if possible—to take the lens out of the dented cell and put it in a new one. When this has been done, in all probability the lens will be restored to its original condition.

A Country Amateur.—The fault in the picture is not in the developing alone, but also in the exposure. The picture is very much over-exposed, and you appear to have had the sun shining into the lens at the time. Cannot you induce some photographic friend to give you a few practical lessons? Seeing half-a-dozen negatives developed will be of more value to you than any amount of reading.

R. J. Bidder.—If you purchased the gelatine as being by the manufacturer named you certainly have been deceived. The sample shows at a glance that it is one of the commonest kinds to be found in the market, and its value is, we should say, not more than tenpence or one shilling per pound—not three-and-sixpence, as you have paid. Such stuff is useless for emulsion work. No wonder you failed.

Lottie.—Many thanks for the promised collection of charming little studies. They certainly will find a conspicuous place in our album. The pictures, if you will permit us to say so, show a very marked improvement on those you first sent, and they were good. Many of the collection are as near perfection as it is possible to obtain in photographs. We shall hope to see some of your work in the next exhibition.

An Experimenter in Carbon.—Why not employ indian-ink in your experiments in tissue-making? It may be somewhat more expensive than lamp black or ivory black, but its colouring power is much greater, consequently it will go further. You can procure it in a moist form, which is a great convenience, as it will save you having to grind it yourself. Any artists' colourman will supply it, as well as any other colours you may require. Use a very soluble gelatine, or you will not succeed.

Norval.—We see no reason why you should not succeed in using dry plates on the West Coast of Africa, provided you adopt the precautions usual for working in hot climates. Of one thing you will have to take especial care, namely, to keep the plates well packed in waterproof or damp-resisting material during the rainy season, otherwise they will be sure to suffer injury. Your safest plan will be to keep the plates in air-tight metal cases, soldered up or otherwise hermetically sealed, to prevent access of moisture, which pervades everything at that season.

Y. E. S.—If you are using the royal arms, and styling yourself "photographer to the Queen," simply because you have executed a few small commissions for Her Majesty, you certainly are rendering yourself liable to a penalty of twenty pounds. Your neighbour, who photographs the prisoners in the county gaol, has no more right to style himself "royal photographer" than you have. Our advice is—take down the arms and drop the title as quickly as possible, or you may find yourself involved in trouble. We believe the authorities intend to enforce this part of the Act rigidly.

Photographic Club.—At the forthcoming meeting of this Club, at Anderton's Hotel, Fleet-street, on Wednesday next, the 4th June, the subject for discussion will be—*The Consideration of the Best Means of Obtaining Density on Gelatine Plates without Resorting to Intensification.* An outdoor meeting will be held on Whit Monday at Welwyn. Train leaves King's Cross at 10.32.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

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FREE SILVER AND SENSITIVENESS IN GELATINE EMULSION.

Pursuing the subject of the function performed by free acid in preventing fog in emulsions when an excess of soluble silver salt is present, we may repeat the view we expressed last week, namely, that the action of the acid is simply to retain the organic silver compound in a soluble condition, in which it is removable by washing.

In addition to the instances of similar action quoted in our previous article, we may allude briefly to one or two others which tend to prove that this view is correct. Every dry-plate worker knows what is the result of applying a solution of tannin, gallic acid, or pyrogallol to a film containing free silver. The latter is immediately reduced and the film badly discoloured; but, some years ago, Colonel Stuart Wortley showed that an emulsion plate carrying a large excess of silver together with free acid might be plunged directly into a preservative of the character named without the slightest tendency to the production of fog.

Later, in 1875, Mr. M. Carey Lea described a washed emulsion process, in which the "pellicle," containing a considerable quantity of free silver, was immersed without previous washing in an organifier consisting of various substances, such as tannin, gallic acid, pyro., coffee, and many others, acid being present both in the emulsion and the preservative. Here we have the free silver actually soaked out of the pellicle on a solution of a reducing agent, the reduction being arrested by means of acid. In either of these cases the organifying solution becomes very dark in colour from the formation of an organic silver compound, but retains its clearness because the compound remains in solution.

The presence of an acid during the preparation of an emulsion will thus prevent the formation of an insoluble fog-producing compound; but it will do more than this, as in many cases fog, already present from such causes, may be removed by the action of an acid. Thus, some years ago, we were consulted by a gentleman on the subject of a quantity of washed emulsion which was hopelessly fogged. According to his description of its preparation he had eschewed free silver (not being a believer in the principle) and, consequently, also free acid. Before washing the emulsion it had been tested and found to be all right, but when washed and re-dissolved it was so badly fogged that no trace of an image could be found amongst the general veil.

Upon examination of our friend's formula we found that, in substituting one bromide for another, the difference in combining equivalents had been ignored, and, instead of the emulsion containing a slight excess of soluble bromide, it really carried a large excess of silver and no restraining acid. As a large quantity had been made —involving not only the silver and bromides employed but also the equally-expensive ether and alcohol—it became important, if possible, to utilise the emulsion rather than relegate it to the waste-tub. After one or two experiments we succeeded by dissolving in a concentrated form—adding nitric acid and *rewashing*—in producing an emulsion perfectly free from fog, of good sensitiveness, and only differing from an ordinary one in giving a thinner image. The addition of acid without subsequent washing produced no effect whatever, as the silver compound remained, though in a soluble condition, in which it was easily and entirely removed by washing.

It will be obvious from the tenor of our remarks that we intend to suggest the same application of acids in connection with gelatine emulsion as that we have alluded to in the case of collodion. Assuming the power of utilising the effect of free silver under such circumstances to be an advantage (and reasoning from analogy we see no necessity to doubt it), it seems to us probable that the formation of the gelatino-silver compound which causes the red fog in a gelatine emulsion would be as thoroughly destroyed or arrested in formation as the more definite silver compounds with tannin and similar substances. At the same time there are certain considerations which partially remove gelatine from the exact position occupied by collodion.

First, with regard to the probable advantage to be derived from the use of an excess of silver: we know that prolonged emulsification, increase of temperature, and the addition of an alkali all tend to heighten the sensitiveness of a collodion emulsion in the same manner as in gelatine, but in a less degree. We also know, as has been already stated, that the highest degree of sensitiveness in collodion can only be obtained when the silver is in excess; and it is, therefore, but reasonable to assume that what proves to be the most powerful accelerator with collodion may also be the same with gelatine.

It may be urged that the acid employed will counteract any gain in sensitiveness arising from the excess of silver, because in the ordinary "boiling" process an acid emulsion requires longer cooking; but a moment's consideration will show that the conditions are so obviously changed when free silver is introduced into the question that the objection is not for an instant tenable. That the presence of nitric acid in combination with silver nitrate is not inimical to sensitiveness is proved not only by its action in collodion emulsion, but also in the acid bath introduced in America some years since by Mr. J. W. Black, of Boston. In this an abnormally large proportion of acid was employed, with the result that extreme rapidity and great softness were obtained.

The action of the acid upon the gelatine has, of course, to be taken into account, independently of its suggested fog-preventing power. Thus, we know that if gelatine be heated for a very short time in the presence of an acid, it loses all setting power and becomes converted into a permanently-liquid state. This fact militates against the employment of an excess of acid silver in any of the methods of emulsification which involve the use of the full strength of gelatine during the operation; but, on the other hand, it favours the processes in which precipitation is relied upon.

It does not follow, however, that (bearing in mind the comparatively small quantity of acid necessary and the low temperature usually adopted in the "prolonged emulsification" methods) the effect will be so great as to destroy the setting power of the whole of the gelatine, or even to affect it to a serious extent. If so large a proportion as twenty-five per cent. of the gelatine be destroyed or converted to the soluble salt, it would be removed with the other soluble matters in washing, and, if necessary, could be replaced with fresh after that operation.

But it is in the direction of precipitation that we are inclined to look most hopefully for success—not only as presenting fewer chances of injurious complications arising from the organic silver compound, but also as affording the most convenient and scientific method of preparing a pure emulsion. A minor consideration (one of economy) is to be found in the greater convenience precipitation presents of collecting the surplus silver removed from the emulsion—an important item in the case of large operations.

So far we have said nothing as to the practical results to be obtained when working on these lines. We have preferred just to give in detail the principles upon which we have proceeded, and shall shortly publish the results of a number of experiments in the direction indicated.

CERTAIN NICETIES IN FOCUSSING.

When recently attempting to focus a subject of extreme delicacy we found the ground glass of the camera much too coarse for the purpose, notwithstanding the fact of its being a specimen of the finest ground glass possible to be obtained. This is an experience, we may observe, that is more or less common to all who attempt to photograph diatoms and microscopic objects of the finer class. The point of best focus can readily be ascertained, more especially if recourse be had to the magnifying services of a focussing eyepiece of low power. But the amount or extent of the definition cannot always be perceived; for, when to secure this end the power of the eyepiece is increased, then the granulated surface of the focussing-screen appears so coarse as to prevent the desired end from being attained.

It is all very well to tell us to discard a ground surface in favour of a plate of plain glass; but this presupposes the function of the focussing-screen to be limited to that purpose from which it derives its appellation, namely, that of focussing upon, whereas one important use of this surface is to permit of the composition of the subject being properly noted and arranged.

The highest order of focussing is that effected by the aid of a compound microscope, by which we here mean two *systems* of lenses in a focussing eyepiece instead of one. To explain: a direct magnifier—composed usually of one, but sometimes of two, or even more, lenses—represents the latter, and by means of it the image on the ground glass is itself viewed; but by the former we mean such a system as that by which a second or virtual image of that which is on the focussing-screen is formed at the other side of a lens, and which image is viewed by a second or eyepiece system. This forms the best of all focussing-tubes, because it may be easily made in such a manner as that, when once adjusted to the front surface of the focussing-screen, a difference so trifling as the ten-thousandth part of an inch in racking in or out the photographic objective can be readily perceived from the degree of sharpness of the image. This is, of course, assuming a very careful measure of correction of the photographic lens.

Desirous of "running to earth" this subject of focussing, we first of all constructed a compound focussing eyepiece. It consisted externally of a paper tube, formed by wrapping a long strip of *The Times* newspaper, six inches in width, round a circular desk ruler with a cement of ordinary glue, made rather thin, between each layer. When the glue was dried the rigidity of this tube was marvellous.

Just here, and while on this subject, let us say a few words on paper tubes. In our estimation paste, which has so commonly been recommended as the means of uniting firmly together layers of paper, is greatly inferior to glue. We speak of this after acquiring some experience in the formation of two or three long tubes for astronomical telescopes. Let any reader make one tube, long or short, of a few thicknesses of brown paper well saturated with flour paste, and a second tube in which glue forms the cement, and he will be satisfied as to which is the better. One of the latter, about four feet in length and three and three-quarter inches diameter, which we had placed on the roof of a house to dry, was caught (after being dried) by a gust of wind, and after being carried more than sixty feet was thrown against a hard pavement without sustaining the slightest damage.

Into a tube formed of this material we inserted a cheap, French-made one-and-a-half-inch microscopic power of the usual triplet class, inserting at the other end an ocular composed of two plano-convex crown-glass lenses, mounted Huyghenian eyepiece fashion. By the aid of a cap sliding over the tube we adjusted this compound focussing system so that when the lower end of the tube was pressed in contact with the back of the focussing-screen the granulated surface of the other side of the glass was in sharp focus. By means of delicate scratches made on the anterior surface of the plain glass, intended as a substitute for the ground glass, we found that the thickness of both was identical.

Here, now, became apparent a difficulty that had been to some extent anticipated. When focussing upon the plain glass we could obtain, without any difficulty, a focus which was absolutely sharp. It only sufficed to place the end of the pocket compound focussing microscope, just described, firmly against the focussing-screen and rack the lens in or out until the maximum visual sharpness was obtained, precisely in the manner in which a telescope is used, and upon a sensitive plate then inserted was found delineated all the sharpness of definition which the lens employed was capable of yielding. This was all right, so far as it went; but upon a plain plate of glass it was found to be wellnigh impossible to adjust the subject as a composition. On the other hand, when the ground-glass screen was employed it was found to be difficult to focus sharply.

After some consideration we formed a circular hole in the centre of the ground glass by making a perforation, half-an-inch in diameter, as nearly in the centre as possible. This we did by chucking a small piece of brass tube in the turning lathe and applying emery powder and water to the end, pressing this against the plate of glass, by which a hole was speedily cut through. To this hole the microscope was applied after making a very slight adjustment to compensate for the removal of the thickness of the glass and restore the equilibrium of spherical correction.

This system worked to perfection; but we reflected that, from a practical, everyday point of view, it would be preposterous to expect photographers to be able to "follow suit," as the number who have appliances for effecting the perforation of the ground glass is necessarily limited. We therefore tried the effect of polishing a small portion of the centre of the ground glass. This experiment, too, was attended with success; but, like the one previously described, it was troublesome.

We eventually hit upon the thing of all others best adapted to the purpose, and we can recommend it as costing comparatively nothing either in expenditure of cash or trouble, while it fulfils the purpose desired in a satisfactory manner. It is as follows:—

Having rendered the ground-glass surface of the focussing-screen quite clean, take one of the circular thin glasses employed for covering the objects on microscopic slides, which are sold by all opticians for this purpose at so much an ounce, and having placed a small drop of Canada balsam upon the centre apply it to the ground surface of the focussing-screen as near to the middle as possible. Instantly the granulated surface disappears (at least sufficiently so for our purpose) in favour of a bright, polished spot. By the application of heat the small portion of balsam that oozes out at the margins of the disc of microscopic glass—which may vary in diameter from half-an-inch to three-quarters or more—soon becomes sufficiently hardened to enable it to be chipped away by the point of a knife, or dissolved by the application of benzole or ether.

Next week we shall take occasion to follow up certain ideas here indicated.

EOSINE IN THE COLLODION PROCESS.

Everyone knows the difficulties attendant upon, and the unsatisfactory results which, as a rule, are obtained in copying works of art. The real difficulty is that of rendering in monochrome by photography the different colours of the picture in their correct value. It frequently happens that the lights and shades in certain portions of a painting are completely reversed in the photograph, if the former contain a large proportion of yellow and the latter blue or violet. This, of course, often renders the photographic copy little short of a burlesque on the original.

On the continent, where the reproduction of works of art is made a greater feature as a branch of business than in this country, much better results are usually obtained. We have in our mind's eye just now some of the wonderful reproductions from the old masters by MM. Braun, of Dornach, MM. Goupil's reproductions by their *photogravure* process, and the works of other firms we could mention. It is not our present intention to refer to the causes frequently assigned for this superiority, as allusions have been made to them in our columns on previous occasions. It may, however, be remembered that, a year or so since, a report gained currency that the superiority of the work issued by some of the continental firms was due to the employment of a modified collodion process, by which the colours of the picture were rendered in the photograph in the same relation as to tone as occurred in the painting. About the same time MM. Clayton and Tailfer, of Paris, introduced a special make of gelatine plates, for which it is claimed that they reproduce colours in their correct relation, this being secured, it is said, by the introduction of eosine—one of the aniline dyes—into the emulsion. These plates are now, we believe, an article of commerce in France, though, so far as we are aware, they have not been introduced into this country, consequently we have had no opportunity of testing their merits.

Recently, Dr. Vogel has brought the subject of rendering colours in their true proportion by photography before the Berlin Association for the Cultivation of Photography, and described a means by which he claims that the collodion film is rendered *eight times more sensitive to the yellow than to the blue rays.* This result is obtained by the addition to a bromised collodion, containing a little iodide, of a certain proportion of eosine. The after operations of developing, intensifying, and fixing the negative are much the same as those of the ordinary wet collodion process, similar solutions being used ; so it will at once be seen that the new process is by no means beset with complications.

The idea of employing different colouring matters in the sensitive film, with the view of absorbing the more non-actinic rays, is by no means a new one, as it was promulgated several years ago, and at different periods many have tried it, but with varied results. Some experimentalists have maintained that certain advantages were gained by the addition ; while others, on the contrary, affirmed that no advantage whatever accrued, and, furthermore, gave reasons why none should be expected.

Up to the present time, so far as we know, the plan has never been brought into use commercially, unless, indeed, it has been worked as a "secret process." It is quite possible, after all, that the discrepancies in the results hitherto obtained by different experimentalists may, in a measure, be due to the particular method of working adopted by them or to the character of the colouring material employed. Be that as it may, Dr. Vogel, who has devoted considerable attention to the subject for many years past, has now published in the *Mittheilungen* full working details of his process, which we reproduce [see page 244 *ante*, and page 360 of the current issue], so that any one may try it, and on its merits decide for himself.

Presuming the process will accomplish or secure even a portion of what is claimed for it by Dr. Vogel, it is simply impossible to overrate its value to those who make a speciality of copying works of art; because, however skillfully a negative may be retouched or the painting itself may be manipulated or "dodged," the copy can never possess the same value it would have done if equal results could be obtained direct from the original without sophistication. Whatever advantages may be obtained by the new process we can foresee they will not be gained without some attendant inconveniences, and of these Dr. Vogel appears to be fully cognisant.

For example : we are told that the eosine-bromised plates are about three times slower to white light than ordinary wet collodion plates; and, further, it is advised, in the event of blues coming out too light in spite of the eosine, to take the negative through a plate of yellow glass, which, as a matter of course, will still further prolong the exposure. When we consider that in copying oil paintings it is generally necessary to stop off a large proportion of the light falling upon them in order to avoid reflections, it will be seen that the exposure will become inconveniently long. Furthermore : when large sizes have to be produced—say on plates of twenty-five or thirty inches, such as those produced by some of the continental houses—lenses of long foci become imperative, and even then very small stops must be used in order to obtain good definition over the large plate ; hence, it will be observed, a very long exposure will be absolutely necessary in working this process. We are aware it is no uncommon thing for an exposure of three-quarters of an hour or longer to be given in the ordinary wet collodion process, as at present employed, when copying old oil paintings. Occasionally, when a painting cannot be removed (as is the case in some collections) and it has to be copied *in situ*, several hours' exposure is frequently necessary. In such cases the new process will, of course, be placed at a considerable disadvantage.

Now, the great difficulty in working the wet collodion process with such protracted exposures is that of preventing the plate from drying, or partially drying, during the time. To overcome this Dr. Vogel employs a dark slide with a plate-glass front, so that the evaporation is to a great extent retarded. It appears, also, that the eosine has a very injurious action upon the silver bath, which causes it to become disordered after a few plates have been sensitised ; indeed, two baths appear to be necessary in practice—the second to immerse the plate in prior to development, so as to remove the impurity left by the first. However, this is a very trifling matter, as large plates are usually sensitised in horizontal baths, so that only sufficient solution to cover the plate need be used. When this becomes disordered it can be discarded and a new one taken into use. The old solution can then be restored at leisure in the ordinary way, or added to the residues, without incurring much trouble if the former plan be adopted, or much loss if the latter be employed.

These comparatively trivial inconveniences, however, are scarcely worthy of consideration if the results to be obtained approximate to what is claimed for the process. They certainly are not of such a character as to deter for a moment any person from giving the process a fair trial now that such full and complete working details are published, particularly when we consider that it is quite possible, as the result of further experience, that the difficulties to which we have alluded may be eventually overcome, or at least considerably ameliorated.

If the value claimed for eosine in collodion can be secured equally well in the gelatine process it will prove an immense advantage, as then the difficulties of disordered baths and protracted exposures will be entirely obviated. We are pleased to learn that Dr. Vogel is still experimenting in this direction, and we hope he will be able to bring his experiments to a successful issue.

OPACITY OF FILM AND QUALITY OF IMAGE.

In the search for sensitiveness in gelatine plates almost all other qualities were for a long time ignored ; so long as a plate was extremely sensitive, and especially if it did not frill, it was looked upon as pre-eminent, though, certainly, we may say density was, almost concurrently, considered a desirable characteristic, but it held quite a second place. Quality of image was about the last thing sought for, and, indeed, at the present day it is only occasionally that, irrespective of the question of density and clearness of the shadows, it has been discussed to any serious extent.

We have for some time past been making a series of trials of various makes of plates with this particular point in view, and we have formed a very positive impression as to the bearing of facts in, at anyrate, one direction. The distinct opinion we have arrived at is that, outside all considerations of iodide or chloride admixture with the gelatino-bromide, the opacity of the film exercises a most important part in determining the character of the image. The addition of iodide has been said to make a plate less sensitive, and also to increase its sensitiveness—to render it more and to render it less liable to green fog, more sensitive to the red, and less sensitive ; in fact, to perform all the most contradictory feats imaginable. But that this greater or less opacity of the film, especially in portraiture, affects the character of the image as regards delicacy, crispness, and range of tone may be conclusively proved. The facts upon which this effect is based are well known; it is their application upon which we would lay stress and draw attention, seeing that, so far as we have observed, little or no publicity has hitherto been given to any such opinion.

A very little argument will prove our position, and, if we mistake not, indicate a point of departure for all dry-plate-making experiments. "A good, thick film" has for some time been looked upon as a *desideratum* without any very logical reason being assigned. We proceed to indicate our views as to its function. There has not been an exhibition in Pall Mall yet in which the presence of "halation" has not marred some of the pictures hung. Parts that should have been black have been in some instances so affected as not to be deeper than a middle tint—sometimes to the ruin of a picture, and at others scarcely to the injury of the effect at all; but if a plate be liable at all to halation, little or much, who can say when the effect will not be most prominent and most injurious? If anyone look through an album of portraits by different artists he will find in almost one-half of them, where a white collar and a black coat are portrayed, that the purity of the deep black is degraded close to the collar owing to halation; while in cases where much linen is displayed the effect is sometimes ludicrous, a species of aureole surrounding the dignity of a large white cuff or the weeds of a widow displayed over her sombre attire.

We have before us two pictures, in taking which similar difficulties met the operator, but which have been encountered very differently—one being a steamship taken by a photographer in the north, and the other a large crane by an artist in the south. In each case there were fine lines of dark ropes or chains set upon a background of clouds—a most difficult class of subject. In the first named they were as sharply rendered as though cut out of the negative with a knife; in the second they were grey and flat to a degree.

Now, without any knowledge of the mode of manipulation employed, we have little hesitation in saying that the one was taken with an opaque film and the other with a more translucent one. So far the inference from these facts would not be disputed, but we will go a step further. We would ask—Can it be doubted that, if a gross amount of degradation of shadows can be indubitably shown in some cases, there are a multitude of others where the lighter tones must also be degraded, but in a manner that cannot be readily seen and pointed out? It is the absence of this degradation that causes the effects termed "crispness," "pluck," "brilliancy," &c., and it is its presence that reduces the variety of tones by merging the more delicate ones into the high lights, so as to cause complete absence of tone.

When the light on a plate is very feeble, either through slight illumination of the view or portrait, or through excessive stopping down, halation is reduced to a minimum or is entirely absent. In such cases a thin film is equal to a thick one. But when the subject is brightly illuminated, or a large diaphragm is employed, those parts of the plate which receive a bright portion of the image allow it to pass through and become reflected in the now well-known manner. Similarly with a portrait. With average illumination and a stop not too small a thin plate will allow sufficient light to pass through that portion where the image of the face is thrown to be reflected back to the film, and so destroy those delicate tones that lend such beauty to a photograph. But, as when the light is poor (which is so often the case in our variable climate) or a diaphragm is used, the light becomes too much reduced to have much effect, this special characteristic is lost sight of, and the distinct defect of a thin plate remains undetected.

It is very difficult to point out—as can be so easily done in the case of a white cuff, or an open book on a black surface, &c.—an example of this defect in the lighter parts of the picture; but we can show how it may be easily appreciated. Let anyone take two or three negatives on thin and two or three on thick films of a lady in a white dress, or of a chorister, for example, in his white gown, choosing a bright light, using no diaphragm, and not "backing" either of the kinds of plates. Let him obtain the best negative he can, and he will find that the thick film gives an infinitely better effect than the thin, no matter what developer he employs.

This will be further seen on the back of the plate. The thin film will exhibit the whole of the image at the back, while the thicker film will show less of the image, or none at all, according to the amount of its opacity. There will, however, be more to be observed than this. The image seen at the back of the thin film will have a misty, unsharp, or fogged appearance, while that slightly showing through a thicker film will be crisp and sharp—the first instance being distinctly a localised fogging of the image in special portions only.

It will thus be seen that the old criterion of the correctness of the exposure, namely, the image showing through to the back, will be quite useless for some plates—plates that we would recommend—and could only be of service in the thinner and more defective plates.

We need not point out that a great deal of this effect of halation proper and of degradation of the middle tints will be greatly diminished by the use of backing. They will not be entirely diminished, but all such additional labour should be avoided, if possible; and this will be facilitated by the use of a plate with a thick film. Such a class of plates entails other difficulties which we cannot now discuss; but we may say that the greater the number of plates we have experimented with in this direction the stronger grows upon us the conviction of the great superiority of an opaque film—so much so that we hazard the opinion that in half-a-dozen years' time, for ordinary work, it will beat all other (thin) plates out of the market.

There exists a pretty close intimacy, as a rule, between the theatrical and photographic professions, but it is perhaps impossible to expect that they should always rub on together with perfect smoothness. Here, at least, is evidence that somebody (the photographer, of course) has been "had" once, and doesn't mean to allow it again. The correspondence reaches us from a midland town:—

Says the "acting manager" of a travelling company:—"Dear sir,—Do you make any charge to the dramatic profession for photos.? I require some for professional use only, and have heard you very highly spoken of. Should be glad if you would drop me a line," &c., &c.

In response to this the guileless collodion man says:—"In reply to your note received this day I beg to say that when the places of dramatic entertainment are thrown open free of charge to the photographic profession, then you will probably be able to obtain what photographs you may require without paying for them. Until such somewhat doubtful advantage is attained I, for your further information, beg to say that my terms are—for *cartes*, 6s. per dozen; for cabinets, 12s. per dozen; and *with the profession strictly cash with order*.—I am, yours," &c.

We have employed the italics because we think that this photographer's knowledge of "the profession" deserves emphasising. If some of the "guinea-a-dozen" *carte* men would do less in the way of *not* making "any charge to the dramatic profession," many of their fellows in, perhaps, a less flourishing way of business would be saved a great deal of trouble from such attempts as the above, usually made by the "tag-rag and bob-tail" of the profession they do anything but adorn.

We read about a new patent cork lately invented, to be called the "reversible distributor cork," which seems to possess promise of usefulness. It is coned from the middle to each end so as to fit either way up, and, in addition, has at one end a pair of grooves cut opposite one another, starting at the middle and terminating at the extremity, so as to enable the ubiquitous "drop" to be delivered—one groove permitting the fluid to pass while the other admits the necessary amount of air.

By the way, why are not all corks made cone-shape, or "taper," as the technical term runs? If we send to the nearest chemist for a dozen or two corks we are too apt to be supplied with a number of short rods instead of a nice cone-shaped, elastic stopper of beautiful velvety-looking material—as different from the "cork" rods as a building brick is from a majolica vase. We learn, too, that the term "velvet" also is appropriated by the cork-cutters to describe one superfine quality of material. We shall in future always ask for "velvet taper corks" when we require an easy-fitting stopper that will neither send a dust spray into the bottle to which it is applied nor break off short when we attempt to extract it.

Last week we alluded to the new substitute for bichromate of potash—the bichromate of soda—which it was advertised by the makers would be much cheaper than the older salt. It would, however, need to be vended at a very low rate if it is to successfully compete with the potash salt spoken of at the meeting of the Applied Chemistry Section of the Society of Arts on the 28th ult. Mr. Barr, the maker of an ingenious primary battery, said that when his firm commenced the manufacture of the batteries they paid sevenpence per pound for bichromate of potash, while now they only gave threepence halfpenny for it. It occurs to us that possibly it is the soda salt that he referred to when quoting the lower price.

The old familiar sulphate of iron, usually shortened to "iron" among photographers, is recently exhibited in quite a new *rôle*, a chemical investigator having ascertained that it possesses high manurial value, while he now informs us that chlorophyll—that marvellous colouring matter which furnishes the prevailing tint of green that beautifies the face of the globe, or would do if we had a little more rain—owes also its colour to sulphate of iron. He considers it probable that in "the chlorophyll cells the molecules of ferrous sulphate which are taken up by the roots are constantly being decomposed, the iron combining with the colourless variety of this glucoside (that is, the *leukoplastids* of the vegetable physiologist) forming the green glucoside (chlorophyll)." It will be singular if the colour which of all others is most antagonistic to the action of the developing solution should really turn out to be caused by the main constituent of that solution.

It will be remembered that about a year or two ago the scientific papers were full of accounts of a new mode of preparing aluminium, which, it was asserted, would cause its price to be so low as to bring it into common use. Nothing further was heard of the process, and in Messrs. Spon's new *Workshop Receipts* reference is made to the method, which, it is stated, only cheapens the price of alumina, not the metal. This book states that if the method enabled the alumina to be produced even fifty per cent. cheaper than by that of a well-known maker on the continent it would only cheapen the price of the metal five per cent.

The example set by Oxford and Cambridge in declining to exclude the fairer portion of the community is becoming contagious. The other day the Royal Microscopical Society held solemn conclave to decide whether they should admit ladies to the privileges of the Society, and they passed a resolution—"That ladies shall be eligible as Fellows of the Society, and shall be subject to all the obligations and entitled to all the privileges of Fellows, except that they shall not be entitled to attend the ordinary meetings of the Society." We think that lady photographers would, if we may be allowed the expression, be received with open arms by the leading photographic societies of the country.

In connection with the old silver print and its singular set-off on the backboard of the frame that held it that we described in our last issue, we have been able to ascertain how it was produced. The plain paper was coated with a solution founded on the lines of a formula published by our late esteemed *collaborateur*, Mr. Thomas Sutton, and was as follows:—

Chloride of sodium	10 grains.
Gelatine	1 grain.
Sugar of milk	30 grains.
Distilled water	1 ounce.

It was toned, we learn, by *sel d'or*, and is, as we said, a beautiful colour. Seeing that it was, as we are informed, printed from a "converted positive," as the term run in those days, there never could have been much half-tone in it; hence it is practically as good now as upon the day it was first produced, though it has been knocking about without any care whatever having been given to it.

COLOURED AND NON-ACTINIC LIGHT.

In reply to Mr W. E. Debenham's article: I think if he refer to mine again he will see that I did take account of the different illuminating powers of different parts of the spectrum, and that the greater portion of my remarks towards the end was in the express direction of his own question—"Which part of the spectrum possesses the least effect upon the photographic film *in proportion to its illuminating power?*" Looking over what I wrote, I really seem (to myself) to have gone very directly to that precise point, though I know "the heart is deceitful above all things" in matters of one's own authorship. Mr. Debenham "has" me fairly enough in another matter, for the simple reason that I made no attempt to treat exhaustively of the subject, and would, indeed, have thought it presumptuous to attempt more than some main outlines. He is, for instance, quite right in saying that some media which pass little visible light may pass *invisible* actinic rays. But, practically, this objection applies to scarcely any media likely to be used in experiment; and hence I took no notice of a point which perhaps ought not to have been omitted. In practice it will be rather difficult to find a medium which only passes the less actinic of the visible rays, that does much harm by invisible rays, and so I let it alone.

There will not be much difference between us if I say that in my remarks I made not so much reference to the final and conclusive results, as to which I concur that the photographic plate must be the final appeal, as to the preliminary work of choosing and compounding media. The prism, *merely used at the eye*, does swiftly and surely what otherwise is haphazard; and it is most of all advantageous *because* most media "allow more than one band to pass." Taking any two, three, or four media, one glance through the prism shows at once the residual light which gets through the whole; and, since the eye itself can judge of the visual effect, the operator knows at once if he has got a *promising* combination, which can then be submitted to more crucial tests. But the prism infallibly casts out at once, without further trouble, media or combinations which cannot possibly lead to any good result, though they might consume much time and many plates if tried on account of their appearance to the eye alone.

So, again, my remarks as to differences in plates referred to the case of absolutely "non-actinic" light. If such do exist at all, my remark was that it could be only for one precise condition of the salt. In practice, on the other hand, I referred to "a wide range of bromide plates" as showing broadly the same result.

About the effect of exposure on sensitiveness I can pretend to no authority; but my impression was founded on *many* scattered statements here and there. It must be borne in mind that all plates do have some exposure. Query: would a bromide-gelatine plate prepared from first to last in *absolute* darkness be as sensitive as one prepared in the usual way? My impression, gathered mainly from facts I have seen stated, is that it would not be. Mr. Debenham thinks it would be. The question is exceedingly interesting from the molecular point of view; and I should think it was of enough practical importance to be decided beyond cavil. Meantime dogmatism on either side is probably unwise.

The question in the last paragraph of the article is a very simple one—another of those which is at once answered by the prism; and here let me say that when I mention the prism I mean no complicated "spectroscope," but simply a prism of any kind, *held at the eye*, though a direct vision is the best, and a small thirty-shilling pocket spectroscope handier still. Nearly all coloured media transmit more than one colour, as Mr. Debenham has noted, and most of them show more than one absorption band. Now, by using more and more of the medium it will be seen that the bands become wider and darker, till at last two bands may approach and coalesce. There is no better example than the litmus solution so often mentioned in text-books. Suppose we have it in a wedge-shaped cell, so that we can look through gradually-increasing quantities. A thin layer only shows a narrow band near the D lines. As we pass the observation-slit towards the thick end of the cell this band rapidly widens and darkens, and another appears at the violet end; and as more medium is employed these bands approach till there is perceptible absorption even midway, and the total light allowed to pass is a purplish-red instead of blue. The explanation, of course, is that there really is *some* absorption in the thinnest layer long before the eye can take account of it. As we add more medium *all* the absorptions increase, but not all in the same ratio; so that the final colour may be very different from the first. The prism will show beautifully how successive portions of the spectrum are gradually encroached upon by more of the absorbing material, till at last total obscuration is the result. The glass coloured with copper oxide changes little or nothing except towards darkness, because at the very first most samples transmit only reddish rays. But as half the whole spectrum at the red end, when gathered together, appears orange, or even yellow *if more green be taken in*, and the other whole half appears blue, it is easy to see what changes may be made by greater and greater absorptions in blue or yellow of such a compound nature, instantly revealed by the prism, though the eye is deceived.

I was rather interested, and may frankly say puzzled, by the alleged effect of passing light through a *diffraction grating*, as mentioned at a meeting of the London and Provincial Photographic Association. That employed would probably be a photographic copy of Nobert's; and the usual size (about one and one-eighth of an inch square, 3,000 lines to the inch) I have seen advertised in the *English Mechanic* at half-a-guinea. Mr. Lettsom's, which was referred to, if a Rutherfurd (which it probably is), would be on speculum metal, and would give reflected spectra, with, probably, different results. Professor Rowland's are also on speculum metal, and one four inches square costs from £8 to £12; smaller ones are much cheaper. Mr. Brashear, who has the disposal of them, informs me that they are not at present ruled upon glass, as the demand for metal ones cannot be supplied. These are far the best yet made, when the best quality is obtained.

Another expedient may be worth investigation. As Mr. Darker observed, there are many methods of modifying light; and there *might* be photographic advantages in passing light through *fluorescent* media. The rays most active in exciting fluorescence are the *most actinic* also, and in doing this work they are bound to disappear. Two or three layers on glass of even luminous paint must necessarily absorb most of the *invisible* actinic rays, for instance, though the visible rays may remain. But a cell of eosine solution might be worth trying, and so might a piece of uranium glass in combination with other media. Probably neither would answer alone; but most of these substances are such powerful absorbents of all the *invisible* actinic rays that in combination they should be useful, and both the yellowish-green of the uranium glass and the orange-red of the eosine would not be bad colours to start with as the foundation. Has anyone ever tried the two in combination? The glass can be got in small pieces of sheet very readily. LEWIS WRIGHT

P.S.—By a strange coincidence, since the above was despatched on Monday, I have had the pleasure of seeing the solar spectrum as shown by Mr. Lettsom's magnificent grating, in company with Mr. Darker. It is, as I supposed, a Rutherfurd, on speculum metal.—L. W.

CLOUD PHOTOGRAPHY.

OF all the classes of subjects which are presented to the camera that of clouds receives but little attention. Whether it is because these lovely objects are common to every place alike (too common in England sometimes, perhaps) that none are worth pictorial record, or that there are not the opportunities as in landscape work for the display of taste and skill, is not evident. There is a failure, at anyrate, of one great incentive, in that a picture composed principally of cloud would not excite the pleasurable sensations derived from old associations and enjoyment as one of a place visited; therefore, the impulse to practice this branch of photography must arise more from the love of depicting the beautiful. With the dictum that one needs but little skill I most certainly disagree.

The chief charm of cloudland consists in the great variety and ever-changeableness of its character. When a grand effect displays itself it is on this account of more importance to secure a photograph, and because of the certainty of its never recurring. There may be similar ones of the same class, and although the likeness may be great there is still variety.

Cloud photography up to the present, except in a few instances, has been limited to the production of those of a marked character, for the purpose of breaking up bad skies in landscapes. As for this purpose it is necessary that they be thin in the negative and quick printers, to suit the requirements of double printing, and also not too obtrusive when appearing over a landscape where breadth and depth of tints are so small that anything beyond a mere indication would detract instead of enhance, all their beauty excepting that of form is suppressed, and the loveliness of their delicate gradation is never seen. Now, negatives of clouds for pictures in which the landscape is to be subordinated must have their scale of gradation complete, and therefore require, in comparison with the thin ones mentioned above, rather longer printing.

In these cases the process of double-printing should be reversed, the cloud being first printed to a depth sufficient for its finer details to escape the destroying influence of the toning and fixing baths, and the landscape printed up to harmonise with it. This procedure is absolutely necessary. The great difficulty is to obtain brilliancy. The lights of nature are so pure and strong, and the extremes of light and dark so great, that the artist is compelled to resort to opposition of extremes and juxtaposition of colours to eliminate the muddy element from his comparatively-restricted scale of tints, which range from dirty grey to black. Nothing on paper or in pigment will bear placing beside nature, for lack of purity pervades all that is artificial. The nearest approach to natural effects in respect of brilliancy would be found in transparencies illuminated by electricity. These being the most perfect kind of photographs, in not having the greater part of their details washed out or clogged as in paper photography, the richness and depth of shadows could be made to subdue the strong illumination, while its full power sparkled through the highest lights. Paper work alongside is crude and out of the hunt. I never have seen a good cloud on a paper photograph; they invariably fail to show all gradations of tone. The art has yet to be mastered; the process is still wanting.

The skill and judgment required to successfully photograph the beauties of the sky are of a very high order. Some of these, however—such as the masses of cumulus in a storm-cleared sky—are not very difficult; and upon these it would be well for a new adventurer in the field to commence. In their being strongly contrasted with the blue background the duration of exposure and after treatment of the plate need no special care. It is otherwise when delicate cirrus, "mares' tails," "mackerel" skies, masses of cumulus in heat haze, storm clouds, and evening effects are attempted. These tax one's ingenuity to the utmost. The very slight difference in the photographic action of the various parts render it necessary to use the greatest care in timing the exposure and restraining development to intensify this slight difference as much as possible; otherwise a plate simply exposed to light and developed will give an equal and possibly a superior result.

Evening skies are most deceptive on account of colour. It is not advisable to attempt these too late. Some of the brilliant effects appearing a short time before sundown, in the absence of haze, photograph easily; whilst others fail to impress anything besides a few of their main features. I was on one occasion most thoroughly deceived in an evening sky. It was a very fine one—all aglow in colour, with just sufficient haze to allow one to define the sun's limb without distressing the eyes. Two plates were exposed, with no other result than that of impressing the contours of a few of the upper clouds, the sum of those near the horizon consisting in a slight and uniform fog—no sun, nothing beside. It was rather expected that the orb would have given some slight indication of his presence, but not the faintest trace of him was visible. He, in common, and equally with his surroundings, had contributed sufficient light to produce fog, neither more nor less.

If the design in photographing clouds were for pictorial purposes only many of the most difficult kinds need never be attempted. Should, however, the photographs be required for scientific use in meteorology, then all kinds of these valuable weather signs must of necessity be obtained, partial record being of little, if any, use. The camera must be out in almost all states of wind and weather, when uniformity of tint does not prevail.

The best selection of clouds for general professional work are those appearing after a sou'-wester or during the prevalence of a westerly wind. Absence of haze is the distinguishing characteristic of weather from this quarter; whereas those appearing in the N.E. (here at Littlehampton, at anyrate) are pea-soupy, mangy, plague-striken-looking things poisoned, I firmly believe, with "London particular;" for yellow haze is perceptible a few hours after a change of wind into this quarter, and in winter especially this smoky veil hangs over us like a very dirty yellow blanket. It is our "plague wind"—a curse to photography and photographers. Half a gale from the S.W. is heralded with unmixed feelings.

To enable pictures to be made at all points of the compass an elevated position or an open space is, of course, a necessity. The camera should be of a substantial make, light-tight in strong light, and fitted with a hood in front to cut off all extraneous and useless light. A view meter or sights is an important addition. Its stand must be firm and strong—to attain which leave the element of portability out—and its head fitted with a means for moving it in a vertical direction and in a horizontal circular one. A ball-and-socket motion is the kind of thing, if it were not spoiled by tendency to vibration in high winds. Whatever arrangement is adopted its adjustments must be free and firm, for no time can be spared in dealing with quickly-moving clouds; they will very soon pass into the wrong place on the plate. Focussing having been once performed for clouds with a particular lens, the camera may be marked and the screen removed.

The single lens is the best adapted for use, from its being more brilliant in action and free from the annoying reflections which arise when double combinations are presented sunward, or to other intensely-illuminated spots. In the use of the stop attention should be paid to the fact that the smaller the one used the lesser the brilliancy, and *vice versâ;* therefore, with subjects deficient in contrast, enlarge the aperture and reduce the exposure. This is a matter of great importance, and frequently makes all the difference between success and failure.

Let the rapid shutter be an adjustable one, with a range from about one-hundredth of a second, or less, to a second and a-half. It will be gathered from what has been already written that the great stumbling-block in this branch, as in all photography, is the judging of the exposure, the difficulty, however, being much increased from the fact that its latitude is more restricted, the interval of time being shorter; that intervening between under- and over-exposure of a mackerel sky would be but a small fraction of a second.

In selecting the kind of plate, that capable of yielding the greatest scale of tints in their true relation, together with freedom from fog and cloudiness, are the qualities to be taken note of. It need not be of a very rapid description. Their coating should be liberal and opaque, or they must be backed with a solution of asphaltum in benzole, for halation is not required. Be sure of its working clean. Rapidity may be sacrificed, and with advantage, to ensure this. Development must be well restrained and cautious, and rather inclining to excess of vigour till sufficient progress is made to enable an exact judgment to be formed as to what treatment it must receive. Wet plates are preferable to gelatine ones. They are quite rapid enough, and well under control; but one might just as well speak of daguerreotype and waxed paper as make any remark in favour of wet collodion.

Nothing need be said respecting fixing, this operation being as usual. Should the negative, however, require much intensification, and of a fine effect too good to throw away, intensify it to full strength and reproduce it by carbon transparency. The fog and thickness may be eliminated in the process and a fair result obtained. Bear in mind the purpose for which the clouds are intended. If for printing-in purposes they must be kept thin and clear; if for cloud pictures they should be fairly intense and full of detail.

The negatives in possession, their printing into landscapes is an easy matter. About the simplest plan to follow is to take the printed landscape and tear out a piece of paper to the shape of its sky line, adjust the print upon the cloud negative, close the frame, and take it out to print in the sun, during which keep the mask gently moving to prevent abrupt lines, but with care not to fog the edges of the landscape. Tear the paper slightly larger than those parts projecting into the sky, so that the chances of their being exposed may be as small as possible. As one does not approve of this operation taking up much time, the negatives are made thin and clear, so that a few seconds may suffice. In selecting a cloud for a picture, while the question of pictorial suitability is receiving full attention, some thought should be expended in making choice of such as have deep portions to shelter any projecting parts whose purity would be spoiled by exposure to light. To illustrate: a tower or spire or any other object might appear in a light portion of cloud, and be thus protected—to the advantage of the picture, in all probability, in its pictorial aspect. JOHN HARMER.

ON THE DEVELOPMENT OF INSTANTANEOUS PICTURES.

[A communication to the Liverpool Amateur Photographic Association.]

WHEN, somewhat rashly perhaps, I ventured at last month's meeting upon adding a few words to the discussion upon the development of instantaneous negatives, I did not anticipate that the penalty would be that I should be put into the forefront of the battle tonight. Had I done so I might probably have considered discretion to be the better part of valour. Yet, as I think it the duty of every member of a Society like this to contribute what he can to the general benefit, even though it be but the widow's mite, I could not refuse to obey the call, although I am conscious that I shall contribute nothing new and nothing probably which other members of the Society would not be better able to bring before you.

Mr. R. Crowe, in his interesting remarks upon the subject last month, divided instantaneous negatives (by which I presume are meant those taken by the aid of a quick-acting shutter) into three classes. Now, I accept his principle, so far as believing that all instantaneous negatives are by no means to be treated alike; but would prefer to make *two* divisions only, namely, fully-exposed and under-exposed negatives. There is one class of instantaneous negatives which, requiring only a very brief exposure, have by means of the shutter received quite as much as they need. Such are sea views, which I look upon as instantaneous pictures merely in name—that is to say, they are as fully exposed by action of the light lasting only a fraction of a second as the average of plates where there is nothing to limit the amount of exposure but the photographer's own judgment.

In Mr. W. K. Burton's table of exposures I note that, for a view containing open sea and sky in good light, the correct exposure with a lens of $\frac{f}{8}$ (about the aperture of the No. 1 stop of a symmetrical) is given as $\frac{1}{50}$ second; whilst, when the lens is stopped down to $\frac{f}{16}$ (about the No. 4 stop), the exposure ought still to be as little as $\frac{1}{10}$ second. It may easily happen, therefore, that even with a quick shutter such a picture may be rather *over-* than *under-*exposed, and, consequently, may demand the treatment suitable to the former rather than to the latter class. For such negatives the treatment Mr. Crowe lays down for his first class is no doubt exceedingly well suited, although I must confess that my own experience leads me to believe that there is no advantage (and probably no disadvantage) in the preliminary soaking in pyrogallol over plain water, and that the essential point of his developer is rather in the relative proportions of pyro., bromide, and ammonia being especially well suited to the peculiarities of the subject.

I would take, however, as my second class of instantaneous negatives those where, had it been convenient, a longer exposure would have preferably been given, and where only the exigencies of the subject have necessitated an exposure of so limited a duration that objects in motion may not seriously spoil the picture or may even be taken with good definition, such as street views or a train in motion, the latter being a subject which most amateurs have, at some time or other, been tempted to attack. Such negatives, I think, need a different treatment, and the method I advocate is to soak them before developing in dilute ammonia.

I have said that I claim no credit for anything new. I am merely endeavouring to remind the members of what most must already have read, but which, perhaps, may either have been forgotten amongst the multitude of suggestions that are constantly being made, or which some amongst our numbers may never have brought to the test of actual experiment. It is some years ago (I think in the ALMANAC for 1882) since Colonel Stuart Wortley advocated this method of development, without, however, making any distinction between the classes of instantaneous photographs. My only claim in bringing the method forward again is that, being struck at the time with its apparent reasonableness, I forthwith experimented upon it, and think I have obtained better results in that way than I could otherwise have expected.

Probably, the most convenient method of employing this mode of development—at all events of those who use the more scientific method of separate ten-per-cent. solutions—is to add the correct amount of ammonia to the full quantity of water to be employed, and to leave the plate soaking in that whilst measuring out the pyro. and bromide solutions (which may, of course, be in the relative proportions that experience suggests as suitable to the class of subject and make of plate); then return the ammonia solution to the developing cup, and flood the plate with the mixture. Thus, if developing a quarter-plate, and using three grains of pyro., two minims of ammonia, and one grain of bromide—which, I believe, is an average formula—I should take twenty minims of ammonia to one ounce of water in which to soak the plate, and while soaking place in the developing cup thirty minims of pyro. solution and ten minims of bromide solution, return the ammonia to the cup, and finish development in the usual way. In my own practice, however, as I use Edwards's method of developing, in which the ammonia and bromide are mixed in one bottle under the name of "accelerator," I soak the plate in water containing a few drops of ammonia whilst mixing the usual developer, throwing away the dilute solution of ammonia, or keeping it for the next plate, and developing with the mixture in the ordinary way.

In case any of our members should not have employed the sulpho-pyrogallol solution, I may perhaps, in passing, advert to the great convenience of that mode of employing pyrogallol, particularly for an under-exposed plate, where a good deal of forcing may be required. The sulpho-pyrogallol solution permits the addition of a good deal of extra ammonia when necessary, and of a very prolonged development without any staining of the plate. Thinking it might interest the members to see the result of an actual experiment, I took an opportunity, whilst at New Brighton last Saturday, of exposing three plates, with a drop-shutter working in about one-twentieth of a second, on the same subject in rapid succession, so that the light might be presumed to be unaltered. One of these plates then received a preliminary soaking in ammonia and one in pyro., the two being afterwards developed together in the same dish with the same solution. The third plate was developed without soaking in either pyro. or ammonia, but with the same proportions as the other two. Only one half of that plate was soaked in water, the other half remaining dry, in order to test the question whether soaking in water was to be taken as an advantage or a disadvantage.

On developing, the negative soaked in ammonia began to come up in ten seconds, and was finished, as I judged, in nine and a-half minutes from the time of commencing, when it was removed from the developing dish, leaving the other one still developing. The one soaked in pyro. showed no signs of development until eighty-five seconds had elapsed, and was not finished until it had been in the dish for twelve and a-half minutes. The third plate, half soaked in water, began to show signs of action on the unsoaked side in ninety seconds, and on the soaked side not till the expiration of 150 seconds. As it was inconvenient to remove the one half from the dish before the other, both were pronounced finished at the same time, namely, in sixteen minutes.

The result is that the soaked side is perhaps a shade less dense than the unsoaked one, but is, I think, somewhat clearer. A print is before you, and I will leave you to judge which side shows the advantage, if any. In developing these three plates I used Fry's plates and employed Fry's ordinary developer, taking care that each plate was subjected as nearly as possible to the samo treatment. I did not, therefore, vary the solutions, and arrested each when it had attained the same degree of density as the first. It might, perhaps, have been in some respects a fairer test had they all been developed for the same period of time. I, however, exposed another plate to an exactly similar subject at the same time of day but a somewhat different point of view, and that plate I developed according to the best of my judgment, first soaking in ammonia and, when partly finished, adding a double portion of accelerator. This began to come up in ten seconds, was finished in nine minutes, and I think is undoubtedly the best of the four. I place before you for comparison the four negatives and prints from them, and will leave you to judge in which way the difference of quality lies. I must say, however, that, in my opinion, it is less than I should have expected.

Probably the exposure was not very insufficient, as the view was brightly lighted, and I gave about $\frac{1}{20}$th second with an aperture of $\frac{f}{x}$. With less illumination or more rapid exposure the difference between the two methods would probably have been more marked. The fact, however, that one negative attained a certain density in nine and a-half minutes, whereas with the same developer the other took twelve and a-half minutes to reach the same point, seems to me to show considerable gain in sensitiveness, due to the preliminary soaking in ammonia. I intend, however, to try the same comparative plan in exposing and developing two negatives under considerably less light, and should I obtain any additional evidence I shall be glad to report it on a future occasion.

In confirmation of these views as to increased sensitiveness under difficult circumstances of light, I may perhaps venture to call your attention to a print of a plate exposed during our recent visit to Rufford. The light on that occasion was so unusually dull as to cause us almost to despair of getting ordinary pictures, and when inclined to try a drop-shutter picture on a magnificent bull, the mere idea of getting any result seemed almost an act of lunacy. I ventured, however, upon the trial, and, although I certainly cannot say I obtained a picture, yet there is something to show, which would probably be considerably improved by intensifying the negative. So bad was the light that I should scarcely (but for knowing the effects of soaking in ammonia) have been surprised had the plate shown no result whatever, but been capable of being used over again. As Mr. Ellerbeck with a much quicker lens and, I believe, quicker plates (I used Fry's 20 times) took the same subject, perhaps if he would kindly show his result and explain his method of development it would be interesting.

Another experiment bearing upon the same point is as follows:—At Easter of last year I took a very peculiar subject—a deep pot-hole in the limestone district at Settle. Some portions of the hollow were in deep shade. In another portion a stream of water falling over had frozen into a mass of stalactites with a hill of ice underneath, into a basin on the top of which the water fell; this portion and the masses of snow were in sunlight. On this subject I exposed two plates (Edwards's). One, with a stop of $\frac{f}{x}$, received four seconds' exposure; the second, with $\frac{f}{x}$, was taken with the drop shutter. The first was developed by Edwards's ordinary formula, whilst the second was soaked in ammonia. After finishing, the two plates were so much alike that it was difficult to distinguish which was which except by the numbers attached.

I ought to apologise for taking up so much of your time; but as this is an interesting subject, and as the object of adjourning the discussion was to get a fuller expression of the views of the members, I have been desirous to put before you as fully as possible the method that I advocated in the few words I spoke at our last meeting. W. A. Watts.

ON THE SENSITIVE-TO-COLOUR COLLODION PROCESS, OR THE CORRECT REPRESENTATION OF COLOURS BY BLACK PHOTOGRAPHS.*

Precautionary Measures.

In a previous article I have minutely described the mode of operating with stained collodion, and now add the following remarks based upon newer experiments:—1. If two or three per cent. of alcohol should be added to the first silver bath (the sensitising bath), that will prevent the formation of the crescent-shaped streaks, which are produced in consequence of the stained collodion repelling the silver bath more decidedly than ordinary collodion does. 2. When exposing without yellow glass twice the exposure required for ordinary iodised collodion should be sufficient for stained collodion. 3. When exposing through clear yellow glass about five times as long an exposure as for wet iodised collodion will be necessary. 4. Since eosine is alkaline and neutralises the silver bath, and since by its means disturbing organic substances easily find their way into the bath, it is necessary before every time of working that both baths should be tested. A few drops of a one to one hundred solution of permanganate of potassium is added to them; if the rose-red colour disappear at once add a few more drops, and then a third time another few drops until the rose colour remains for a minute. Then test with litmus, and eventually acidify either with glacial acetic acid for bath 1 or with nitric acid for bath 2. With reference to the second bath, it may be observed that it contains the same addition of iodide of potassium as the first.

It has often happened that my pupils, who are already making practical technical use of the stained collodion process, get thick fog and very peculiar granularity with comet-like tails, which have a perfectly frightful appearance. With three drops of permanganate of potassium and a couple of drops of acid the fault was removed in a few minutes, after which faultless plates were obtained.

The Restoration of the Silver Bath.

The organic impurities which arise in the silver bath owing to dyes are more difficult to remove than those which one has usually to combat in photography. In order to render them harmless at length cold treatment with permanganate of potassium no longer suffices. The baths must be heated to boiling-point in a porcelain dish, and then some 1 to 50 solution of permanganate of potassium dropped into it—first, one drop, which usually turns the bath brown immediately; then a second drop is added, and so on. Finally comes a time when the addition of one drop more turns the bath of a rose colour. If this colour remain for half-a-minute stop adding any more of the permanganate solution, filter, and, testing with litmus, acidify again with glacial acetic acid for the sensitising bath and with nitric acid for the developing bath. Permanganic acid is the best of all restoratives of the bath; but many persons are unsuccessful in their use of it because they add too much of the preparation.

Effect of the Granularity on the Pictures.

The slightness of the effect of the granularity of paper, which elsewhere has such a disturbing effect, is a remarkable phenomenon in the case of stained collodion. I have not infrequently taken the same picture successively on ordinary iodised collodion and on stained collodion. In the case of the first plates there was a very strongly-marked and disturbing granularity; on the latter plates, taken with *proportionately exactly equal* exposure, there was often not a trace of granularity. I and my pupils have so often observed this phenomenon that there is no longer any room for doubt respecting it, and this circumstance forms one great advantage of the new process. The explanation of the phenomenon is that the shadows of the grain of the paper are only illuminated by the yellowish reflex light of the studio. This acts on ordinary plates like black, and therefore marks very intensely; on stained collodion plates, on the other hand, this yellow reflex light from the studio walls acts like white, the shadows are not clear but dark, and so disappear.

On the Reproduction of the Colour Scale.

The accompanying photograph of the colour scale, when compared with the reproduction in Vogel's *Lehrbuch*, shows quite surprisingly distinctly the powerful action of the yellow and of several of the green tints. But the action of the madder, the vermilion, and the ultramarine shows better in the silver print than in the lichtdruck print.* In the silver print the tints mentioned are distinctly lighter.

It is the light-green tones that still act somewhat too powerfully; but by the addition of cyanosin, the absorption lines of which lie further towards the yellow, I hope to overcome this drawback. The granular appearance of the colour field is caused by the coating of colour having been unequally taken on. Of course it is understood that the plates were not retouched. At present the dyestuffs that render collodion sensitive to red are not in the market sufficiently pure to justify one in recommending their addition to collodion.

A Final Word.

It is an old and well-known fact that, whenever a discovery is published, there are immediately some people who say that they had discovered this or that before. This is also the case with this stained collodion process. It is certainly quite possible that many persons may have a similar process—as Braun, of Dornach†—because the principle discovered by me is not new; but then they have not pub-

* Concluded from page 341.

* The print of the colour scale referred to here appeared in the *Mittheilungen*.

† Dr. Eder remarks, on page 274 of the *Photo. Correspondenz*, that the firm of Braun, of Dornach, "apparently brought collodion stained with eosine" into the market, but the firm of Braun, of Dornach, have informed the editors of the *Mittheilungen* by letter that such is not the case.

lished the matter, but kept it a secret, and, according to the old axiom, the claim to priority of discovery is considered the due of him who first publishes his discovery. This applies to me also in the case of the process I published for purifying gelatine. With regard to the contention that M. Ducos du Hauron was the first to take through yellow glass: I only remark here that as early as 1873 I used yellow glasses, as anyone may learn by referring to the *Photo. Mittheilungen*, vol. x., p. 237. H. W. VOGEL.

THE SCIENCE OF DEVELOPING-ROOM ILLUMINATION.

Now that the subject of developing-room illumination has been well started in these pages, it would be a public loss should its examination cease before the approximate limits of practical improvement have been reached, so far as present knowledge can go. One point ought to be decisively settled, namely, that it is unscientific to use two or more thicknesses of any deeply-coloured screen of the same material to obtain a safe light in the developing-room. It is true that if feebly-coloured glass or paper be used there may be advantages in using more than one layer of the same material to get fair intensity of colour; but when a substance so deeply stained as the ordinary ruby glass is employed a second sheet gives the extra security chiefly—not entirely—by the general darkening of the room, and a proper screen selected on better principles and with proper illumination should let as much light through as one thickness of ruby glass, and yet be more safe.

Two bad screens, properly selected, are likely to give a safer light than two good screens of the same kind of glass. For instance: suppose a photographer to possess a tolerably safe sheet of orange glass and a tolerably safe sheet of ruby glass, and that these two sheets could be split into four, each of half the previous thickness, the superposition of one of the thin orange upon one of the thin ruby sheets would be likely to give a safer light than either colour before gave by itself, for the simple reason that one of the combined sheets is likely to cut off many of the particular rays which were doing mischief through the other, and this advantage is gained with scarcely any loss of light by the general darkening of the room.

As a rule for practical guidance, with coloured screens of ordinary intensity there is no doubt that two layers of the same glass should never be superimposed to get the best results. Whether the molecules of the one material be in the solid, liquid, or gaseous state, the first fairly-coloured layer does most of the sifting of the beam of white light, and the next layer is in greater part transparent to the previously-transmitted rays, except by darkening the room. In experiments on the transmission of light through ice—such as setting fire to a substance by rays brought to a focus by a lens of ice—it is usual to first pass the beam from the electric lamp through a plate of ice or through a layer of water. In the former case the plate melts rapidly; in the latter, which is the better method, the water becomes nearly boiling hot, but the sifted beam is in both cases practically cold, so far as its action on the ice lens is concerned. The substance ignited, however, by the sifted beam which will not melt ice without great delay, becomes hot because it absorbs rays to which ice is transparent, just as glass of one colour will absorb some of the rays to which glass of another colour is transparent, as already stated. These are established facts of physics.

Unground glass, I am convinced, should not be used at all for a lantern screen to get the best results, which is the reverse of what might be expected without previous attention to the subject, as its preferable substitute—paper—is full of minute holes. The reasons for this conclusion were given in my last article on this subject.

The Editors have favoured me with a piece of the remarkable green sheet gelatine made by Mr. Woodbury, a few superimposed thicknesses of which are green by transmitted light, whilst many superimposed are red. In the spectroscope a few layers of the specimen cut off all the yellow, orange, and yellowish-green rays, but permit plenty of red, as well as most of the blue and violet and bluish-green, rays to pass. Hence when many thicknesses of this green medium are superimposed the delicate blue and violet rays are gradually absorbed, until at last, with a three-parts opaque set of layers, only the red rays can force their way through, but the transmitted light is then feeble.

Coloured materials which cut much out of the middle of the visible spectrum, but allow the two ends thereof to pass, often present curious optical phenomena. One of these is a solution of cyanine, which possesses the blue of the corn-flower by daylight and a bright violet colour by gaslight—the light in which it is so difficult to exhibit a bright violet. The violet of cyanine is not, however, for the most part a true violet, but a violet made up chiefly of blue and red, as revealed by that optical policeman—the spectroscope. Hence, as daylight wanes and gaslight takes its place, the chemical rays become less plentiful, the red in the cyanine gains more proportional ascendancy, and the liquid assumes a rich violet hue. These effects afford a strong argument in favour of yellowish artificial light in place of daylight behind the coloured screens used in photography, since the chemical rays so preponderate in proportion in daylight as to thus change the colour of particular exceptional screens of a given thickness from the colour they possess by gaslight.

A five-per-cent. solution of chrome alum in cold water, as pointed out to me by the Editors, possesses curious optical properties. A moderately-thin layer of the solution transmits greenish-blue rays; a layer two or more inches thick appears red when viewed by transmitted light. If the solution is in a bottle of somewhat large diameter it is but necessary to turn the bottle upside down; the liquid in the neck will appear to be of one colour by transmitted daylight, and that in the larger part of the bottle of another colour. As in the cyanine example, it is a liquid which absorbs much of the middle of the visible spectrum, so that when the thickness of the layer is increased most of the blue and violet rays are absorbed; the green and yellow have been absent all along, and therefore the red, for the most part, find their way through. The red light, however, is then not bright and strong; the safety from the blue rays has been largely purchased at the cost of general absorption—in other words, by piling on an undesirable amount of relative opacity, as in superimposing two sheets of ruby glass.

With a saturated solution of cyanine in alcohol and water the thickness of the layer of the coloured liquid matters little; it is simply blue by daylight and violet by gaslight. Its value in Dr. Vogel's new experiments consists in its power of cutting off the yellow, green, and some of the red rays of the spectrum. The greens which are of any use as fundamental screens in developing-room lanterns are yellowish-greens, and not bluish-greens. They must also be true greens, and not greens produced by mixing yellow and blue colours; therefore, many bad greens are readily available, which perhaps has been the cause of the absence hitherto of general utilisation of green light in the developing-room. Good greens for the purpose can easily be discovered, and selected from a number of samples, by means of a polychromatic negative.

Arguments drawn from photographing coloured papers or ribands are valueless as applied to spectroscopic problems, because the violet may not be a true violet, but a mixture of red and blue; the green may not be a true green, but a mixture of blue and yellow, and so on with other tints. Had the dyer used colouring matters of another chemical composition the photographic results might have been different. If the rays thrown off by the ribands were to be first analysed by the spectroscope to ascertain their real nature, arguments resting upon such a foundation would begin to be of value.

Mr. A. Pringle's statement that the great extra safety obtained by allowing the light to fall upon the solution in the developing-dish at a low angle means so much light withdrawn from the illumination of the plate under development is quite correct. The advantage is that by moving the dish five or six inches nearer to the lantern more light on the plate can be had, *if* wanted and *when* wanted; and I find it safe to develope in that bright light all the way through. Still, the moving of the dish six inches away to gain the two very great additional elements of safety—namely, low angle of incident light and increased distance from the translucent screen — gives a feeling of absolute security which is psychically soothing. With extremely-sensitive plates attention to these two latter points might be more necessary.

As coloured oiled silk is not made in England could not the tracing-linen used by engineers and surveyors be stained? Glass is not translucent, ordinary papers and fabrics are too thick, and thin papers too irregular. What is wanted is plenty of choice, on the part of the purchaser, of many varieties of green, orange, yellow, and red. The latter colour, I believe, will go out of general use for practical photographic purposes unless it be modified by a companion layer of green; but yellow and green are likely to give light more for the benefit of the eyes. I hope Mr. W. E. Debenham will bring up some better screens and more suitable lights at the next meeting of the Photographic Society of Great Britain, for he has not yet reached the limits of possible improvement; and it would be a pity to stop half-way to continue his antagonism with the solar spectrum.

This article is written to show reasons for further advance where good authorities are now stopping short. Week by week good authorities in photography admit their use of two thicknesses of ruby glass; the point herein advocated is that on other principles they can get equal safety with all the illumination of less than one sheet of ruby glass. A good authority, Mr. Pringle, says that the chemical and other visible rays are in the same relative proportion in daylight and in ordinary artificial white lights, which is herein denied. The brilliant oxyhydrogen lime-light and its poverty (too much generally over-estimated) in chemical rays is an additional case in point. If my views are right—and they can be experimentally tested—Mr. Debenham's good light is only on the road to the brighter light of the future, which he ought to be the man to introduce instead of quarrelling with the spectrum.

W. H. HARRISON.

EXPERIENCES ON THE THAMES.

"WHERE to go with the camera" and obtain pretty little picturesque "bits" has often been a puzzle to myself and, as far as I know, to many others to solve. With my friend, who will figure in the following *Experiences on the Thames*, I have made several excursions. One time we visited Eltham to get pictures of the fine old ruined abbey, said to have a long historical past. The abbey is picturesque enough in its way, and so is the pond close by the station; but as its tranquil surface is broken by neither swan, duck, nor boat, our subjects were still life only. The results we obtained did not come up to the ideal we expected.

Another time we tried Box Hill, with its pretty villas and cottages nestling amongst umbrageous bowers; its rippling, meandering stream bounded by overhanging trees; and its fresh, sparkling waters covering

"Here and there a lusty trout,
And here and there a grayling."

Here and elsewhere on our rambles we have obtained a few interesting negatives; but we longed for something more, and were, moreover, eager for adventure and novelty. At length an opportunity occurred to myself and friend—who I will henceforth refer to as the "Philosopher" (for he always did the philosophising *en route*)—to "do" the Thames from Oxford to Windsor. It took us a long time to make up our minds to do the trip, and it took us a still longer time to make up our minds "how to do it." We often regretted we had such a mental superfluity.

First, the idea of a steam-launch naturally occurred to us. We thought and dreamed of the pleasure we should have in skimming along the tranquil surface without any labour of rowing. We would sleep on board, cook our own provisions, and be independent of rapacious hotel-keepers. One fatal objection was urged against such a course: we feared we might be so enthusiastic and absorbed in our search after the picturesque scenery of the Thames that we might forget all about the boiler, and a blow-up might happen in consequence. This, we argued, would cause us a considerable amount of inconvenience and a needless destruction of valuable apparatus; we, therefore, reluctantly gave up those dreams of luxuriating on the Thames in a steam-launch, deciding at last to go in for a small boat, and we wrote to Salter's, at Oxford, to arrange for the hire of a suitable vessel (the "Philosopher" always dignified our boat by the name of "vessel").

At length the morning of starting arrived, but it rained in such quantities and blew such a gale that we were naturally "found wanting." However, next day it cleared somewhat, and at 9 a.m. we were at Paddington, in the main-line express, bound for Oxford, *viâ* Didcot, arriving at our destination about two hours later. Leaving our luggage at the station we had a look at the town.

The antiquity of Oxford is pretty remote, and is probably as great as that of any other English city. The early chroniclers never worried themselves about facts when fiction was equally acceptable. One of them, who was burdened with a large amount of inventive ingenuity, was an ecclesiastic named Geoffrey of Monmouth. This worthy man, who lived in the twelfth century, gives us a very fanciful and amusing account of the founding of this city. He declares Oxford to have been built originally in 1009 B.C.—more than 250 years before Romulus founded a city on the banks of the Tiber—by Memphric, King of the Britons, "upon the ryver Temes," and, therefore, "deserves to be reckoned not only amongst the first and most autient cities of Britain, but of all Europe and of the world." However, we know it suffered much at the hands of the Saxons, was burnt by the Danes, and ever suffered severely during the internecine wars from the Conquest to Charles I. To its university Oxford owes its fame. It is asserted that in the ninth century it had become a fountain whence issued many learned clerks; and that amongst the earliest to endow it was King Alfred. The separate erection of colleges for the special accommodation of students did not commence until the middle of the thirteenth century. Merton, Balliol, and University are the eldest, being founded between the years 1264 and 1300. Altogether there are nineteen colleges in Oxford.

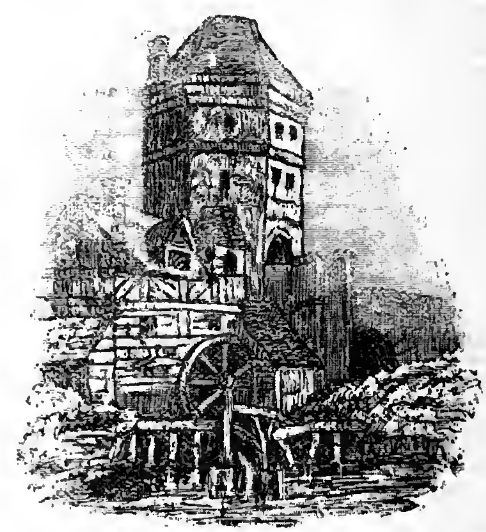
"Ye fretted pinnacles, ye fanes sublime,
Ye towers that wear the mossy vest of time;
Ye massy piles of old munificence,
At once the pride of learning and defence;
Ye cloisters pale that, length'ning to the sight,
To contemplation step by step invite;
Ye high-arch'd walks, where oft the whispers clear
Of harps unseen have swept the poet's ear;
Ye temples dim, where pious duty pays
Her holy hymns of ever-echoing praise;
Lo! your loved Isis, from the bord'ring vale,
With all a mother's fondness bids you hail!
Hail! Oxford, Hail!"

The arms of Oxford are emblematical of the city's name, being an "ox crossing a ford." At length, after being duly impressed with respect for those venerable piles of colleges at that ancient seat of learning, we reached Salter's, where we had hired our boat. We were somewhat anxious about our vessel; for we had been liberally entertained with dreadful stories of accidents to small boats, and several kind friends had even requested us to make our wills in their favour and then "never mind." We inquired for the manager and asked him to show us our vessel. He apologised; that being Henley week he had not quite such a large choice to offer us, at the same time showing us several which, from their delicate taper and want of width of beam, simply shocked our nerves. He asked us what we did want. We told him we had a very large cargo of valuable apparatus, besides baggage, including waterproofs, rugs, vast quantities of dry plates, cameras, cooking utensils, &c.—in fact, all the paraphernalia for a regular campaign, all more or less valuable, and we wished to risk nothing. What we wanted was a kind of elongated tub, or, more properly speaking, something of the lugger type. Our man thought he understood and selected the most tub-like form he had in stock. As he had nothing broader we were forced to be content, and forthwith gave orders to have her fitted up with awning, for protection from the sun (which rarely shone), and all the usual gear of sails, mattresses, towing line, &c.

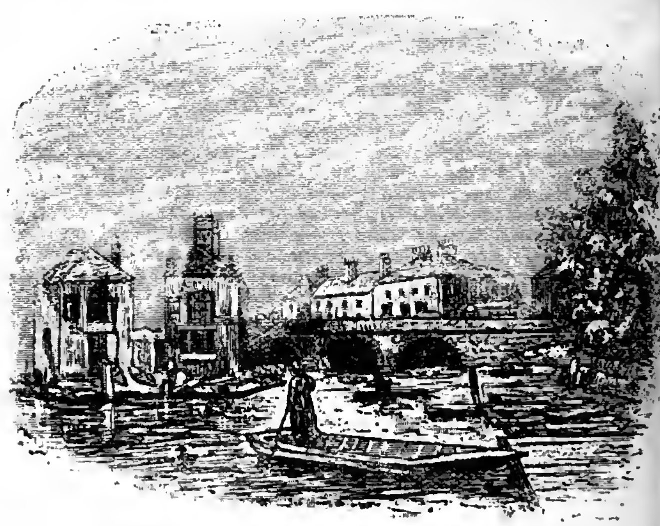
This important business completed, we took a more tranquil look at the university town, and regretted we could not spare time to have a few "shots" at the various colleges, for we were convinced we might get some very interesting negatives.

After making further purchases of provisions, including eggs—which, unfortunately, very soon got into a leaky condition, much to our discomfiture—we got back to Salter's in the afternoon.

Our first act was to have a "shot" at Folly Bridge. Friar Bacon's study, which forms the subject of our first illustration, formerly stood



on the bridge "near the end next the city," but was taken down in 1779. It is traditionally narrated that to this tower the great Roger Bacon, one of the greatest luminaries of the middle ages, used to resort at night "to take the altitude and distance of the stars." Popular prejudice accused him of magic, and he was sent to Rome by the general of his order to answer his charge, but, having cleared himself, was sent back to England. The second illustration is the picture which we



took. The Philosopher manipulated the camera, whilst I posed myself in a punt so as to form an attractive foreground. We had carried several rigs-out in the way of changes of garment and hats, so as not to be recognised as "that same individual again," and we even went so far as to purchase a couple of decoy ducks, and these added variety and "charm" whenever the foreground was a weak one. The Philosopher wanted to get one or two decoy swans. I have no doubt this was a good idea, but, luckily for our comfort, they are not manufactured. Many other pictures we got in this neighbourhood, which included views of the university barges down the stream, the Grand Pont, &c., and, as we had Salter's boats at our disposal, we had no difficulty about foregrounds. At length, though rather late in the day, we got ready for the start; but meanwhile the wind—which had already caused us serious interruption in our camera work (one camera narrowly escaped going to the bottom)—blew a regular white squall. We were getting quite nautical by this time. However, we got our baggage and apparatus on board, but our enthusiasm was rapidly running down to zero.

We had started and had proceeded for about a couple of hundred yards when one of us whispered whether it would be wise in face of such a "gale" to keep on. We stopped to argue the point, but just then an extra gust came which carried away several things out of the vessel and one of our hats. This decided the question; so, after collecting what we could, we beat a hasty retreat back to Salter's, deciding to make an early start on the morrow. For the rest of that day our cameras remained idle.

In the evening we developed a few of our plates and found we had hit the exposure fairly correctly. Circumstances necessitated a rapid exposure; we could rarely give more than a-quarter of a second. Our plates registered 22 on Warnerke's sensitometer; and we found that, with a rapid rectilinear lens and the No. 5 stop, a-quarter of a second was quite sufficient for sunshine, whilst for a picture without sun we either used a No. 3 stop or exposed longer—usually the former alternative, for we had rarely a chance, in consequence of the windy weather, of giving more than a-quarter of a second.

J. J. Acworth, F.I.C., F.C.S.

(To be continued in our next.)

THE ROYAL INSTITUTION.

The Production of Coloured Lights.

On Thursday, the 22nd ult., Professor Dewar delivered another of his series of afternoon lectures at the Royal Institution, on *Flame and Oxidation*, in the course of which he exhibited apparatus for producing coloured flames, which would be of use in obtaining coloured lights for experiments in developing-room illumination. Hydrogen burns with an almost non-luminous and colourless flame, its tinge of yellow being chiefly due to impurities in itself and in the air, in the shape of floating particles of soda salts; but this tinge is not deep enough to do harm in the application of his apparatus to the purposes just suggested.

The apparatus consists of a kind of "spray-producer," by which the gas is first charged with particles of any desired salt in solution, and then conducted to the burner.

To obtain a steady flame a steady blast of gas is necessary. At the Royal Institution hydrogen, compressed in an iron receptacle, is used; but any other arrangement which gives pressure enough will answer the same purpose.

Professor Dewar charged the hydrogen gas with solution of chlorochromic acid. This gave a brilliant white flame, rich in rays which act on photographic films. It also gave off a white smoke, which, on being collected on a white plate, was seen to really consist of green particles of oxide of chromium; indeed, the plate was coloured a bright green. By means of a salt of sodium he gave a yellow colour to the flame, and to himself a ghastly appearance. In short, the apparatus affords a ready means of keeping up a steady and large coloured flame when the operator has a steady supply of hydrogen at sufficient pressure. It is better than the old-fashioned plan of colouring a spirit flame by salts dissolved in the alcohol, because many salts will scarcely dissolve therein at all; and when they do, and are not volatile, they often clog the wick, and do not find their way in any great quantity into the flame. The construction of the spray-producing part of Professor Dewar's apparatus is a very simple matter of glass-blowing.

In the course of some experiments on increasing the luminosity of flames, Professor Dewar proved that increasing the quantity of air would, under certain conditions, increase instead of decrease the light of a Bunsen's flame. He directed a jet of air into a Bunsen's flame, and, when a particular steadiness and pressure of air-blast had been reached, the air coloured the flame green where it passed through it. He also exhibited Frankland's experiment of burning an oxyhydrogen flame under pressure, and its luminosity increased with the pressure. From this Frankland argued that the luminosity of flame does not necessarily depend upon particles of solid matter liberated in the flame, for in this experiment no solid matter is present. Professor Dewar said that there is some truth in Frankland's hypothesis that the luminosity of flames is due to highly-condensed gases, and a great deal of truth in Davy's original hypothesis that the luminosity is due to liberated particles of carbon or other solid matter in the majority of cases. He next proved that the luminosity of the electric spark increases under extra pressure of air, but said that the result might be explained by a variety of hypotheses, so that its real cause is difficult to unravel.

The lecturer further stated that some hydrocarbon compounds enter, like paraffine, into combination with other substances with difficulty; others, like olefiant gas, acetylene, and naphthaline, are easily decomposed, or easily enter into new combinations. In illustration of this he experimentally proved that a small quantity of bromine will quickly absorb a large volume of olefiant gas, and also that bromine readily unites with naphthaline, giving off vapour of hydrobromic acid in the act.

Professor Dewar remarked that in scientific research it is sometimes necessary to use a flame free from superheated steam. Such a flame can be most readily obtained by burning a jet of chlorine and hydrogen, mixed near the nozzle of the burner, for safety, and care being taken to carry off the hydrochloric acid gas, which is the product of the combustion.

Photography Applied to Sidereal Astronomy.

On Friday, the 23rd ult., Mr. David Gill, F.R.S., H.M. Astronomer at the Cape of Good Hope, delivered an evening lecture at the Royal Institution, on *Recent Researches on the Distances of the Fixed Stars*. Lord Rosse presided, and among the listeners were Professor Huxley, Professor Tyndall, Dr. Huggins, Lady Arthur Russell, Mr. William Crookes, Dr. Edmunds, Professor Dewar, and Dr. Mann. There was a large attendance altogether.

Mr. Gill began by stating that the study of sidereal astronomy is particularly fascinating. We gaze upon the galaxies of suns which surround us, and wish to learn whence we come and whither we are drifting in the realms of space, and what is the position of our own sun in the starry host. Are the nebulæ for ever to retain their ghostlike forms, or are they condensing into suns? The discoveries of the past prove that "art is long and life is fleeting," and that in the long run careful observation will do more than the most brilliant speculations. He would not, however, undervalue the imaginative faculty; for nothing else would sweeten the dreary watches of the night and make the work of the astronomer a labour of love. He then spoke of the distances of the fixed stars, so far off that before 1832 all attempts to measure the distances of any of them had failed, and then information began to be gained by comparing small changes in their position in relation to other stars apparently near them. Henderson, of the Cape Observatory, was the first to obtain the parallax of a star by direct measurement, and the distance of the stars is so great that it is customary to state their position by the time light takes to travel from them to the earth. Light takes 500 seconds or 8⅓ minutes to come from the sun to the earth; this estimate of the time is probably right within one second. The distance of the sun from the earth is about 93 millions of miles; this estimate of distance is probably correct within 200,000 miles. The time in which light travels to the earth from other fixed stars than our sun has to be expressed in years, the other stars being so far off. He and a young American astronomer, Dr. Elkin, had for two years been measuring the distances from the earth of some stars in the southern hemisphere, by means of a telescope with a divided object glass, the two halves of which could be placed at measured angles in relation to each other. The result of their observations was that light was 4·36 years in travelling from Centauri to the earth; 8·6 years from Sirius; Lacaille (9352) 11·6 years; E Indi, 15·0 years; O 2, Eridani, 19·0 years; Eridani, 23·0 years; Tucanæ, 54·0 years. The broad conclusions at which they had arrived were that neither the apparent size nor apparent proper motion of a star gave any true idea as to its distance from the earth. Mr. Warren De la Rue was the father of the application of astronomy to photographic observations, and his results were well known to all present. Of late years great strides have been made in the chemistry of photography, especially in methods of manufacturing highly-sensitive dry plates, so that photography is increasing in its power of giving aid to astronomy.

The lecturer then exhibited on the screen, by the aid of the electric lamp, some photographs of the great nebula of Orion, taken at Ealing. The time of exposure of the plates had varied from one minute to one hour, the latter giving a splendid representation of Orion. No hand of fallible man (said the speaker) had touched these representations; the soul of the artist was not in them, but so much the better for science. Elaborate drawings of Orion had been made and engraved in the past; but a hundred years hence, if astronomers were given the choice between the destruction of all the engravings or of the photographs he held in his hand, he thought they would vote unanimously for the preservation of the photographs at the sacrifice of the drawings. Was it not, then, the duty of the scientific world to begin the photographing of the heavens? Did not future generations demand the performance of the work as a duty to them? A photographic library of the heavens was wanted, but the work must be done by proper instruments made for the purpose; and it was a work which must be done on a national scale. Mr. Norman Lockyer had recently declared that the future of astronomy lay in photography, and had laid a proposition in practical form before the Royal Astronomical Society. Mr. Lockyer also considered it to be the duty of the nation to take up the work. He (Mr. Gill) would conclude his remarks by quoting the words of Sir John Herschel—words as beautiful as they were just, and uttered in the early days of stellar astronomy, when the strongholds of space were just beginning to yield to scientific research. What a pleasure it would have been to Sir John Herschel, could he have seen the photographs of the nebula he so laboriously studied! The following words of Sir John Herschel were uttered forty-two years ago, in presenting the medal of the Royal Astronomical Society to M. Bessel, for his researches on the annual parallax of the star 61, Cygni:—"Such results are among the fairest flowers of civilisation. They justify the vast expenditure of time and talent which have led up to them; they justify the language which men of science hold, or ought to hold, when they appeal to the governments of their respective countries for the liberal devotion of the national means in furtherance of the great objects they propose to accomplish. They enable them not only to hold out but to redeem their promises, when they profess themselves productive labourers in a higher and richer field than that of mere material and physical advantages. It is, then, when they become (if I may venture on such a figure without irreverence) the messengers from heaven to earth of such stupendous announcements as must strike every one who hears them with almost awful admiration, that they may claim to be listened to when they repeat in every variety of urgent instance, that these are not the last of such announcements which they shall have to communicate—that there are yet behind, to search out and to declare, not only secrets of nature which shall increase the wealth or power of man, but truths which shall ennoble the age and the country in which they are divulged, and, by dilating the intellect, react on the moral character of mankind. Such truths are things quite as worthy of struggles and sacrifices as many of the objects for which nations contend and exhaust their physical and moral energies and resources. They are gems of real and durable glory in the diadems of princes, and conquests which, while they leave no tears behind them, continue for ever unalienable."

RECENT PATENTS.

PATENTS APPLIED FOR.

No. 8,351.—"Photographic Apparatus." S. M. Messinesi, 16, Philpot lane, E.C.—*Dated May* 28, 1884.

No. 8,463.—"Photographic Cameras." S. D. McKellen.—*Dated May* 31, 1884.

No. 8,470.—"Photographic Camera for Travelling Purposes." J. Joyner.—*Dated May* 31, 1884.

New Apparatus for the Exposing of Photographic Sensitive Plates in Cameras.

This is the specification of John and Alfred George Hopkins, of Hoddesdon, Herts.

Our invention as above, to be designated hereafter as the simplex slide and reversible camera back, consists of a perfectly light-tight box or slide, made so as to receive the plate in a carrier, which said carrier is made to run in grooves in slide, and which cannot get displaced when putting in or taking out plates. This said slide is made perfectly impervious to light by means of a simple lid affixed to the plate carrier, in such a manner that when the said carrier containing sensitive plate is pushed home into the slide, and by means of a simple turn of screw let in on top of slide into a screwed plate on plate carrier to keep it fixed, it becomes perfectly proof against light. The camera back is so made, with an opening on top the exact size of the plate slide, which, when exposure is to be made, it is fixed thereto by means of two levers each side of back inserted in small grooves made in plate slide, which by this means makes the whole perfectly rigid. The exposure of plate is made by simply removing the small screw on top of slide, and inserting a rod with screw at end, so as to screw into plate carrier, by which means the plate is let down or drawn up at will of operator; the said rod to be just the length of slide, so that by simply pushing the plate carrier down in grooves into the said back the sensitive plate is kept in position by means of a spring, which is attached to back of plate carrier. The plate is then ready for exposing. The camera back is made with a door, so that the focussing-screen can be inserted or taken out without interfering whatever with plate slide when attached to camera back, so that the focussing of a subject and exposure of plate on same becomes a most simple and very easy method and very quickly done.

Having now particularly described and ascertained the nature of our said invention, and in what manner the same is to be performed, we declare that what we claim is—

1. The plate carrier, with spring back and light-tight lid affixed.
2. The slide or box to receive plate carrier.
3. The arrangement of rod, with screw end passing through top of slide into a screw plate on carrier, for bringing into position the sensitive plate into camera back for exposure and then also into slide after.
4. The arrangement of the screw passing through top of slide into screw plate of carrier, for keeping slide impervious to light when closed.
5. Reversible camera back, made with an opening to receive plate slide.
6. Levers on camera back, for making slide quite rigid when brought into grooves of slide.
7. Method of inserting focussing-screen into camera back without interfering with slide while attached to the back.
8. The camera back can be made to fit any camera, and any number of slides can be used with same.

Contemporary Press.

A SIMPLE TEST FOR THE DETECTION OF A BROMIDE IN THE PRESENCE OF AN IODIDE.

[English Mechanic.]

When chlorine or chlorine water is added to a soluble iodide in the presence of starch or dextrine, the well-known violet-coloured iodide of starch is produced, this compound being destroyed by excess of chlorine, owing to the formation of chloride of iodine. A solution of bleaching powder or of sodium hypochlorite behaves in a similar manner when substituted for the chlorine or chlorine water.

When chlorine or chlorine water is added to a soluble bromide in the presence of starch or dextrine a yellowish-brown or brown colouration is produced, according to the amount of bromide present or to the state of its dilution. This colour is not so easily destroyed by excess of chlorine. With a solution of bleaching powder or of sodium hypochlorite no colouration is produced until an acid (in most cases dilute sulphuric acid is preferable) has been added, when we get the ordinary colouration due to bromide.

Upon this fact depends the following simple test for the detection of a bromide in the presence of an iodide:—To the solution containing an iodide and a bromide starch or dextrine is added, and then a drop or two of solution of bleaching powder or of sodium hypochlorite, when the violet colour indicating the iodide appears. Sufficient hypochlorite solution is now added carefully to produce the chloride of iodine, or until the blue colour disappears. Then, on the addition of dilute sulphuric acid, the brown colour indicating the bromide is at once brought out.

The bromide reaction is by no mean so delicate as that of the iodide, but from experiments made it was found possible to detect $\frac{1}{50}$th of a grain of bromide of potassium when mixed with $\frac{1}{100}$th of a grain of iodide of potassium in a concentrated solution, and $\frac{1}{8}$th of a grain of the bromide in the presence of $\frac{1}{10}$th of a grain of iodide when dissolved in one fluid ounce of water.

The test was applied to the concentrated fluid obtained by the evaporation of twenty ounces of sea water to the bulk of three ounces, and an excellent result was obtained. A similar experiment with 1,000 grains of sea water was also made. In this case the salts deposited were removed, and the mother liquor concentrated to a very small bulk. On applying the test there was an abundant indication of bromide.

The test has also been applied when the iodide and bromide were mixed with salts of the following metals, viz.:—Potassium, sodium, ammonium, aluminum, zinc, and magnesium, with excellent results. With barium, strontium, and calcium the reactions were distinct, but on account of the precipitated sulphates when dilute sulphuric acid is employed the colour of the bromine is not so definite. Hydrochloric acid may in such cases be substituted for sulphuric acid, and excellent results obtained. With salts of chronium, iron, manganese, nickel, and cobalt the test cannot be applied. If a bromide or an iodide should be present with these metals they can be detected by first precipitating the metals by means of potassic hydrate, and then examining the filtrate in the usual way.

Also in the presence of the following salts of the alkali metals—sulphates, chlorides, phosphates, carbonates—with satisfactory results. With soluble sulphides an opalescence occurs due to precipitated sulphur, which hides the bromide reaction. The iodide is also unworkable in the presence of a sulphide. If, however, the sulphide is precipitated by zinc sulphate solution, the filtrate may then be employed to detect both the bromide and and iodide with excellent results. With chromates the reactions are also indefinite. In this case the chromic acid may be reduced by sulphurous acid to chromic oxide condition, then precipitated by potassic hydrate, and the filtrate examined for the bromide and iodide.

In the presence of a chloride the bromide is tested for in the same way, and, having the chlorochromic acid test specially for the chloride, this test leaves nothing to be desired in the detection of these three acids when mixed in a solution.

Henry Thos. Jones.

University of Aberdeen.

Our Editorial Table.

The Royal Academy Illustrated.

London: Chapman and Hall.

In this, the first of a new series of illustrated guides to the Royal Academy, Mr. Henry Lassalle has collected together nearly two hundred of the principal works of art in the different classes in this year's collection. The work resembles more in its character the *Illustrated Catalogue of the Paris Salon* than our own *Academy Notes*, the illustrations being for the most part of full-page size, and have been reproduced by a photographic process from the sketches supplied by the artists themselves. We learn from the editor's preface that the idea of the work was only conceived a few days before the opening of the exhibition. The task of collecting together in so short a time so large a number of pictures must, therefore, be considered to have been carried out in a most admirable manner; and it may be hoped that, with more time in future years and the increased facilities brought by experience, Mr. Lassalle will be able to achieve even greater success.

All About Derbyshire.

Derby: R. Keene.

This is a pretty volume of nearly 400 pages, consisting, as the preface informs us, of a number of occasional articles contributed to various journals by Mr. E. Bradbury descriptive of Derbyshire scenery. Mr. Bradbury's name is not unknown to our readers, he having contributed one or two articles to our *Where to Go with the Camera* series last year. His style is clear and pleasant, and the character of the book is as far removed from the matter of fact "guide-book" pattern as it is possible to be conceived. The work is profusely illustrated by woodcuts and photographs, the latter consisting of full-page platinotype prints produced from his own negative by the publisher, Mr. R. Keene, whose photographs have also been utilised by the wood engraver. The book will form an elegant addition to the libraries of lovers of English scenery.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
June 10	Great Britain	5A, Pall Mall East.
,, 10	Bolton Club	The Studio, Chancery-lane.
,, 11	Bury	Temperance Hall.
,, 11	Photographic Club	Anderton's Hotel, Fleet-street.
,, 12	London and Provincial	Masons' Hall, Basinghall-street.
,, 12	Notts.	Morley House, Shakespeare-st.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society, held on the 27th ult., the chair was occupied by Mr. A. L. Henderson.

Letters were read that had been received from Mrs. H. Baden Pritchard and from the daughter of the Rev. F. F. Statham acknowledging letters of condolence which had been sent by the Society.

A communication was also read from Mr. Berryman, in answer to one that had been written by Mr. A. Haddon, Curator of the Society, requesting a lecture and demonstration of the enamel process as practised by Mr. Berryman. This gentleman's reply consisted of a promise that he would in the autumn comply with the request of the Society.

Mr. A. COWAN said it had often been stated that the addition of chrome alum to an emulsion had the effect of slowing development; it had also been asserted that it made the emulsion slower—that is, less sensitive. He now produced two negatives which had been similarly exposed and developed together in the same dish. The one plate had been coated with an ordinary emulsion; to the other chrome alum in the proportion of one grain to eight ounces had been added before coating. There was no noticeable difference between the two negatives either in apparent sensitiveness or density.

The CHAIRMAN had always found that a soft gelatine gave greater sensitiveness than a hard one; there might, however, be great advantage in the use of chrome alum, as development could then be conducted warm. He requested Mr. Cowan to try the effect of hot, weak solutions on the plates and to report the result.

Mr. W. COBB remarked that chrome alum solution required to be very carefully mixed with the emulsion or it would cause parts of it to become gelatinised. He had obtained some of his most sensitive emulsions when using a hard gelatine.

Mr. W. E. DEBENHAM said his experience was similar to that of Mr. Cobb's.

Mr. W. M. ASHMAN thought that in the case of the negatives shown the point was that sensitiveness had been obtained before the chrome alum was added. A small quantity of this salt did not render gelatine insoluble, as was exemplified in a solution used as a substratum. Mr. Cowan had proved that, even if the gelatine were hard, development went on all the same.

Mr. COWAN had received a letter from a gentleman whom he had instructed in the emulsion process, and who was now at the Cape of Good Hope. The writer mentioned having a batch of emulsion the gelatine in which, from long keeping, had become decomposed and useless; upon adding fresh gelatine it had given pictures surpassing in quality and rapidity those that had been obtained from it in the ordinary way.

Mr. COBB said that this pointed to the desirability of allowing the gelatine to become decomposed.

Mr. H. S. STARNES suggested the use of a very small quantity of gelatine, and of allowing it to become entirely decomposed.

The CHAIRMAN said that if either a hard gelatine were used or the chrome alum added to an emulsion the result would not be affected thereby, provided the plate were soaked before the commencement of the development; but if pyro. were used in the first instance the film became parchmentised. It was found that the addition of metagelatine to an emulsion induced greater speed.

Mr. STARNES described a dark slide made of sheet tin, which he would produce at a future meeting.

The CHAIRMAN referred to two developed but unfixed plates that had been shown at the previous meeting. To prevent development from going on, these plates had been for a short time immersed in a solution containing a small quantity of bromide of potassium and of nitric acid. The effect of this had been that the image was reduced, and, indeed, it happened in the case of the more powerful image that it was removed altogether. He (the Chairman) then showed a clamp, which had been lent him by Mr. F. York, to be used instead of a camera-stand, in places where the employment of the latter would be impracticable. It consisted of a top with screw for attachment to the base of the camera, connected by means of a universal joint with a cramp for fixing to a window sill, the edge of a vehicle, or any convenient support. He also showed a negative taken the previous day, at Epsom, of the horses starting for the Derby.

Mr. DEBENHAM then exhibited a lantern to demonstrate that composite white light might safely be employed for developing purposes. In the sides of the lantern were two paraffine lamps—one glazed with glass of a yellowish-green colour and the other with a sheet of stained-red. The light from these lamps was not allowed to fall upon the front of the lantern direct, but was received on a sheet of white cardboard curved to fit the back of the lantern, over the front of which a sheet of tissue-paper was stretched. To compare the light thus produced with that resulting from reflection only—and which it had been said was sufficiently safe for developing purposes—the coloured screens were removed from the lamps and the wicks turned low. The light from the front of the lantern was then to the eye very similar to the composite light first exhibited. A variation was now shown by means of which still greater safety could be attained. The coloured glasses were re-inserted, but a sheet of yellow paper was substituted for the white cardboard employed as the reflecting surface in the first experiment. The yellowing effect to the eye resulting from this change was less than might have been expected.

In order to test the photographic effect of these lights several of the members—including Mr Ashman, Mr. J. J. Briginshaw, Mr. J. Cadett, Mr. Cowan, Mr. Debenham, and some others—adjourned to an adjoining darkened room. Mr. Cadett was selected to decide the distance at which he could read ordinary print for each of the lights to be tried, the wicks, however, being so adjusted as to make these distances as nearly as possible equal. Mr. Ashman exposed a portion of a plate—which had been supplied by Mr. Cowan for the purpose—full square to each light, for a period of one minute, at the reading distance as found by Mr. Cadett. The plate was then developed in the appliance exhibited by Mr. Debenham at the previous meeting, and handed round to the members. A strong impression was found to have been produced by the reflected light, when used without coloured screens; but no trace of an image had resulted from exposure to the composite white light, reflected either from the white cardboard or from the yellow paper. In reply to a question,

Mr. COWAN said that the plate just used was one registering 19 on the sensitometer.

The CHAIRMAN said he would now repeat the experiment he had shown some time previously at a meeting of the Society, and which had been sneered at at the time as unscientific, but which he considered to be the same in principle as the composite light just shown. The idea, he might say, he had obtained from Mr. J. W. Swan. Two gas jets were lighted—one turned low, and the other surrounded by a globe of ruby glass. An opaque object was then placed in such a position as to cast side by side shadows from the two burners upon a paper screen. One of these shadows was, he (the Chairman) observed, red, and the other green. If the light proceeding from these portions of the paper were combined a compound light would be produced similar to that shown by Mr. Debenham.

Mr. DEBENHAM pointed out that the shadow from the red light only appeared green by contrast. The green-looking space was simply illuminated by the uncovered burner, and to use the light from this in conjunction with that from the red covered light would only be to use white and red light together.

Mr. HADDON remarked that the eye supplied the effect of the colour complementary to that actually falling upon it.

Mr. STARNES said he was much obliged to Mr. Debenham for demonstrating the truth of the remarks which he (Mr. Starnes) had made as to the use of an artificially-produced white light obtained by the superposition of coloured lights. Those remarks had been denounced by Mr. Lewis Wright and by the Editors of THE BRITISH JOURNAL OF PHOTOGRAPHY; but he was glad to see that their correctness was now fully demonstrated.

Mr. DEBENHAM was afraid he could not lay claim to Mr. Starnes's gratitude. As he understood it, Mr. Starnes proposed to convert rays of one colour and refrangibility into those of another colour and refrangibility. If two media could be employed, each of which transmitted one ray of the spectrum only, and this ray was not the same for each, the superposition of these media would produce darkness. All the available coloured media —at all events when used of moderate thickness—allowed rays to pass from some considerable portion of the spectrum. Thus the red and the green glasses he had been using both allowed yellow to pass, and therefore, if superposed, let yellow light through. The superposition of coloured lights upon a reflecting screen was, however, quite different from the superposition of coloured screens such as he had understood Mr. Starnes to advocate.

Mr. DEBENHAM inquired whether the Chairman had brought the lamp with diffraction grating (which, at the last meeting, had been stated to produce such a remarkable effect) for the purpose of test and demonstration.

The CHAIRMAN had not brought it, but would do so on a future occasion. Ultimately the 19th instant was fixed upon for the purpose.

Mr. STARNES replied that he had proposed the superposition of coloured lights, and had not mentioned that of either coloured glasses or other transmitting mediums.

It was announced that Mr. W. Coles's lecturette on *Altering the Density of Gelatine Negatives* would be given on the 12th instant.

PHOTOGRAPHIC SOCIETY OF IRELAND.

THE closing meeting for the session of 1883-4 was held in the Royal College of Science for Ireland, on Wednesday evening, the 21st ult,—Mr. Thomas A. Bewley in the chair.

Mr. HOWARD GRUBB, F.R.S., delivered a most interesting and instructive discourse on *Photographic Lenses*, in the course of which he described the nature of lenses in general and the way in which rays of light were refracted in their passage through them. He next touched on the many errors arising from spherical and chromatic aberration, astigmatism, &c., and the various means adopted for the correction of such errors in different types of lenses used in photography.

An animated discussion followed, in which the Chairman, Messrs. J. V. Robinson, H. Bewley, E. P. Johnson, G. Pim, and others took part.

Mr. R. C. WALKER showed a single "back" which he had constructed almost entirely of Willesden paper, and which was found to answer exceedingly well, being very light and portable.

The meeting was then adjourned to October next.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE monthly meeting of this Society was held at the Free Library, on Thursday, the 29th ult.,—Dr. Kenyon, President, in the chair.

The minutes of the May meeting having been read and confirmed, Messrs. Cross, Heape, and Stott were elected members of the Association.

The Hon. Secretary read a letter from the Secretaries of the Associated Scientific Societies, and also the balance sheet of last year's *soirée*. With reference to the suggestions of the Committee contained in the letter,

Mr. J. H. T. ELLERBECK proposed and Mr. B. BOOTHROYD seconded a resolution that the Liverpool Amateur Photographic Association should repeat its guarantee of £5 towards the funds of the Associated *soirée*.

Some discussion ensued as to the proposals of Mr. Leslie for more extended action on the part of the Associated Scientific Societies of Liverpool.

Finally Mr. BOOTHROYD proposed and Mr. A. BEER seconded a resolution that the present delegates of the Association to the Associated Committee be re-elected, and that they be instructed to report further to the Society on the subject of Mr. Leslie's proposals.

Both the resolutions were assented to.

Mr. A. Beer exhibited and explained a new and very ingenious changing-box.

Mr. E. Roberts showed a fine negative developed by himself with—

Washing soda	1 ounce.
Bromide of potassium	3 grains.
Water	10 ounces.
Pyro.	10 grains.

This formula had been given in the present year's Almanac, and Mr. Roberts said he found it a capital developer, giving clean negatives of good printing colour and density.

The Chairman asked Mr. Roberts how this developer acted as regards fog.

Mr. J. H. Day remarked that an artist friend of his had used the soda developer exclusively for some time with the very best results, but he (Mr. Day) would like information as to rapidity of action.

Mr. Roberts said that he had only used this formula with some Swan's plates which he had kept by him for some two years, and with these plates he certainly found it slow; but possibly it would not differ from other developers in this respect when fresh plates were used. There was perfect freedom from fog.

Mr. Rogers and the Chairman exhibited specimens of Mr. George Smith's sciopticon camera. This little camera measures when folded $2\frac{3}{4} \times 5\frac{3}{8} \times 4\frac{3}{4}$, and weighs under $1\frac{1}{4}$ pound; yet it carries a $3\frac{1}{4}$-inch square plate, and has a range of focus of from $2\frac{1}{4}$ to 12 inches. The double dark slides are correspondingly light, and the whole work in the most simple and yet rigid manner; there is a rising front and a swing back. The great novelty is the manner in which the extra range of focus is provided for without detriment to the field of short-focus lenses, and in this respect the pattern is the very model of perfection. At last photographers have an apparatus so portable that it can be carried anywhere without fatigue, and yet of such range of power and rigidity that there is really no drawback in regard to efficiency. Mr. Smith's persevering efforts to introduce lightness without sacrifice of power into photographic apparatus have thus at last attained a complete success. A light stand is in course of preparation; meanwhile, the original scenograph with stand answers perfectly for mountain work.

The Chairman called attention to some good prints of portraits and groups taken by Mr. H. N. Atkins with one of Smith's cheap single lenses.

Mr. Watts read a paper, *On the Development of Instantaneous Pictures* [see page 359], and passed round a number of prints in illustration of his remarks.

The Chairman, in proposing a cordial vote of thanks to Mr. Watts for his careful and useful paper, remarked that the Society was much indebted to Mr. Watts for his paper and for the trouble he had taken in preparing negatives to illustrate it. He (the Chairman) had little doubt but that the principle enunciated by Mr. Watts was the correct one, and would in practice be found of substantial benefit. This was testified by the relative times occupied by the development of the negatives exhibited, and to some extent by the relative densities of the negatives; but, as to detail, it was noteworthy that the difference between the negatives exhibited in this respect was scarcely appreciable. This corresponded with the recorded experience as to different proportions of bromide in the developer, viz., that a large proportion of bromide, although it lengthened the period of development, produced no real loss of detail.

Mr. H. N. Atkins had, since the last meeting, been experimenting in the direction pointed out by Mr. Crowe in his valuable remarks at the April meeting, and found his formulæ work admirably.

Mr. Watts said that he thought it important to use sulphite of soda in fresh solution of pyro., and alluded to the tendency of sulphite to change to sulphate if the solutions were kept too long.

Mr. Crowe exhibited some specimens of his instantaneous work, taken in the streets of Liverpool on the Queen's birthday.

The Chairman explained a new apparatus by Lancaster, of Birmingham, for affixing a camera to a bicycle.

The meeting, which was numerously attended, was then adjourned to the last Thursday in June.

DERBY PHOTOGRAPHIC SOCIETY.

At a meeting held at Rodney-chambers, Corn Market, Derby, on Wednesday, the 28th ult., Mr. Arthur J. Cox occupying the chair, the Derby Photographic Society was formed for the promotion of the art.

About twenty members were enrolled, and the Society shows every prospect of being a most successful undertaking. Among those elected were Messrs. C. E. Abney, Richard Keene, Arthur J. Cox, H. Arnold Bemrose, J. E. Kaye, J. W. Price, and T. Scotton. Mr. Fred. W. Simpson, Hamilton Villas, Mill Hill, Derby, was elected Hon. Secretary.

The first meeting will be held this month, when a paper will be read on some photographic subject by a member of the Society, and will be followed by a discussion.

BOLTON PHOTOGRAPHIC SOCIETY.

The first outdoor meeting of the season was held on Saturday, the 24th ult., at Adlington, near Chorley. The weather was beautifully fine and clear, and caused a good muster of members to assemble. About twenty (including some friends) left Trinity-street station for Chorley, and thence walked on to Yarrow. As most of the members were fully armed for photographic warfare their appearance caused no little surprise to the natives, and in one or more instances the object of the strange party was rather energetically canvassed.

The woods behind Yarrow hotel proved fertile in "bits," and the members soon began operations. Modesty prevents us stating the number of plates exposed, but the manufacturers certainly had an "innings." Proceeding through the woods the party emerged on the banks of the canal above Adlington. Not "striking ile" a start was made for the Boltonian's elysium—Rivington. Plates were exposed on the house and beautiful grounds of the late Mr. Martin, and it was getting late in the evening when a *réunion* took place at the "Black Lad" for tea.

Thanks to the kindly forethought of Mr. R. Harwood, tea was soon served and fully appreciated. Great praise is indeed due to mine hostess for the liberality of her catering. After spending some time in strolling around the lakes a start was made for Horwich Station, and the party arrived in Bolton about nine o'clock. The trip was thoroughly enjoyed, and it is hoped that future outdoor meetings may be favoured with similar weather.

The next meeting is appointed to take place at New Brighton.

NORTH STAFFORDSHIRE PHOTOGRAPHIC ASSOCIATION.

A meeting of this Association was held on Wednesday, the 4th instant, at the Mechanics' Institute, Hanley,—Mr. C. Alfieri, Vice-President, in the chair.

Mr. R. S. Burgess exhibited two instantaneous shutters received from Mr. J. J. Atkinson, of Liverpool—the "Kirkby" and "Eclipse."

The Chairman exhibited two shutters of his own manufacture, both opening and closing in the centre, working behind the lenses, and forming at the same time the sliding-front of the camera, the weight of the whole being but a few ounces.

A shutter sent by Messrs. Reynolds and Branson was also exhibited.

It was unanimously agreed that, as the Society could work more harmoniously free from the professional element, with the exception of one gentleman, the names of the above be erased from the list of members, and that the Society henceforward be designated the "North Staffordshire Amateur Photographic Association," the following gentlemen constituting the committee:—Messrs. Emery, Alfieri, Burgess, Taylor, Insull, Kampton, and Kirkby.

It was resolved that an excursion be made on Wednesday, June 25th, to Alton and Froghall, per conveyance from Stoke-on-Trent, the members to assemble there, each to have the privilege of bringing a lady friend. It was also resolved to engage permanently a room at the Potteries Mechanics' Institute, Hanley, for purposes of holding meetings, giving demonstrations, &c.

After some interesting conversation and discussion upon various photographic topics the meeting was terminated.

BERLIN ASSOCIATION FOR THE CULTIVATION OF PHOTOGRAPHY.

This Society met on the 21st March,—Professor H. W. Vogel in the chair. Several new members were admitted.

A letter from Paris was then read, in which Herr Trant described Klary's method of colouring photographs, so as to make them look like water-colour drawings, and a new retouching pencil by Faber.

Herr V. Kolkow inquired what was the best sort of glass for the roof of a glass-house, and several of the members present recounted their experiences with different sorts of glass. He (Herr Kolkow) then mentioned that some Westendorp gelatine plates, which had been taken on a North-Pole expedition, and had been subjected to a temperature of 30°, had behaved very well; but, unfortunately, most of them appeared over-exposed.

Herr Tschentscher sent some cuff-studs ornamented with photographic portraits, the preparation of which he makes a speciality. The picture side of the photograph is coated with gelatine and affixed to the back of a round glass, and then the whole fixed by *adamantine cement* to a stud back. Herr Tschentscher complained that the photographs generally soon turned yellow, and inquired whether that might be caused by the gelatine or the cement?

No one being acquainted with the cement named, it was not possible to say anything positive on that point; but one of the front plates which was pulled off from the stud part was pronounced to have an acid taste, and the probability is that acid in the cement was the cause of the yellowing. It was said that many of the cements sold under various names consist mainly of gelatine and acetic acid.

Herr Christmann remarked that pictures mounted with gelatine upon glass yellow more rapidly than those mounted in the usual way—perhaps owing to the acid in the gelatine.

The programme of the Photographic Society of Great Britain was then discussed, particular attention being given to the standard stops. Some members approved of the idea, while others considered it impracticable and the gradations not gradual enough.

Herr Graf showed some *plaque* portraits and an embossing-press. The portraits were much admired; but it was suggested that they wanted some protection from air and dust, either in the form of a glazed frame or of a coat of varnish.

Herr Kurtze exhibited a large collection of landscapes and architectural views.

The Chairman gave an account of his experiments towards giving the true optical value of colours to photographic reproductions of pictures. He showed a photograph of a colour scale taken by the old method, and the same by a newer method. The difference between them was very striking. Chrome yellow, yellow ochre, and Schweinfurt's green all appeared lighter than ultramarine blue. Red lead and vermilion were both lighter than formerly. Alizarine, on the other hand, by the new method of staining films, is darker than formerly.

The short lecture was listened to with great interest, and at its conclusion the meeting was adjourned.

Correspondence.

ALBUMENISED PAPER.

To the EDITORS.

GENTLEMEN,—For some time past I have used almost exclusively the ready-sensitised paper now so common. This, though undoubtedly convenient and possessing some advantages, has also disadvantages, which make me desirous of giving it up.

But I find, nowadays, that I cannot sensitise my own paper to give results at all approaching those I obtain on the ready-sensitised, nor even equal to those I once obtained with ease. Comparing some of my pictures, produced before the days of ready-sensitised papers, I can but sigh and wish that I could equal them now.

What is the reason of this falling off? I am myself convinced that it is in the papers supplied at the present time (I have tried most of them of good repute, with similar results), for only a few weeks ago I accidentally came across a-quarter sheet of albumenised paper that must have been in my possession at least twelve years, and upon trying it, as a matter of curiosity, I was surprised and struck with the marked difference in its behaviour as compared with modern samples. Not only was the quality of the prints better than I am now accustomed to, but the results were got without any trouble or "nursing" in the toning and fixing.

If, as I believe, the modern paper is at fault, cannot something be done to induce paper makers or albumenisers to revert to their old methods? If it is merely a matter of using pure albumen, stronger salting, a more carefully-sized paper, or anything else that adds to its cost, then I for one would gladly pay twice, thrice, or ten times the extra cost to get a good article. Albumenising is not an operation that can be performed on a small scale, or I would be independent of commercially albumenised paper.

Is there anything that can be done to improve the quality of the prints obtained upon a weakly-salted or albumenised, but otherwise good, paper? The makers of the ready sensitised article appear to have some such secret. —I am, yours, &c., A. E. P.

London, June 4, 1884.

IMPROVEMENTS AND DISCOVERIES.

To the EDITORS.

GENTLEMEN,—Under the heading of "A Correction," Mr. A. Mackie gives the credit of the discovery of water in the place of air for the releasing of catches attached to photographic shutters to Mr. Sands. This I believe to be incorrect, as our esteemed Hon. Secretary of the Manchester Photographic Society, Mr. W. J. Chadwick, patented that and other fluids and semi-fluids.

In the same article which called forth Mr. Mackie's remarks there is an allusion to a *new* mechanical arrangement for releasing catches patented by Mr. Warnerke. This I have had attached to my camera for the last three years, and others I have made for members of our Society. This is another of the instances in which two minds arrive at the same result, and which the pages of THE BRITISH JOURNAL OF PHOTOGRAPHY have been so familiar with during the past few years. The one I have attached at present I believe is a decided improvement on Mr. Warnerke's, as instead of the motion being a push it is a pull, which enables it to be attached to a flap shutter for the purpose of keeping it open for a longer or shorter period, similar to Cadett's pneumatic flap. The inner coil of wire I make upon a knitting needle running in the lathe, afterwards covering it with Maw's black india-rubber tubing used for feeding bottles. For the inner wire I substitute catgut, which I find far preferable to any metallic motor, as it is not liable to become bent and gives more elasticity to the arrangement when finished.

I shall have great pleasure in sending you a camera to which it is attached for your inspection, if you think it would be of any service.—I am, yours, &c.,

Victoria Cottage, Vernon Grove, Eccles, Manchester, May 31, 1884. W. BROUGHTON.

[It will afford us pleasure to examine the camera.—EDS.]

THE REGISTERING LANTERN CARRIER.

To the EDITORS.

GENTLEMEN,—Our Mr. William Chadwick thinks your article on *Lantern Industries* in this week's journal reads somewhat as though Messrs. Oakley were the original inventors (or proprietors) of the registering lantern carrier.

Mr. William Chadwick, Mr. Arthur Coventry, and the late Mr. Michael Noton used a carrier of this description, for a single size slide, seventeen or eighteen years ago—thus five or six years before Oakley's commenced business.

The carriers for registering the various size of slides is undoubtedly the original invention of Mr. Chadwick, and those made by him were perfect pieces of apparatus, although the imitations made by other firms were far from being so. (See his contribution to THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC in 1878).—I am, yours, &c., R. H.

Liverpool, May 30, 1884.

[The first registering carrier for lantern slides of which we have any account is that described in the issue of THE BRITISH JOURNAL OF PHOTOGRAPHY for January 10, 1868, in an article by the then Editor, entitled *Transparencies: How to Mount and How to Exhibit Them*, in the course of which our predecessor says:—"The method we are now about to advocate is one that we designed many years ago, and have had in constant use ever since. There is no person to whom we have shown or recommended it who has not been pleased with its efficiency and simplicity. It consists of an adapter, which is placed in the lantern and allowed to remain there." And then follows a detailed account, illustrated by a drawing, and giving all the necessary measurements for constructing the adapter that is in general use at the present day for exhibiting slides of one standard size.—EDS.]

CHANGING PLATES.

To the EDITORS.

GENTLEMEN,—The following may be useful to some reader:—A year ago I had a changing-box made of light American wood and the size of camera I use for whole plates. When out for a day the box holds camera, plates, &c. That makes only one box to carry.

The sleeves I got made of brown leather, which is much better than any textile fabric. I have used the same box lately for changing plates (quarter size) in the studio, and find it much more pleasant for the eyes than shutting myself in the room to change plates, and rush out in the glare of the glass-house. (Take note who wants to take care of the eyes.)

There is nothing easier than changing plates by *feeling* in the box. I read of someone who tried their blankets for a changing-bag! This is better. I changed twenty-two quarter-plates the other day, using my waterproof coat for a bag. Button up the front and lay the coat flat down, keeping the back up; fold in below the lower part so that it may be close and tight; insert the dark slide at the neck opening, and fold under the same; hands in through the sleeves, and see it is close, and you can change plates without any light getting on them if your coat be really waterproof. Try it if you ever leave your changing-box behind and find yourself in a "fix;" though that was not the case with,—Yours, &c.,

Lerwick, Shetland, May 28, 1884. C. SPENCE.

Notes and Queries.

GEORGE BAXTER inquires:—"What will be the effect if I place a piece of pale green glass in front of the lens when I take a landscape?"——In reply to this we inquire, in return—"Why not try the experiment, and let us know the result?"

HENRY MARTIN inquires what has been the final outcome of the addition of iodide of mercury to the developing solution, as recommended by Mr. Henry J. Newton, of New York.——We reply to this by saying that we do not know. In the hands of ourselves and a few friends it was not found to produce the effects indicated.

URANUS.—This correspondent desires to have our opinion on a solution of iodine in ammonia as a detergent in the case of several very bad silver stains on his hands.——It is certainly a desperate remedy, but still it *is* a remedy, for the evil of which "Uranus" complains. All we would say is this:—See that the iodine is always largely in excess, and then no danger will accrue.

B. F. says he has tried a method of mounting prints recommended on the authority of Mr. A. Cowan and others, but without success. He applied starch to the backs of the prints and also to the face of the mounting-board, and allowed both to become dry. He then passed a damp sponge over the surface of the mount, and, laying a print down upon it, pressed them in close contact; but, after allowing a reasonable time for them to become dry, he found that they were not attached at all.——We have no doubt the failure in this case arose from the pressure having been altogether insufficient to bring the print into the requisite close contact with the mount. We can testify to the efficacy of the system when properly worked with the degree of pressure necessary to its being effectively done.

BATCHELDER AND CO. (Melbourne).—Our correspondents inform us of an invention made and perfected by an amateur in New Zealand, by which any amount of angle of view can be included. It differs in construction from the pantascopic camera, or from any other previously described. A print measuring 24 × 5 inches and embracing an angle of 140° has been seen by our correspondents, who inquire if such an apparatus would be likely to "take" in this country. This is a matter upon which we have great diffidence in offering advice. At various times in the course of the past thirty years panoramic cameras have been introduced, some of which have been most effective, and yet none of them have, so far as we can learn, been commercially successful. We shall be glad to put any maker desirous of taking it up in communication with our correspondents at the Antipodes.

PHOTOTYPER would like to be informed of a method by which collodion negatives from engravings could be rendered very intense, so as to stand severe printing in a strong light without the whites becoming affected. ——Answer: There are two among many other methods of intensification by either of which he will attain the desired end. The first consists in bleaching the negative, after being fixed and washed, by the application of a solution of bichromate of potash to which have been added a few drops of hydrochloric acid. After the deposit has become quite white wash carefully, and apply a ten-grain solution of Schlippe's salt, by which the image will be made of a dense brown colour. By the other method the negative, after fixing and washing, is bleached by a solution of bromide of copper, followed, after being washed, by a solution of nitrate of silver. This gives great opacity to the deposit. If any difficulty in procuring the bromide of copper be experienced it may be readily made by dissolving nearly equal parts of bromide of potassium and sulphate of copper in different vessels and mixing them together. Nicety of proportions is not required in this case, nor does the presence of the sulphate of potash interfere with its working.

W. D. R. has an accumulation of gelatine plates that he has made at various times for experimental purposes, some of them being very rich in silver. He inquires if there be any ready method by which he can recover this silver, which, in his estimation, must amount to many ounces.——In reply: Let him immerse them in a fixing bath and then recover the silver in the form of sulphide, in the usual way.

REV. BENJ. F. STODARE.—Our correspondent has become the possessor of a fine engraving by Goupil, executed by the Rousillon process, and he inquires if we can afford him some information concerning the process of engraving employed.——So far as we know the Rousillon process is similar to one by Mr. W. B. Woodbury, who invented it and introduced it sufficiently to enable any skilled workman to carry it into practical effect. The Rousillon method may, however, be quite different. Being worked as a secret process we have no means of pronouncing upon it; but we are at one with our correspondent regarding the admirable results obtained by its agency.

Exchange Column.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

NOTICE.—*Each Correspondent is required to enclose his name and address, although not necessarily for publication. Communications may, when thought desirable, appear under a* NOM DE PLUME *as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.*

PHOTOGRAPHS REGISTERED.—

Thomas Riley, 52, Manchester-road, Burnley.—*Two Photographs of the Laying of the Foundation Stone of Victoria Hospital for Burnley and District.*

W. LANG, JUN.—*Anal. Zeitschr.*, 23, 33-35.

J. KNOWLES.—Sealing-wax varnish—such as that used for electrical machines—is simply ordinary red sealing-wax dissolved in methylated spirit.

PYRO.—There is no satisfactory way of making enlargements direct on canvas. The powder or the carbon process is the best we know of for such pictures.

O. P. S.—From the description given of the instrument we believe it to be an orthographic lens; but without seeing it we could not pronounce definitely with respect to its capabilities.

A. S. FERGUSON.—There is nothing at all extraordinary in the first washing water of your prints having a strongly acid reaction to litmus paper. Most ready-sensitised papers are strongly acid.

BENJAMIN.—The affair is more of a toy than a really serviceable photographic apparatus. So far as we are aware it is not now an article of commerce, for we have not seen one for several years, except in an auction room.

A. T. PENFOLD.—Do not send the kaolin itself to the refiner, but wash it in two or three changes of water containing a little nitric acid. Add this water to the washing waters from the prints; then the silver will be precipitated as chloride when the salt is added.

W. J. S.—The spots are doubtless caused by metallic particles detached from the "gold-edged" cards upon which the prints are mounted. Pure gold leaf would have no effect on the prints should any small particles get detached and come in contact with the photograph.

ARGOL.—Your chief fault appears to be in the employment of a too high temperature in emulsifying. The variations in the formulæ would produce no such effects. It is also possible that you are employing too small a quantity of gelatine in the earlier stage of the process.

T. B. (Liverpool).—Your query should be put to a respectable solicitor. We cannot undertake to answer questions on purely legal matters. From your statement we should surmise that you have good cause of action, and morally you should succeed. Consult a solicitor without delay.

L. H. W.—Two thicknesses of the orange paper enclosed will answer quite well for the window of a dark room where only collodion plates are manipulated. We fear, however, the colour will not prove very permanent. Keep a watch upon it, and make a change as soon as the outside sheet shows signs of fading.

J. S. R.—Without actually trying the paper it is impossible to give an opinion as to whether it will yield purple tones. You must bear in mind that rich purple tones in prints depend nearly as much upon the character of the negative as upon the paper. If the negative be unsuitable it is impossible to get purple tones on any paper.

THOS. BENTON.—Your failure, we should say, is due to your employing a sample of gelatine that contained alum, or, possibly, it was acid. In all processes dependent upon the solubility of bichromated gelatine a very pure sample of gelatine is imperative. That which you have employed is, we know, very unsuitable for such purposes.

C. WATSON.—Yes; mix the two kinds of residue together before you send them. We advise you, after mixing, to make the residue thoroughly dry, pound it in a mortar, and then pass it through a sieve. By this means you will reduce it in bulk and remove all extraneous matter, and so assist the refiner, enabling him to make a smaller charge for reducing.

ALPHA.—The reason your collodion turned quite red as soon as the iodide was added is that the ether was in fault. You say you have had it in stock for "two or three years," and that the bottle it was kept in was only half full. The ether being at fault is further proved by the rancid smell you say it has. We fear you will not now succeed in making it a good working collodion, although you may be able to render it colourless.

E. A. COULES.—Your failure, in making a solution of india-rubber, is twofold:—In the first place: you have used benzoline, in which rubber is not soluble, instead of benzole, in which it is. In the second place: you have employed vulcanised rubber, and that is insoluble, even in benzole. Try again, using benzole and good bottle rubber. If you can get "masticated" rubber in your neighbourhood it is the best kind to employ, as it will dissolve more readily.

LEX.—We have always succeeded very well with the ozone bleach. Perhaps with more experience you will succeed better. The best plan of reducing by abrasion is that of Mr. Barber, who recommends the film to be gently rubbed with cuttle-fish powder. In our hands the former plan is the more satisfactory. Messrs. Hopkin and Williams will supply the chemicals in a state of the greatest purity. The foreign pyrogallic acid named by you is of very good quality indeed; so is the English manufactured by the above firm.

PHOTOGRAPHIC CLUB.—At the forthcoming meeting of this Club, at Anderton's Hotel, Fleet-street, on Wednesday next, the 11th inst., the subject for discussion will be—*On the Best Methods of Preserving Sensitised Paper*. Saturday afternoon meeting at Hampstead Heath, North End, and West Heath. Members will meet at the Bull and Bush, at 6.30.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—The next ordinary meeting of this Society will take place on Tuesday next, the 10th inst., at eight p.m., at 5A, Pall Mall East, in the Gallery of the Royal Society of Painters in Water Colours, when the discussion upon Mr. W. E. Debenham's paper, read at the last meeting, will be taken. Papers will also be read on *Commercial Fabrics Suitable for Dark Room Illumination*, by Mr. J. R. Sawyer, and on *Silver Prints*, by Mr. E. Dunmore.

BALLOON ASCENT.—We are favoured with the following from Mr. Cecil V. Shadbolt: — "The first ascent of our new balloon (at present without any name) took place, on Saturday afternoon last, from the Crystal Palace, at about 5.20, when we had a most enjoyable trip. The little machine fully realised all expectations and lifted three persons easily. There were in the car General Brine, Mr. Dale, and myself, and the ascent was a very steady one. We did not go much beyond 2,000 feet high, and when over Croydon at that altitude a pigeon was let loose, which reached its home at Chislehurst about two hours later. Another despatched five minutes after the first did not get in until after dark. The descent was effected at Woodcote Grove, Wallington, Surrey, on the estate of Mr. Puckle, who, with his son, accorded us a hearty and courteous reception, and, after having entertained us at his house, kindly placed his wagonette at our disposal, in which we drove to the station, the balloon having previously been sent on by a cart, also belonging to our host."

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1258. Vol. XXXI.—JUNE 13, 1884.

THE PHOTOGRAPHIC SOCIETY.

We should not have noticed a matter which somewhat affects us, had it not been that the correspondence published in another column (a portion only of what we have received) proves that the letter to which reference is there made has already produced an impression—so far, we are glad to say as it affects us, favourable to our side. The charges, if we can so call them, are also by this time in the hands of every member of the Photographic Society of Great Britain, a very large percentage of whom are country members who, beyond the Society's *Journal*, have no means of gauging either the opinions of their fellow-members or the correctness or otherwise of the reports of its meetings.

In order, then, to prevent any misapprehension on the part of non-resident members we shall make a few explanatory remarks; and, as many of our own readers are not members of the Society, we append Mr. Herbert B. Berkeley's letter in full, which appeared in the last number of the Parent Society's *Journal*, in order that they may be able to judge the value of his complaint:—

29, *Southampton-row, W.C., May 3rd.*

To the Editor.

Sir,—Would it not be well to revive a former custom of sending out slips for the correction of members who have spoken at the meetings, whether general or technical?

Errors and omissions are of frequent occurrence in this Journal, and not only in the reports of *other* journals, where, under the present system of publication of a non-official character, such errors must remain inevitable. By the way, I fail to see any logic in the conclusion that, were the publication of the reports of meetings now contained in the weekly photographic press delayed until the full and corrected (presumably) report could be taken from this Journal, such publication would form "stale news." As well might we say that the papers so delayed in publication are "stale news." I take it, correctly speaking, that the paper read requires publication rather *before* the remarks made upon it than after them. Hence, delay in the publication of the discussions arising upon papers should be an advantage of some importance. Properly, one and the same issue should contain both paper and the discussion upon it.

But the best argument of all must be that at present the reports in the weekly press are meagre and incorrect; while, I admit, that those in this Journal might be improved upon by adhering to the practice of sending out slips for correction.*

Again, in any case, what is the use of "fresh news" if it is not to be depended upon as correct?

I should suppose that many who are readers of the photographic press must be of much the same opinion as myself upon these matters.—I am, sir, yours faithfully, Herbert B. Berkeley.

So far as concerns the management of the Society's *Journal* and the sending out of slips we have nothing to do, and shall confine ourselves to the portion of the letter which affects the "weekly journals," premising that under the "present system of reporting," whether official or "unofficial," or, indeed, under any system whatever, it is perhaps inevitable that errors must remain—at least in the opinions of some. If the condensation of a speaker's remarks while still retaining his *sense* constitute error, the whole science of reporting is vicious; if, on the other hand, the careful elaboration, extension, and final polishing of a speech until it represents what the speaker himself thinks he intended or ought to have said be the ideal of correctness, then a new style of journalism must arise before the system can secure adoption. "Weekly" or "commercial" journals, whether photographic or otherwise, have too many calls on their space to permit them to be run in the interest of any one society. Their object is to work for the benefit of the greatest number, and their success is commensurate with the manner in which they carry out the attempt. Mr. Berkeley can scarcely charge us with any want of attention in this respect to the society to which he belongs, reports of whose meetings occupy at least as much space and, we venture to say, are quite as accurate as those of any of the numerous other societies whose proceedings we record.

Turning to the suggestion of the delay of our reports until the publication of the official corrected reports, we can only say that it was waste of time to mention it. If the weekly journals consented to this course, which they are not likely to do, they would be sadly wanting in their duty—not only to photography and photographers generally, but especially to the members themselves—if they kept back any account of the proceedings of the Society until such time as they were able to cut it bodily from the official *Transactions*, in which every member would already have had an opportunity of seeing it; and this because a few members hold the idea that the Society should have a sort of copyright in its proceedings.

Considering that the Photographic Society of Great Britain is supposed to be the representative national society, it owes it to British photographers and the world that its proceedings be as promptly and as widely circulated as possible, instead of being nursed for a month, and finally given to the world in a private journal which scarcely circulates beyond the members of the Society.

On the question of accuracy in reporting the speaker himself is not, perhaps, the best judge; and where the reporters employed are practical men—that is to say, not only reporters for the nonce, but practical photographers—they may well be entrusted with the task of condensing the sense of a speech within the bounds necessary in a weekly publication. This task is, we make no hesitation in saying, carefully and admirably performed in the "weekly journals," and fully as great accuracy obtained as by the system of permitting each speaker to elaborate and modify the remarks he may have made.

The "stale news" question would be settled simply and at once by the publication "in one and the same issue of both paper and the discussion upon it," which Mr. Berkeley recognises as the proper method. This can only be done when the Parent Society consents to place itself in the same position as every other Society in the United Kingdom, by allowing the weekly journals to have access to the papers read in time to be printed the same week they are delivered. The possibility exists if the will were there; but at present we fear we can see no probability of improving the "meagreness" of our reports—so far, at least, as the publication of the papers is concerned.

* Since writing the foregoing letter, I have been informed that the slips are still sent out for the corrections of members who have spoken at the meetings of the Society—I presume whether general or technical. I can only say that I have not received such after the more recent occasions on which I have made a remark; and that certain errors I have observed in the reports, from time to time, lead me to infer that my statement was correct. I also had further reason for my belief, into which it will not be necessary to enter. It may be, then, that slips do not always reach the hands of (or are mislaid by) the members to whom they are sent.

As regards their accuracy we are content to leave the majority to decide.

In conclusion: it is worthy of note that in the present number we publish simultaneously the report of the June meeting of the Society and the papers read at the May meeting—a fact which speaks for itself.

ON ALBUMENISING PAPER.

Complaints still continue to reach us from correspondents stating that it is now impossible to obtain the rich tones in silver prints formerly produced. The cause of this difficulty is usually ascribed to the use of the "ready-sensitised paper," together with negatives of a totally unsuitable character to produce such tones. However, as some of our correspondents write, this is not all; for if, instead of employing the ready-sensitised paper, they take the albumenised paper now in the market and sensitise it for themselves (using the strength of bath as recommended by the makers) the same difficulty still exists in securing the deep purple tones of former times, even if the identical negatives of old be employed. In a word, it is asserted that from the same negative it is now impossible to obtain prints of similar tones to others still in existence produced years ago on paper then an article of commerce. With this experience before them, it is by no means surprising that many should conceive the idea that the albumenised paper of the present day is prepared differently from what it used to be, or that the paper itself may be of a different character.

A letter from a correspondent which appeared in our last issue is a fair type of a very large number we have received during the past year or two, with, perhaps, one exception. Our correspondent says he accidentally found a piece of albumenised paper prepared some dozen years or so back, and curiosity induced him to sensitise and print it. The difference he found between its behaviour and that of any he can now procure was very marked indeed. He, therefore, not unnaturally inquires why manufacturers will not supply the same kind of paper at the present time. There is no question whatever that the albumenised paper of commerce *is* of a different character from that of a previous period, and the discrepancy has more than once been explained in our columns during the past few months. But this difference, it should at the same time be remarked, has been brought about, to a large extent, by photographers themselves. They have demanded a paper with the highest possible gloss. They also required a paper which could be weakly sensitised, as that kind of paper is found to suit better the general class of negatives now taken; and, furthermore, taste has changed, and warm, reddish-brown tones have become the prevailing fashion for photographs in place of purple.

Now, the first of these conditions, as we have before stated (see page 274 of the current volume), is directly opposed to the production of deep purple or black tones, inasmuch as the image is confined almost entirely to the albumen coating; whereas, for dark tones, it is necessary that it should, to some extent, be in the body of the paper itself. The second condition has necessitated that the albumen should contain but little chloride.

It is tolerably well known among practical printers that little or no advantage is gained with a weakly-salted paper by increasing the strength of the silver bath beyond a certain point, as no larger proportion of chloride of silver can be formed by so doing; therefore it is of little use, as many have discovered, employing a strong sensitising solution if the albumen contain but a small proportion of chloride. As the matter now stands, it would appear that if paper of the old character be required, capable of yielding a deep tone from suitable negatives, the only way of obtaining it is perforce to prepare it for oneself or to get it prepared specially. The latter is easily done if a ream or two be ordered, but few albumenisers would undertake to prepare a quire or two specially, or such small supplies as would satisfy the requirements of the amateur.

The preparation of albumenised paper, it may be mentioned, is by no means a difficult operation, though up to the present time very few working details have been published on the subject. It is for this reason, perhaps, that it is generally assumed the albumenising of paper is a somewhat formidable undertaking. However, it is not so in reality, and we shall here give such practical information on the subject as will enable any one, with a little practice, to prepare exactly what he requires.

The first thing for consideration is the selection of the paper itself. Of this, unfortunately, there is but little choice; for, practically, there are but three suitable for photographic purposes from which to select. These are the Saxe and the Rives. Of the latter there are two manufactories, but between the two there is little to choose in point of quality, though one is a trifle lower in price than the other. Formerly there was a considerable difference between the characters of the Saxe and Rives paper, but of late years this difference has been less marked. Each manufacturer appears to have emulated the best qualities of the other, and so the features of the two papers have become more assimilated. Still there is a difference, and it is very much a matter of taste as to which is to be preferred. It may, however, be mentioned that the Saxe is a tougher paper when wet, and for this reason is often preferred for large sizes. Each kind is supplied of different thicknesses. That more generally used is known as "ten kilos"—equal in weight to about twenty-two pounds per ream.

The paper being decided upon, the next consideration is the chloride to be used for salting it, and its proportion. The chlorides usually employed are those of ammonium, barium, or sodium—some preferring one and some the others, and some a mixture of two or of all three. It is said that the base of the chloride used influences the colour of the print; but this, in practice, is more imaginary than real—that is, in the finished print, though there may be a difference in the colour when it is first taken from the printing-frame. However, owing to the difference in the atomic weights of the salts, the proportion used is a matter of great importance, inasmuch as ten grains of the ammonium chloride is equal in the amount of chlorine it contains to eleven grains of sodium chloride, or twenty-two of the barium salt. The salt generally employed, and the one we prefer ourselves, is the chloride of ammonium. With regard to the proportion: that must be dependent upon the strength of sensitising bath to be employed. Bear in mind that the more strongly the paper is sensitised, all things being equal, the stronger will be the resulting print; for the more reduced silver it contains the greater will be the ease with which dark tones can be obtained when required.

It has been found in practice that, as a rule, the best results are obtained, so far as the print is concerned, when, supposing the chloride of ammonium to have been used, the proportion of chloride in the albumen equals in weight one-eighth of the nitrate of silver employed in the sensitising bath. Thus, if a forty-grain bath be used, the albumen should contain five grains of chloride to each ounce; but considerably less than this, we are informed, is often employed, and there are still weaker baths than that mentioned. For a sixty-grain bath seven and a-half grains is found to be about the correct proportion. When it was customary to salt the paper as highly as ten or twelve grains to the ounce of albumen, baths of from eighty to one hundred grains' strength were in vogue.

With these preliminary notes we shall defer until next week the consideration of the practical portion of the question.

FOCUSSING-SCREENS.

In a previous article we have spoken of the twofold function of the focussing-screen as a means of securing a sharp focus, and also of seeing the composition of, and arranging, the subject to be photographed. Bearing in mind what has been said concerning the value of a compound microscope for securing a sharp focus upon a plate of plain glass, and the difficulty of doing so upon a ground-glass surface, there are certain compromises between the two that suggest themselves in addition to those of which we have already spoken.

A surface rendered granular by means of what is so well known as ground-glass varnish answers well for one purpose—namely, the examination of the subject—but not for the other. Still, this method of preparing a focussing-screen is useful when a magnifier such as that which we advocate is employed; for it is easy by means of benzole to clear off a small spot in the centre of the screen against which to place the pocket focussing tube. This is a method we have tried with complete success, the ground-glass varnish employed for the purpose having been composed according to the standard formula published at page 229 of THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for the current year. But, as we have observed, this forms a bad surface upon which to focus with any degree of refinement or certainty, because of the particular nature of the matt formed by the action of the two antagonistic solvents of the gums, benzole and ether.

When glass is coated with a thin solution of starch and allowed to become dry, a surface is secured which possesses certain advantages over all others. It possesses a very fine grain—one which, better than any other, is adapted for arresting the rays from the lens under circumstances conducive to the examination of the image either by a single powerful magnifying glass or by the compound tube. The objection to the employment of a single or simple magnifier, even if it be composed of a doublet or triplet, is this—that when used in conjunction with a plain glass focussing-screen there is a certain degree of latitude in the determination of the precise plane upon which the virtual image is projected—a latitude that does not exist when the rays are arrested by any image-receiving surface on the one hand, or, as already explained, by any polished surface on the other, when used in conjunction with a compound magnifier.

An etherial solution of wax has sometimes been recommended as a coating upon which to receive an image. In such experiments as we have made with this substance the result, although exceedingly pleasing when employed as a backing for a transparency, is not successful when used as a focussing-screen. Much better is a film of collodion modified in its physical structure by the admixture with it of an alcoholic solution of lac or the other gum resins which form the solid constituents of a good negative varnish. It is, doubtless, known to many of our readers that if collodion and negative varnish be mixed in certain proportions—the precise nature of which could not be stated unless the exact constituents of each were known—a varnish results which, when applied to a glass plate, dries with an appearance possessing singular beauty. Although both constituents are in themselves transparent, and give transparent films when used separately, yet when mixed the film given by their union is neither opaque or transparent, but it possesses a remarkably-beautiful opalescence.

This, although pleasing and useful as a backing for transparencies, is still of too purely an opalescent character to render it useful for receiving or arresting an image. It gives a surface too nearly conforming to that of opal glass to be of any utility as a focussing-screen. This also applies in some measure, although not to such an extent, to the employment of a bromo-iodised, collodionised plate which, having been immersed in a silver bath, is afterwards charged with atoms of reduced silver through the intervention of a developing solution, these silver particles being exceedingly fine. In this category, too, may fittingly be included emulsions composed of such amorphous salts as sulphate of barytes suspended in either collodion or gelatine.

We may here observe that this last-named preparation forms an admirable backing for transparencies, especially for those which are intended to be viewed through powerful magnifying glasses. The best way of forming the barium sulphate is by adding a little sulphate of soda to a solution of gelatine, and afterwards a solution of chloride of barium. If this be done well, with constant agitation, the resulting sulphate of barytes is very fine and evenly distributed throughout the entire substance of the gelatine.

If, by accident, a focussing-screen has been broken when the photographer is at a distance from any point of supply, the best substitute he can adopt is starch, which, happily, is procurable everywhere. To apply this substance to plain glass all that is requisite is to level the plate, and, having previously boiled and strained the starch, to pour it upon the glass, allowing it to remain quite level until by the evaporation of the water the film becomes hard and dry.

There are some photographers who adjust the subject to be photographed by sights placed on the top of the camera. This is an excellent system, especially when photographing at a distance from home. We have no hesitation in saying that the cameras of every traveller should have such sights affixed to them in case of accident to the ground glass.

Further: to permit of sharp focussing when such accident happens, it would be well to have provided a small but rigid strip of wood capable of being laid across the frame of the focussing-screen, and carrying in its centre a magnifier adjusted in such a manner as to enable a sharp image to be received in air when there is no ground glass at all to intercept it. This air image must, of course, be made to correspond in position with that which falls upon the surface of the sensitive plate. For such a purpose the magnifier, when once adjusted, must be rigidly fixed so as to be incapable of alteration. This will render the photographer entirely independent of the ground focussing-screen should it by accident become destroyed.

DECOMPOSED ALBUMEN: ITS EFFECTS UPON PRINTS.

WE have had shown to us some albumenised paper prints the appearance presented by which caused a complaint to be made that "the paper was defective and decomposed, having a very strong smell to start with, and before the prints were finished washing that caused them to go bad and turn a sickly-brownish green colour." This case forms such an instructive rider to our recent remarks upon the all-important question of permanency that it may be worth while to watch the passage of a print through all its stages to see where faults could arise, and to understand their cause.

We naturally turn first to the examination of the albumenised paper, with regard to which it is a common experience that the market is nowadays flooded with foul-smelling samples, whose very presence in a room is in the highest degree obnoxious. It is matter of surprise to us that the printers who employ it do not suffer in health, the odour of even a spacious and well-ventilated room where it is employed in quantity being most offensive to the olfactory nerves, and, it might be thought, productive of certain injury to those who were long subjected to its effects. The cause of this smell may be traced to the combined influence of cheap prices and that demand for a highly-glazed surface in the production of which manufacturers are continually endeavouring to excel each other. In the first place, other than egg albumen is employed; and, in the next, when such albumen is used it is allowed to become putrid, in order to permit of its more easy flow.

When albumenised paper first came to be employed a very slight gloss only was given, and such samples as are now to be seen were then unknown; but, as the demand for portraiture grew, it was quickly discovered that greater richness was given the greater the amount of surface gloss. Foul-smelling paper was at that time unknown; but the difficulties of getting a brilliant surface were so great that, when it was discovered that by keeping the albumen till putridity was developed it became much more limpid, and the paper in consequence more readily coated, this method of treating the albumen became very common, though there were many honourable exceptions in a trade which, even at that early date, had already begun to assume large proportions. The paper, however, coated by egg albumen that had undergone partial decomposition did not possess the extreme offensiveness common to so many kinds at the present day. When coated and dried it was certainly mal-odorous as compared with that made with fresh albumen, which, practically, was without smell at all; but the odour was very different in character, and not nearly so powerful nor so nauseous.

This increased offensiveness we believe to be owing to the employment of blood albumen—which is apparently similar in composition to egg albumen, and is now produced in very large quantities—but it is difficult to purify, and we should have a decided prejudice against its employment. It is, however, cheaper, so that a highly-glazed paper can be sent into the market at a price which would render competition almost impossible with paper coated in an orthodox manner and with pure fresh egg albumen. A paper put upon the market many years ago—which was readily distinguishable by its smell, but which had by no means a particularly bright surface—

was one of the earliest samples we have seen of impure papers. It was one of the easiest to tone, and, further, gave a very rich colour; it also worked pleasantly and easily all through.

It is evident, now, that more causes than one contribute to create the smell of the offensive class of paper, and the only question to consider is—Which, if any, causes, or is likely to cause, fading? Nitrate of silver is so readily reduced by many organic compounds that if its decomposition took place upon the paper by reason of their presence in any form, volatile or fixed, we might have a legitimate expectation of seeing visible witness of their existence by staining of the paper; and from the absence of such stain the inference might be fairly drawn that compounds capable of decomposing the silver were also absent. It goes without saying that some of these objectionable papers are quite capable of holding their own against those of undoubted purity when the question of purity of whites is concerned.

There is, however, one constituent of albumen, namely, sulphur, which all photographers have been taught to look upon with suspicion, and it is this element which predominates in the gas given off by decomposing albumen. But it is also to be remembered that the sulphur exists in the albumen before it decomposes, and it is a fair question to ask—What grounds exist for supposing the sulphur, when separated into what must unquestionably be a simpler form of combination—the unpleasant smelling gas—to be more liable to decompose silver compounds than in its first state, when it is combined with other elements to form egg albumen? Logical deduction really would point to an exactly opposite conclusion, namely, that the more simple compound would be the less easily decomposed, and we all know how readily sulphur can be separated from egg albumen. The appearance of a silver spoon which has been used with a boiled egg is convincing proof.

It is highly probable that whenever albumenised paper is silvered, however pure may have the albumen employed, a sulphur compound is formed; and, indeed, Mr. John Spiller showed years ago that unless ammonia were used with the hypo. there always remained silver in the purest-looking whites of every fixed print.

All argument, therefore, goes to show that the employment of decomposed albumen is not more likely to produce fading in albumenised paper prints than is pure albumen. Experience, again, is here the best, and indeed the only, guide; for almost any result might be predicted from purely chemical arguments founded solely upon supposition.

The subject is important, and all data that can be collected must be of great service. As a matter of fact we possess photographs taken a score of years ago which, though we know them to have been printed upon foul-smelling paper, are equal to any in our collection in richness of tone and absence of signs of fading—saving only at their edges, where the air has had access to them.

The question is one peculiarly suited to our readers generally. We bring it before them, pressing it strongly upon their attention; and we invite them to contribute their experience with the two kinds of paper (pure and impure), to enable a fair judgment to be formed from facts rather than from fancy.

As will be seen from Professor Stebbing's communication, a fund is being raised in France for the purpose of erecting a monument to the memory of Poitevin, to whose discoveries photographers owe so much. We trust England will not be behindhand in subscribing to so deserving a fund. We shall be happy to receive and acknowledge any sums sent for the purpose.

Professor Dewar, in his lecture at the Royal Institution on *Flame and Oxidation*, exhibited a very curious experiment. The oxidising powers of permanganate of potash and of peroxide of hydrogen are well known to our readers; yet, notwithstanding this, Professor Dewar showed by experiment that the permanganate was oxidised by the peroxide.

The value of photographic evidence is very pointedly shown in the current number of the *Engineer*. Some very important artillery experiments have recently been made at Amager, near Copenhagen to test the projectile-resisting power of armour plates of various makes, and the journal we name gave a series of sketches of the plates after the impact of the shot. These pictures were objected to on the ground of inaccuracy, as also have other illustrations by another journal, and, in consequence, engravings of the official photographs have been given in their place. Both sets of sketches differ from the photographs—most conclusive evidence of the true mode of giving pictorial scientific evidence.

Anyone examining the *Illustrated London News* for the 1st instant will find in one of the pictures what forms a very ironical commentary upon our remarks as to the usefulness of photography for ensuring the truthful depicting of interesting scenes. We must make all allowance for artistic licence and the necessity for picturesqueness and soforth, but, really, even when that is all done, it is difficult to keep our risible muscles under control in examining what we presume to be meant as a serious picture—*The Convicts at Work at Portland.* To the immediate left in the foreground may be seen two convicts—certainly by no means of herculean proportions—toying with a square block of stone, which they appear to be jauntily moving out of the way of an approaching police officer, the said stone, from its size, weighing no doubt thirty or forty hundredweight. In the centre of the picture we have a somewhat similar block being hauled and pushed along the ground, by ropes, by half-a-dozen or so of these unwillingly-industrious workers. Can it be doubted that a photographic reproduction of such a scene would be of more interest than drolleries of this kind?

In Roscoe and Schorlemmer's great work on chemistry, which continues slowly to appear, there occurs a reference to cellulose, which may be alluded to by us as a reminder of one of the dangers of stored gun-cotton—applicable also, though in a less degree, to pyroxyline. Referring to the great explosion of gun-cotton at Stowmarket in 1871, which was shown to have been caused by the presence of acid in the stock of gun-cotton, these gentlemen say it was caused either by insufficient washing or to the felonious addition of acid. The coroner's jury sitting at the time found that the acid had been maliciously added; but, in any case, the warning to photographers to thoroughly wash their pyroxyline is equally strong.

There is an interesting reference to solar photography in one of the papers by Dr. Joule, which have recently been published in a collected form. He infers that the circumference of the sun's disc gives out a very feeble radiation compared with that from the central part, as measured by its photographic action upon a collodion plate.

We suppose a wholesale annexation of our articles is the penalty we have to pay for a widespread popularity and large circulation; but we do think that when our contents are appropriated a correct acknowledgment should be made. A few weeks ago we published the result of a long series of experiments we had been making upon the power of sulphite of soda as a developer. They are dismissed in about half-a-dozen lines by the editor of a little monthly series of jottings as being the process of a gentleman whose experience with our suggestions was published in a letter to these columns. Annexers, kindly take note!

A statement which, if founded upon actual fact, contains information that might be of great usefulness to photographers was published a little while ago in an American technical journal. The writer avers that if a very thin coating of glycerine be applied to a glass surface it will entirely prevent any moisture settling—meaning, of course, the condensation of aqueous vapour in the form of small globules, similar to the well-known effect produced by breathing upon a plate of glass. As an example of the potency of the plan, he goes on to say that "if used on a looking-glass you can shave yourself in an ice-house and the glass will not show your breath. * * * In fact, it can be used anywhere to prevent moisture forming on anything. It does not injure the usefulness of field glasses, &c. * * * I first saw this used on a steam-gauge glass on a Sound steamer where the gauge leaked inside." It is not a difficult matter to put to the test, and it is obvious that the plan would possess a wide sphere of usefulness. In such experiments, for example, as photographing the laryngeal chords, described by us a few months ago, it would materially facilitate the employment of the necessary mirrors. Indeed, the many uses that could be made of such a convenience will at once present themselves to our readers. That even in very thin films it should have no effect upon a lens must, however, be received with some little doubt.

Mr. E. C. C. Stamford read a paper before the Society of Arts which was full of details most interesting to photographers. The communication was *Upon the Economic Applications of Seaweed;* and the writer dwelt very fully upon the extraction of iodine and bromine, which, as many of our readers are aware, used at one time to be extracted wholly from "kelp," the name given to burnt seaweed—formerly the chief source of the carbonate of soda used in this country. Chloride of potassium was obtained from one variety—that richest in iodine—and was worth twenty-five pounds per ton. Immense alkaline deposits were discovered on the continent, and the chloride became so plentiful that it dropped quickly to a third of this price. Bromine was then discovered (also in the deposit), and in such quantity that, instead of being able to fetch thirty-eight shillings per pound in the market, it gradually dropped to fifteen pence—its present market price. Iodine is extracted largely now from the caliche of Peru, so that "kelp" is no longer used, either for bromine or iodine extraction, though Mr. Stamford has introduced such improvements that it may be worth while if his suggestions should be carried out to recommence such extraction. Iodine itself has kept a fair average price, twelve shillings being now obtainable, the highest decimal average having being fifteen shillings and elevenpence.

Of course everyone knows that the sea contains vast quantities of dissolved silver, though no one has yet been able to extract it in paying quantities. Similarly, it contains iodine and bromine. The quantities found by Mr. Stamford were of iodine not more than one part in two hundred and eighty millions, but of bromine there existed one part in sixteen thousand. It might be thought, from analogy with the continental potassium deposits, that our English salt mines might contain bromine, but such is not the case. The Cheshire mines have been subjected to a careful examination without any success. At the present low price of bromine, however—which (except through occasional speculative purchases) is not likely to be increased—there need not be much disappointment. Bromides are quite as cheap as is necessary for photographic purposes.

HOW TO MAKE AN IODIDE EMULSION.

An inquiry in our correspondence column points out a difficulty which has been experienced by a large number of emulsion experimentalists, namely, the granular formation of the iodide of silver. The granulary of silver iodide differs so much from that induced by boiling, or other means in the case of bromide, that, instead of remaining in the emulsion to impart coarseness to the resulting film, it is either precipitated or removed in the course of filtration. It thus happens that, by some methods of emulsification, it is quite possible that no iodide whatever may be present in the finished film, though a liberal proportion may have been employed in the formula.

Owing, therefore, to the readiness with which the iodide assumes the granular form, it is important in emulsifying or mixing to use every endeavour to counteract this tendency. But as the means adopted for that purpose are, as a rule, identical with those which conduce to the production of a slow emulsion, or which require a considerable prolongation of the period of cooking, it is plain that in making a mixed emulsion we are scarcely at liberty to do as we please in connection with the iodide.

Under such circumstances—*i.e.*, when a bromo-iodised emulsion is to be made—perhaps the best plan is to add the silver, slightly acidified, to the concentrated gelatine first of all; to that the soluble iodide is next added (and this may, with advantage, be mixed with a separate portion of the gelatine), and, finally, the bromide is stirred in. By this method the iodide of silver is formed in the presence of a large excess of silver nitrate and also in a concentrated solution of gelatine; the solvent action of the nitrate of silver materially aids in imparting fineness, as does also the thick gelatine, and if the bromide be subsequently added gradually the iodide retains its fineness to the end of the operation.

Another plan, where the proportion of iodide is not large, is to precipitate it separately from aqueous solutions, and, after washing, to dissolve it in the concentrated silver solution, to be added to the bromised gelatine. Here, as the silver nitrate is gradually decomposed, the solvent power of the solution gradually decreases, and the iodide is precipitated in a fine state of division.

The method of forming a fine bromide, and, subsequently, by the addition of a soluble iodide, converting a portion into silver iodide, does not—at least, in solutions poor in gelatine—have the desired effect, as the particles of iodide are as likely to be coarse as not.

Where a plain iodide emulsion is in question the matter is to a great extent simplified. There is no necessity to "cook" the iodide for the sake of sensitiveness, as it is doubtful whether any such treatment is productive of effect except physically. We can, therefore, mix in the presence of the full quantity of gelatine, and, indeed, the solution of that may be concentrated, if desired, so as to render the mixture as viscid as possible, and so prevent the formation of coarse iodide. It is surprising, however, even under these conditions, how large a quantity of granular matter will be found left upon the filter.

In order to produce the most perfect fineness it is possible to obtain we have frequently proceeded as follows:—Weigh out the necessary quantity of silver nitrate, say 100 grains, to make five ounces of emulsion, and dissolve it in (say) two ounces of water, to which add fifty grains of gelatine and two minims of nitric acid. In another two ounces of water dissolve fifty grains of gelatine and forty grains of *chloride* of sodium. When dissolved mix the two solutions, stir carefully and keep in a warm place for an hour, then allow to set. We have now an emulsion of chloride of silver which, as is well known, forms in an extremely-fine state of division—so fine, indeed, as to form perfectly transparent films even when a large proportion of the chloride is present. An interesting illustration of this consists in taking an ordinary transparent gelatino-chloride film and dropping upon it a drop of a ten-grain solution of bromide or, better, iodide of potassium; the result will be the conversion of the transparent chloride of silver into more or less opaque bromide or iodide, while as the particles are held in the solid film they can scarcely undergo much coarsening.

This is precisely the line upon which we next proceed with our chloride emulsion. Having permitted it to set in a beaker or other convenient vessel we pour upon it a solution composed of iodide of potassium, one hundred and twenty grains dissolved in two ounces of water. The conversion of the chloride into iodide will proceed slowly from the upper portion of the mass, until at the end of a few hours it will have penetrated completely through it All that now remains is to break up the emulsion and wash it in the ordinary manner.

A quicker and perhaps more satisfactory method is to break up the chloride emulsion into the solution of iodide, when the conversion proceeds with great rapidity, and the washing completes the operation.

The result is in either case an emulsion of the most exquisite fineness, but it will be found that if kept liquid for any length of time the iodide subsides and conglomerates into coarse particles. It is, therefore, desirable to preserve the emulsion under alcohol or in the dry state until required for mixing with a larger bulk of gelatino-bromide, when in its more dilute form the iodide shows less tendency to agglomerate or become coarse.

As the efficacy of the iodide depends solely upon the fineness of its division the value of this method will be recognised. It may seem a somewhat roundabout way of arriving at the result, but when the ease with which an exquisitely-fine chloride emulsion can be made is taken into consideration, as well as the simplicity and certainty of the subsequent operations, it will be found to be a real gain.

ON A MODIFIED FORM OF TRIPOD.

The photographic tripod stands, as now commonly employed, answer well for general purposes; but there are many special cases where none quite fulfil the conditions required. Those with fixed heads are all right for working upon firm and moderately-even ground; but to level the camera upon one on beach or loose and uneven soil is no easy matter, and takes up much time. The adjustable head is an improvement upon these; but still there is waste of valuable time in levelling the camera, for very few photographers avail themselves of the circular level to assist their judgment and ensure accuracy in this particular. How great a proportion of architectural photographs are spoiled by distortion from this cause alone, the lens often being blamed for defects of this character entirely attributable to slight tilting! The ball and socket, as hitherto constructed, labours under the same disadvantage. Not any of the above are suitable for photographing from boats or any swaying platform, because the rigidity of the tripod head makes the camera a fixture to the boat, and causes its point of sight to be changed skywards or waterwards as the boat pitches and rolls.

The modification of the tripod or addition to the ball and socket (whichever you like) I wish to bring to notice will be without these defects, the portion of head bearing the camera either swinging free of the other portions or being made rigid at will. It consists in drilling an inch hole through the triangular piece (about two inches thick) to which the legs are fastened, and, further, in turning out the top of the hole into a semispherical hollow about two inches in diameter, and in slightly coning out the hole on the other side of the piece. This is the seat for the ball. A cap of metal, with a cavity of like dimensions and drilled with an aperture of an inch and a-half or more, to be strongly but loosely hinged to one side of the first-named hollow and a set screw on the other, secures and binds the ball. This completes the socket, which is in all respects similar to others, excepting that it has a larger opening underneath.

The ball of wood or metal to fit the socket is turned upon a rod which projects to the extent of fifteen or eighteen inches, with a thickness of from five-eighths to three-quarters of an inch on one side of the ball and about three inches on the other, but conical from the ball outwards to give strength and substance for framing it securely to the board which is to bear the camera. The ball is then placed in the socket by passing the long end through the hole, the cap is placed over, hinged, and the binding screw fixed. The lower end of the rod being furnished with a hook, an india-rubber door spring, with string and loop, completes the tripod.

Its use is as follows:—When set up the foot is placed in the loop and the binding-screw released, and the camera is immediately drawn level and clamped. If used on shipboard a weight is hung upon the hook and the binding-screw unfastened. The head is then free to accommodate itself to the motion of the ship by retaining its level in all circumstances of pitching, tossing, and rolling, to which the platform supporting the tripod is subject.

For ordinary use the camera case would be sufficient to keep it steady, and one might always rely on the instrument being level. The head may be made in metal or wood—if the former, cast hollow, and all superfluous portions removed to keep down weight.

John Harmer.

OBSERVATIONS UPON FADING.

[A communication to the Photographic Society of Great Britain.]

So much has been said and written upon this subject that it might be thought almost superfluous to attempt to throw new light upon such a worn-out topic; but the supreme importance of the matter, coupled with the fact that discussion has been re-opened by the reading of a paper on *Old Photographs*, by Mr. E. Dunmore, at the March meeting of the South London Photographic Society, must be my justification for once more returning to the subject.

The conditions of permanence are tolerably well understood by photographers, and, so far as regards silver prints, much more care is taken at every stage of their production than was formerly the case. By the liberal use of fresh hyposulphite, and subsequent removal of the excess of fixing salt by very thorough washing in water; the employment of alkaline, or, at least, well neutralised gold toning baths; silver sensitising bath, not too weak; negatives not too thin—all are points to which attention must be paid, and, so far as my inquiries lead, are now generally observed.

The photographer, having done his best, is now unhappily at the mercy of the paper-maker, for he must needs mount his pictures in some sort of presentable form, and these perchance will find their way into portfolios or albums. What, now, if after all the operator's care and trouble in the exclusion of every trace of hyposulphite from his finished print, he proceeds to mount it upon a cardboard impregnated with this very substance? Or if, careful himself about the card mount, his client thrusts it through the grooves of a mass of paper stuff in the shape of a common album, or puts it behind a heavy "cut mount" of doubtful constitution, with a view to its better preservation!

Sixteen years ago I pointed attention to the *Occurrence of Hyposulphites in Mounting Cards*, in an article written for the *Photographic News*, which this Society did me the honour to reproduce in the *Photographic Journal* for May, 1868 (vol. xiii., p. 54). It was there shown that cardboard was seldom or never free from hyposulphite, and a mild appeal was made to paper manufacturers to abstain from using this salt as "antichlor." Now that the subject of fading is again to the front it seemed to me desirable to re-open this old question, and I have been testing cards and mounts and making a heap of inquiries of the paper-makers. My report, briefly stated, is as follows:—Hyposulphite still to be found in cards of recent make, and the practice of using this salt as antichlor generally admitted by the English paper-makers.

Without mentioning names I may say that the testimony is most conclusive as to its continued use; but I am not without hope that experiments now being tried on the large scale, on improved methods of manufacturing paper-pulp from wood, &c., by the bisulphite of magnesia process, will result in the introduction of a new system likely to be of considerable benefit to our craft. If this should succeed—and I hear favourable reports from several quarters—a revolution of manufacture will be brought about, and henceforth no antichlor will be necessary. At the recent *soirée* of the Chemical Society (April 24th) Messrs. Cross and Bevan exhibited some samples of Ekmann's new paper-stuff, made by the disintegration of wood under great pressure and boiling with the bisulphite solution, and these specimens certainly looked like the right article. On the same occasion Messrs. A. Boake and Co., of Stratford, exhibited a large series of sulphites and bisulphites, as used by paper manufacturers. I am told that Ekmann's pulp can be mixed with an equal quantity of white rag pulp to make the finest paper, and that there is no necessity to employ hyposulphite. If this experience be confirmed we are out of our difficulties. On the other hand, we know there has been of late a demand for extra-thick mounting boards, which could only be supplied at a low or moderate cost by the use of very inferior materials, faced and backed with a better quality of paper. This, of course, offers no guarantee of permanence to the photographer, and the black or highly-coloured tablets are often the worst of all.

Tracing the history of this "antichlor" proceeding I find, on reference to the English patents, that in the year 1852 (November 26th), Thomas Ainsley Cook filed a petition for "Improvements in Bleaching," described as follows: — "In all bleaching operations where chlorine is employed it becomes necessary to take up or neutralise any chlorine that may be in excess. Now, my invention consists in the use of any of the following salts:—Hyposulphite of lime, of soda, of ammonia, of potash, of magnesia, or of alumina, which I apply to the goods after being treated with chlorine, when the hyposulphite used will neutralise any excess of chlorine that may remain in the material bleached."

Eighteen months later (May 9th, 1854) Eben Norton Horsford took out a patent, No. 1,038, for the "Removal of Chlorine from Substances and Fabrics." This invention "consists in neutralising chlorine by means of the substance called 'antichloride of lime,' which may be prepared by passing the fumes of burning sulphur into milk of lime, contained in a suitable vessel provided with agitators. The antichloride of lime, being collected on filters, may be dried and preserved for use. It may be applied by adding a small quantity directly to the pulp engine; or fabrics out of the 'chemic' may be passed through water slightly acidulated, containing in suspension a little of the antichloride."

Here, then, it will be seen that sulphurous acid was proposed to be used instead of the hyposulphite. On tracing back, however, to the earliest mention of the use of sulphites in paper-making I find a prior claim in favour of John Donkin (October 15th, 1846, No. 11,417); and, as I shall presently show, it is a true misfortune for us that at this early date the manufacture of bisulphite of soda was not sufficiently perfected to allow of its general use as an antichlor, or we should have been spared many of our troubles during the last thirty years. The specification runs thus:—"Improvements in the Manufacture of Paper, or in the Machinery Employed Therein, and in the Process of Bleaching Paper, Linen, and Other Manufactures in which Chloride of Lime is Employed." By disclaimer (dated March 22nd, 1847) the title of this patent is altered to "Improvements in the Manufacture of Paper, and in the Process of Bleaching Linen and Other Manufactures in which Chloride of Lime is Employed." This invention consists in "the application of bisulphite of soda in solution to paper, pulp, linen, and other articles or materials which have been bleached by means of chloride of lime, so as to decompose and get rid of the chloride of lime which may be remaining mixed therewith or attached thereto." In practice the patentee has found that "about a pound of the saturated solution of bisulphite of soda is sufficient for decomposing the chloride of lime in the pulp obtained from a hundredweight of rags, when the pulp has been well drained or pressed."

By all means let the paper-stuff be well washed from the bleaching lime and other salts subsequently applied as antichlor; but, in order to determine by actual experiment the relative effects of sodium sulphite and hyposulphite if left inadvertently by the paper-maker, I took two photographs (silver prints), cut them in halves, and submitted them for equal periods of time to the action of these two solutions. The results (exhibited) show that sulphite of soda has no appreciable effect in forty-eight hours, whilst the other portions of the prints immersed in the hyposulphite are considerably bleached, or, as we should say, badly faded.

These striking differences are borne out again by another experiment which I then made. Clean a few sixpences or small silver coins, put them into sulphite of soda solution, weak or strong, hot or cold, and leave them there for an hour. Pour off the top liquid, and test for silver by adding a drop of sulphide of ammonium. No trace will be found dissolved. Now try a similar experiment with the hyposulphite using the same coins, and we shall soon find very distinct evidence of silver in the solution, showing that the metal has been attacked and dissolved by the combined action of air and hyposulphite, forming the well-known double salt of sweet taste.

With these facts before us, the fading of a silver photograph becomes perfectly intelligible, and the necessity for thorough washing and careful exclusion of hyposulphite from the finished print becomes at once apparent. I have described these results somewhat at length, because they furnish an answer to Mr. Dunmore's extraordinary statement that "fresh hyposulphite, even as strong as a twenty-per-cent. solution, applied to and left in the prints and dried in the usual way, has no effect whatever on their permanence."*

Forced to indicate the cause of fading, the last-named author attributes the deleterious effects, wherever it arises from the mounts, to the presence of chlorine (excess of bleach) rather than to the hyposulphite. I have looked into this question also, and certainly find soluble chlorides in the cheaper sorts of cardboard, with plenty of sulphates and all kinds of mineral rubbish, but never met with *free chlorine* in the finished mounts. It would most likely be absorbed by the sizing, if traces only were left in the pulp.

Now, in the event of the paper-makers accepting the suggestion to use sulphite instead of hyposulphite, how would this affect the iodide of starch test, upon which we have been accustomed to rely for the detection of the last-named ingredient? It is known that sulphite of soda will also quickly discharge the blue colour of the starch compound. Thus far no difference. But we have a ready method of distinguishing between them, for the sulphite instantly discharges the colour of weak magenta, whilst the hyposulphite has no such action. This, then, ought to be the paper-maker's guide as to the quantity he should add to the bleached pulp — so much as will neutralise the chlorine and yet not discharge the colour of highly-diluted magenta. Messrs. Giles and Shearer have gone fully into the testing of sulphites in a recent communication to the Society of Chemical Industry, which was printed in their last month's *Journal*. They worked upon some very pure samples of crystallised sulphite of soda made by Messrs. A. Boake and Co., on a large manufacturing scale, which tested over ninety-nine per cent. This proves that high qualities are now procurable, which was not the case when Donkin took out his patent.

Mr. Valentine Blanchard, in speaking of "The Finished Photograph,"† says:—"In a conversation with Mr. England some little time ago on this subject (fading) we confirmed each other's experience that prints mounted on a lithographic tint were more permanent than prints on the ordinary board. The reason for this is not difficult to find. The thin layer of greasy ink keeps the photograph from contact with any deleterious matter in the board, and that such matter exists in a great many samples of pasteboards is only too well known to most of us."

The selection of tinted mounts in preference to pure white is always to be recommended, for then the paper-stuff need not be so highly bleached, and a further precaution is the final application to the photograph of an encaustic paste, which, by diminishing the hygroscopic qualities, helps to shut out the influence of moisture, always so detrimental to the permanence of a photograph exposed in our variable climate.

I have only to add that Dr. Hugo Müller informs me that in South Germany the makers have entirely given up the use of hyposulphite, and he says the same of North Britain. From another source I learn that the paper-makers of Angoulême tried to do without it a few years ago, but have gone back to the old practice. Perhaps now the reduced cost will again offer encouragement to the use of sulphites; if so, the photographic community will be well content to hear that a fertile cause of fading has been banished for ever. JOHN SPILLER, F.C.S.

FOREIGN NOTES AND NEWS.

PROFESSOR H. W. VOGEL IN MOLL'S *NOTIZEN* ON THE INTENSIFICATION OF GELATINE PLATES.

IN Moll's *Notizen* Professor H. W. Vogel, writing regarding the intensification of gelatine plates, says that when gelatine plates first came into use many people thought that any intensifier that was suitable for collodion plates would do for gelatine plates; but they soon discovered their mistake, and at length found themselves almost limited to mercury. Mercury worked admirably, but, alas! for a plate intensified with it when one wanted to use it after it had been lying by for some time! Dry-plate makers now endeavour to make their plates so that they shall not require to be intensified; but for all that it occasionally happens in dark weather that the portraitist has to intensify, and it frequently occurs that the landscape photographer finds his negatives print too flat, and therefore urgently requires a reliable intensifier. For a long time it was not understood why so many kinds of development did not succeed with gelatine plates, but it is now known that the gelatine itself is affected by many of the chemicals used, while collodion is a perfectly indifferent substance:—

"Dr. Eder has just recognised that not only red prussiate of potash, but also uranium salts, have a tanning action upon gelatine they harden the film and at the same time obstruct the passage into the interior. It is therefore, explicable that the uranium intensifier, which has such an excellent effect upon collodion plates, containing as it does a mixture of both the tanning materials, should have but a bad effect upon gelatine plates. For the same reason it is difficult to do anything satisfactory with lead intensification with which red prussiate of potash is used. Chloride of iron, which can be used on collodion plates like chloride of mercury, has also a tanning action upon gelatine, and therefore acts as its own prohibition. Permanganic acid is reduced by the gelatine film, and the latter also becomes coloured by it at places where it should have remained transparent. Lastly: iodine applied in solution to the gelatine film is retained so obstinately by the latter that the brown colour produced by it can only be removed after long-continued washing, and consequently it seems impossible to seize the right instant for breaking off the intensification. It is also difficult to do anything with the ordinary silver intensifier. The reason here lies less in the slightly-tanning action of the pyrogallic acid than in the difficulty with which it penetrates the gelatine film. In five minutes a collodion plate is washed and finished; a gelatine plate requires at least half-an-hour—a proof of how difficult it is for the chemicals to go out of the latter. They have equal difficulty in penetrating it, and that is so much the worse in that the chemically-developed gelatine picture lies much more within the film than the physically-developed collodion picture. The fact is that in the case of physical development the silver is precipitated much more on the surface, and consequently remains much more accessible to chemicals, and therefore to intensification. This circumstance alone greatly facilitates the intensification of collodion plates.

"From the foregoing it is clear that for the intensification of gelatine plates those chemicals are most suitable, firstly, which exert no influence upon the gelatine itself, and, secondly, those that penetrate the film and are most easily removed again. So far as our present knowledge extends, the mercuric salts of silver fulfil these conditions best. Now, these are recommended in the most various modifications. I may here mention the chloride of mercury and ammonia intensifier; Edwards's intensifier, chloride of mercury with iodide of potassium and hyposulphite of soda; and Eder's intensifier, chloride of mercury with iodide and cyanide of potassium. The last-mentioned intensifier works very well, only the cyanide of potassium solution soon decomposes. More cyanide of potassium must then be added to freshen it up. The carbonate of soda formed by its decomposition has a dissolving-off (loosening of the film) action upon many gelatine films. Edwards's developer keeps better; but, as Eder has shown, it soon eventually decomposes with formation of mercuric sulphide. With regard to the ease with which these three intensifiers can be washed out of gelatine films we have no experiments before us; but I know some experienced, practical men who complain that in time negatives treated with Edwards's developer become yellow, while those intensified with mercury chloride and ammonia do not. That speaks in favour of the latter intensifier, and I can only agree with it. It is, however, the fact that negatives intensified by it have not proved durable; here the imperfect washing bears the blame. It is urgently necessary that plates should be thoroughly washed immediately before being treated with mercuric salts in order to remove every trace of hyposulphite of soda, and then (though this is often neglected) again *after* the treatment with chloride of mercury, with dilute ammonia, which turns the plate brown, for at least half-an-hour, in order to remove every trace of the mercuric salt; after that a short washing suffices. If one proceed in this manner he will not have to complain of spoilt negatives."

EXPERIENCES ON THE THAMES.*

WE made up our minds to keep to a certain number of good resolutions before starting. One was that we would always be out at 5 a.m., our photographic friends strongly advising that course. This was, like the rest, "more honoured in the breach than in the observance;" for it was 8 a.m. before we found ourselves in the hotel coffee-room, and nearly 9 a.m. before we had made a move towards the river. It was still windy and rough, and, worst of all, a head wind. Between 10 and 11 a.m. we took an affectionate farewell of Salter's *employés* and made our final start, one of us taking the sculls as before.

We had proceeded in this comfortable fashion for half-an-hour or so, getting farewell "shots" at the university barges and Oxford, when "one of us"—not the coxswain—suggested the advisability of a change of programme as regarded progression, and that it might be as well, now we were out of sight of Salter's people, to try towing. This we did; but the coxswain, at our next halt, thought it highly undignified to begin towing so soon, and suggested that we should take an oar apiece. To this we both agreed. Unfortunately, under these new conditions our lugger would not go straight, but always had a tendency towards one bank. This caused some chaffing, and "one of us" (the culprit) put forth a gigantic effort to alter this state of things. It was at the same time a bold and irresistible effort, and the result was that before we knew where we were or could slacken speed we had charged full tilt into the trunk of a large old willow at the bank. It nearly upset us and "shivered our timbers" from stem to stern. A further result was to cause the Philosopher, who was too deeply absorbed with his philosophic calculations to notice such a trivial occurrence, to place his feet where his head should have been, and *vice versâ*, and on sufficient recovery of self-possession to exclaim—"What is it?" Luckily no one saw our *contretemps*, so that we made our investigation in private. We found the tree had suffered more than ourselves. Our lugger had happily not sprung a leak; our baggage only was scattered in all direc-

* *Photographic News*, March 14th, p. 140.

† *Year-Book of Photography*, 1884, p. 77.

* Continued from page 363.

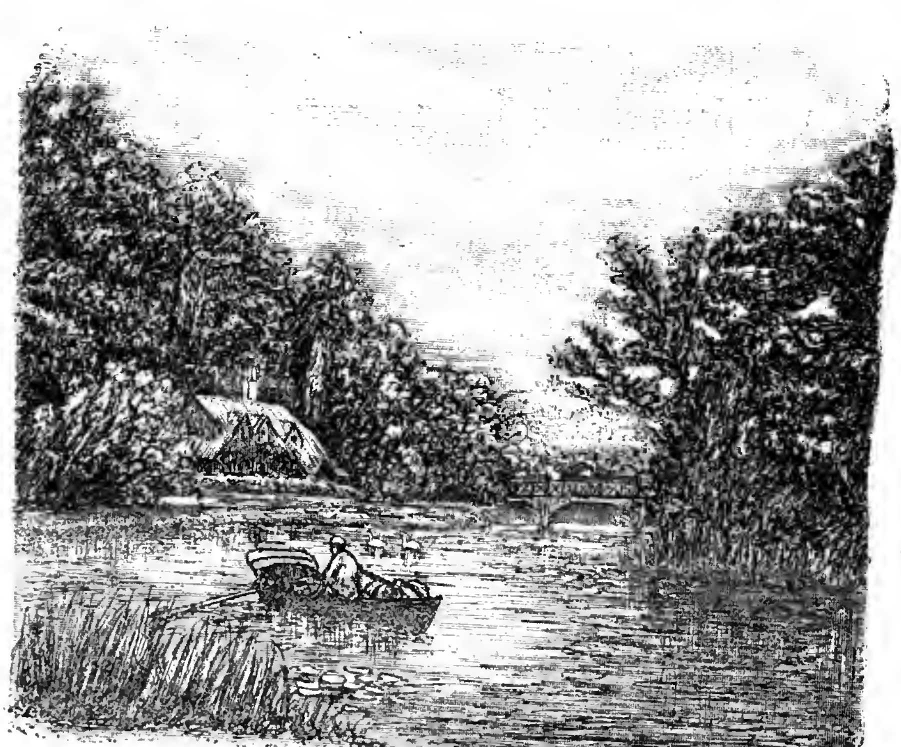
tions, and our nerves somewhat shaken. The tree had fared badly, for we had rammed a big hole and carried away at least a square foot of bark as a trophy. We held a council, and decided to try ramming no more.

Another short pull brought us to Iffley, where we passed through our first lock—a fall of some four or five feet. At Iffley we had a "shot" at the church—a very ancient Anglo-Norman structure supposed to have existed prior to the twelfth century. This is by no means one of the prettiest along the river, and we failed to get a good near view. Iffley Lock absorbed another plate or two, and then we came just below the lock to Iffley Mill—a very ancient and really picturesque "bit;" and, as it was the first we had come to, it was duly appreciated and we tried to do justice to it. The third illustration is one of the views we obtained.

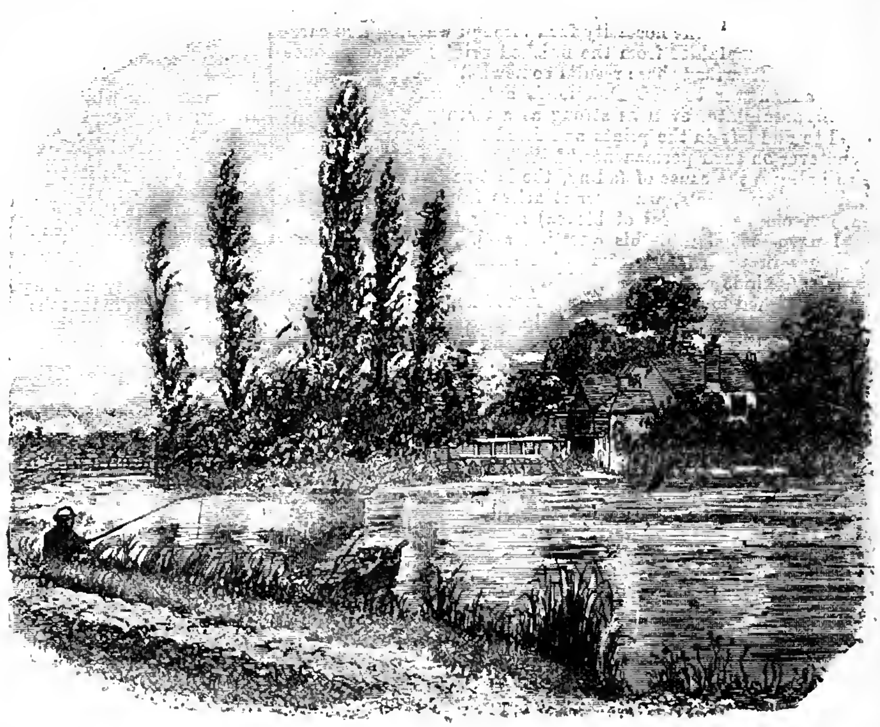
Rarely did we find such a variety of interest for the camera as between Oxford and Iffley. We now each took an oar and were proceeding fairly satisfactorily and cautiously, when suddenly the Philosopher stopped rowing. In alarm I asked him what was the matter. His face had visibly elongated, and in measured tones he replied—"Why! do you know the force required to propel our man o' war (this was the last name it had acquired) increases as the square of the resistance; so that, for instance, the force required to drive her three miles an hour—supposing that feat possible—is just nine times that required to drive her one mile an hour?" I confessed the question had not occurred to me, and that it was very serious. The only remedy was to go back to Oxford and change our "three-decker." This we decided not to do.

Resuming our voyage in a rather disconsolate mood, our next point of attraction was Sanford Lock—an example of one of the many picturesque combinations of lock, weir, and mill. Here we exposed a couple or so of plates and obtained satisfactory results, to which our decoy ducks added some effect.

From Sandford the river increases in picturesqueness until we reach a climax of beauty at Nuneham Courtney. This, the seat of the Har-



court family, is the subject of our illustration, and is certainly one of the finest and prettiest spots on the Thames. The park is well timbered and covers something like 1,200 acres. The magnificent trees hang luxuriantly over the river, and form a perfect wealth of foliage piled on the rising banks. The whole property was purchased for only £17,000 by the first Earl of Harcourt. Those pretty rustic cottages we see in the illustration have been erected for the convenience of picnic parties; for Nuneham Courtney has long been a favourite holiday resort for Oxford students and citizens, and all the summer through



pleasure-seekers leave Oxford for a day amid the shade of those umbrageous woods, or within those cottages erected solely for public accommodation by the Earl.

Our first "shots" were in the evening, just after sundown. Thinking there was little light we gave twenty seconds' exposure, but on developing at our hotel later on in the evening we found we had hopelessly over-exposed, the probability being that two seconds, or less, would have been sufficient. A further pull brought us to Abingdon, where we stayed the night and became acquainted with our error of judgment, thus showing the value of being able to develope *en route*.

Next morning, instead of progressing, we made a retrograde movement in the direction of Nuneham. This time we obtained good results, in which our boat and accessories (the ducks, &c.) were turned to useful account. On our return from Nuneham, the Philosopher suggested he should take both sculls. As I had certainly no objection to doing a little *dolce far niente* at the stern of the vessel I willingly accepted the offer. The Philosopher intended to do a little "show off" this time, but before he had made twenty strokes there was a sudden elevation of his feet with an opposite depression of his head in the direction of the bottom of the river. Curiously enough he had previously remarked—"How nice it would be to have a dive in the cool, limpid water!" When the Philosopher became sufficiently acquainted with the state of things at the bottom of the boat he quietly suggested—"This is very much like catching a crab." I remarked it was the finest species of the crab genus I had ever seen. Again we were thankful; there had been no "spill."

The first pretty view of Abingdon we obtained on our return was a general one which embraced the church steeple, bridge, and sweep of the river. Further interesting views of Abingdon we also secured at the other side of the bridge. Abingdon is a pretty old town and used to be a place of considerable importance, and many stirring events of English history have been enacted there. Today it is quiet, dull, and clean, like many another town whose small manufacturing industry has long since departed, leaving it solely dependent on agricultural interests. It is narrated by easy-going chroniclers that the Mercian Kings used to reside at Abingdon; and as early as 686 a monastery to the Virgin Mary was founded for the monks of the Benedictine order—those good monks who so nobly devote themselves to the manufacture of a cordial of that name, and, in the words of the Philosopher, I add, "long may they live to make it!" The abbey was unfortunately later on burnt by the Danes, and the ruin of the monks was completed by King Alfred, who took away the estates from these militant saints for not having resisted the enemy with sufficient zeal.

A new abbey was built, which suffered various vicissitudes until its final demolition early in the sixteenth century. The remains of the thick walls can still be seen. During the civil war Abingdon played an important part in the contest, being first established by Charles I. as head-quarters for his horse, but subsequently taken by the parliamentary forces. There are many interesting churches at Abingdon. That of St. Nicholas, the Roman Catholic, in the Market-place, is an old Norman edifice. St. Helen's church stands close by the river. Its spire is a conspicuous object up and down the river for some distance, and in every general view of Abingdon, from any point, it always forms a very prominent feature.

J. J. Acworth, F.I.C., F.C.S.

(To be continued in our next.)

ILLUMINATION OF THE DARK ROOM.

[A communication to the Photographic Society of Great Britain.]

The preservation of one of our most cherished faculties—that of sight—is of so much importance to our comfort and well-being that it is proper to give full consideration to the question of how it may be affected by the light in which we work.

Mr. W. Ackland remarks that, since the introduction of red light into photographic dark rooms, he has observed a remarkable increase among photographers, more than others, of failing sight. On this ground he deprecates the use of red light, and recommends the employment of one of a cooler character.

Dr. G. A. Herschell writes:—"Unfortunately for the dark-room operator, red light of all colours is a great deal the most injurious." By those who advocate the use of red light in the dark room other reasons have been sought to account for the photographer's special liability to failing sight. To some extent these reasons may co-exist with the evil influence of the red light. There have even not been wanting those who say that they prefer a red to a yellow or greenish light as a matter of personal comfort; but I am sure that the great majority feel the fatigue and irritation to the sight of working in red light, and would gladly change it for light of a cooler colour if they were aware that the necessity for using a red light, which has been so long insisted upon, is a mistake, and that yellow light of the same degree of illuminating power has no more effect upon the photographic plate, if as much, as the long-vaunted ruby.

The question naturally arises—How is it that if there were no necessity for red light, it came with the introduction of gelatino-bromide plates to be insisted upon and almost universally adopted? It was because it was said that bromide of silver was—compared with the wet-plate collodion, the sensitive compound of which consisted mainly of iodide—much more sensitive to the yellow light in particular, and that red light must therefore be used for bromide, whereas yellow was proper for iodide, manipulations.

It has often been stated that bromide of silver, whether in the form of collodion or of gelatine emulsion, is more sensitive to the colours of the middle and lower part of the spectrum, and will represent these as lighter, compared with the blue and violet, than the old collodion bath plate, which ordinarily consisted of iodide of silver and a small proportion of bromide. So strong a hold had this idea upon the minds of photographers that when collodio-bromide emulsion came into use, although it was less sensitive as a whole than bath plates, it was said it was so sensitive to yellow and orange light in particular that it was necessary to use red light for the purpose of the dark room, and plates were stated to be fogged in a laboratory the light of which did not injure the bromo-iodide bath plate. This probably arose from the much longer time that bromide emulsion plates were exposed to whatever light was used during their preparation and lengthened development than was necessary with bath plates.

When rapid gelatine plates first came into common studio use it was during a winter season, and it was asserted that their rapidity was due to their greater sensitiveness to the yellow light of winter; and it was predicted that when the spring and summer came round it would be found that they would be no more sensitive than the accustomed collodion. This was found to be a mistake, and the most careful experimenters could find no difference in the relative sensitiveness of the two processes in the winter and summer seasons.

Captain Abney, when recommending the use of a small portion of iodide of silver in bromide emulsion, stated that this addition so changed the range of sensitiveness of the compound, by lowering the sensitiveness to orange light, that plates containing a small quantity of iodide might be safely developed in such light, whilst those containing pure bromide only and of equal general sensitiveness were so sensitive to orange that a red light only must be employed in the dark room. Dr. Eder stated recently (*Photographische Correspondenz*, April, 1884, page 95) that the addition of iodide renders the plates more sensitive to the yellow and green. Considering that yellow and orange are so close together in the spectrum, and that the bulk of photographic action is at the other end in the blue and violet and beyond it, these statements are almost exactly opposed to each other.

I have here a sheet of coloured ribbons, made up of violet, blue, green, yellow, orange, scarlet, and crimson. The colours, of course, are not as pure as those of the spectrum, but they are much purer and brighter and should produce more difference of photographic effect than the colours of natural objects with which the photographer ordinarily has to deal, and in the delineation of which spectrum photography professes to direct him.

For photographing these I have prepared three emulsions—No. 1 containing bromide only, No. 2 containing five per cent. of iodide, and No. 3 ten per cent. The emulsions were prepared in other respects in a similar manner, and were made by the boiling process. Here are photographs produced with these emulsions, and I think you will not be able to find any difference between the results sufficient to be positively affirmed. In each case the violet has come out the strongest, and then the blue. From the green downwards the colours have all come out in each plate of nearly equal depth, but it will be noticed that the yellow and orange have had less effect upon the plates than the reds. Probably some white may accompany the reds, although they were the purest colours I could obtain in ribbons; still the main point is that with each plate the result is about the same. From this we gather two things—first, that the addition of iodide does not make that difference in the range of sensibility to the colours presented to the camera that has been stated; and, secondly, that if we were to work in our dark rooms by light reflected from these surfaces we should choose the yellow and the orange, as having less effect upon the plate than the reds, and giving at the same time far more luminosity.

About a year ago Mr. J. R. Sawyer showed a somewhat similar sheet of coloured ribbons and photographs from them, in which it was remarked that each colour came out lighter or darker than another in precisely the same series, whether the negative had been taken on an ordinary bath plate consisting of iodide and a small quantity of bromide, or of a gelatine plate containing bromide and a small quantity of iodide. There was not, however, among Mr. Sawyer's experiments one with a plate containing bromide only; and it is to compare this with plates also containing iodide, and to examine the alleged effects of this addition, that these experiments are made.

At one of the technical meetings of this Society I brought forward a lantern, the four sides of which were glazed with different materials, the two most contrasted of which were two thicknesses of ruby glass in the one case, and in the other a yellow produced by two thicknesses of yellow paper and one of a yellowish-green glass. The latter combination was considered by all those present to give a much better, as well as a more agreeable, light to work by than the rubies, and at the same time it had been found to produce at a given distance much less effect upon a sensitive plate.

Captain Abney, at the March ordinary meeting of the Society, followed with a paper in which he spoke of the question, which he had considered settled, as having been re-opened, and, without referring specifically to the particular light that I had compared, maintained that red was better than yellow for the purpose of dark-room illumination, selecting as the types for comparisons a glass known as "stained red" and a yellow paper known as "canary medium." Now, the stained red glass has this peculiarity—that it appears a red, but is really formed by the piling up of yellow. It is a curious fact that if a clear, transparent yellow be taken, and fresh thicknesses of the same added, the transmitted colour becomes orange, and finally to the eye red, although when examined with the spectroscope it will be seen that the yellow still passes; and this adds to the luminous effect to the eye, although the existence of the colour is unperceived. Every one who has used bichromate of potash solution must have noticed that a thin layer appears pure yellow, but a thick one orange, and if very thick red. Stained red is a silver-stained glass in which the quantity of silver is sufficient to give an orange-red appearance instead of the yellow which a thinner layer shows. I have here a wedge made up of increasing thicknesses of stained yellow, where it is seen the colour passes from a pale yellow to a reddish-orange. More thicknesses would show a colour identical with that of the stained red, except for the fact that the natural greenish tint of so much ordinary glass would have its effect. If a piece of stained red be broken it will sometimes happen that it will chip a little so as to divide the layer of stain, when, as in this piece, it will be seen to be yellow. Immersion for a short time in hydrofluoric acid will, by dissolving away part of the layer, allow the characteristic yellow to be seen, as in the piece now handed round.

In the experiment described by Captain Abney in the March paper there appears to have been an unaccountable oversight, which, when pointed out, will, I think, be admitted. The trial of illuminating power was made by light passing through rather small holes in the side of a lantern. Now to find a reading distance with a clear medium like stained glass the opening in the lantern may be reduced until no larger than the flame, without affecting the result. With a diffusing substance like canary medium the smaller the opening the more the light is cut off, and the nearer the observer has to come to it to see with equal distinctness. The trials for protective power should have, therefore, been made in a similar manner at definite distances from the screens of the lantern. Instead of this, the glass and paper were laid upon a plate, and this exposed to the light of a candle flame; the conditions were therefore not comparative. It is, of course, obvious that when using a clear medium—the stained red—enlarging the area of the sides of the lantern would not have increased the illumination at any given spot (the book read from), but would have made a great difference to the diffusing medium—the yellow canary. Another, to me, unaccountable circumstance, is that Captain Abney should have found so much more protective power with the stained red glass than with the canary medium. I have examined several samples of the stained red—which, however, differed but very slightly—and find in each case that more photographic action passes than through canary medium. I have here a sort of negative, composed of three media side by side—a piece of stained red glass, a piece of canary medium, and one of ruby glass. Exposed either to lamplight or daylight the canary medium shows less image than the stained red, and the latter less than the ruby.

In addition to condemning the use of a yellow light Captain Abney stated that the use of a green glass only stopped those rays that were comparatively harmless; and in an article, about the same time, in the *Bulletin Belge*, said that he thought the recommendation to use it proceeded from a confusion of ideas. Now, if a piece of green glass, such as I have here, be examined in the spectroscope it will be seen that both ends of the spectrum are cut off, the blue is darkened, and the violet almost entirely cut off; the red rays are very much stopped, but the yellow passes pretty freely. When, therefore, such an accumulation of yellow is employed as to present a red appearance to the eye, the use of a green supplementary medium, by cutting off the red rays, restores the yellow character which, to most people certainly, is more agreeable and less irritating than red or orange, at the same time that it assists in more completely cutting rays off of some actinic power. In the lectures last delivered by Captain Abney before the Society of Arts it was recommended, when additional safety was required, to supplement stained red glass by a sheet of cobalt. I have here a double lantern, in one compartment of which I will use a stained red and a cobalt, and in the other a stained red and a green. It will be seen that much more light passes through the stained red and green than through the red and cobalt.

Taking the average of three observers—Mr. J. Cadett, Mr. T. Bolas, and Mr. W. K. Burton—it was found that the distance at which printing could be read with the light passing through the green supplement was within a trifle of half that required when the cobalt was used. This indicates a superior power of illumination of between three and four. I have here a printing-frame containing strips of the same green and cobalt glasses, each in union with the same stained red. I will now expose a plate behind these to the light, and develope together. It will be seen that the red and blue yield a powerful image, whilst the red and green give only a trace. As a supplement to stained red glass, therefore, the green allows three or four times as much working light to pass, and gives much more protection to the plate than the cobalt. The cobalt, in fact, acts by cutting off the useful yellow illuminating power, and renders the red deeper than before; whilst the green, by allowing the yellow rays to pass (and remember that the so-called stained red is really an accumulation of a yellow-transmitting medium) acts by cutting off some of the red and restoring a yellow character to the light. How much of the additional protection afforded by the green glass is due to the removal of the red, and how much to the cutting off of the other end of the spectrum, it is not necessary now to decide. I should think, however, that, in addition to the greater safety and the more luminosity, almost every one would prefer, as less disagreeable to work by, the yellowish light with the green supplement to the crimson with the cobalt.

As a method of working independent of coloured screens it has been recommended as a good working method to employ the comparatively white light of a candle or lamp, taking care to allow no rays to fall direct upon the plate, but to use only the light reflected from the ceiling and walls of the apartment. Those to whom any coloured light is offensive or objectionable may be glad to know of a method by which they can use a light of the same apparent character as the bare candle light, but of much greater safety. Here is a lantern containing two paraffine lamps—one furnished with stained red, and the other with a green glass. By allowing the light from these to fall upon a sheet of white cardboard, and stretching a sheet of white paper in front, a light is produced which is quite as white as that given by one of the lamps when used with no coloured glass, and illuminating the card in the same manner, and turned to such a height as to give equal illumination at a given distance from the screen. Mr. W. K. Burton, who kindly assisted me in making this experiment by taking the reading distance and exposing the plate at that same distance, considered, indeed, that the composite white light was in this case decidedly the whiter, less yellowish, of the two.

I will show you both, and I think you will agree with him. On developing the plate we found much less image on the plate exposed to the composite white light than on the other; and this, indeed, was to be expected, as both glasses used cut off the violet and ultra-violet rays—the most powerful photographic portion of the spectrum. I do not recommend this light for absolute safety; but upon a sensitive plate an exposure full square to the light for a minute, at a distance at which small print could be read, gave the merest trace of a mark—such as would not be recognised as fogging if there were no sharp edge to mark it. Now, there is never any necessity for giving a plate so much exposure to the developing light as this is equivalent to; and those who are particularly sensitive to coloured light may, by using obvious precautions, safely work with a light of this description.

From the experiment described with the ruby, the stained red, and the canary medium, the latter shows the most protective power; but, at the same time, it transmits less luminosity. When these conditions are equalised the comparative results show the least safety for the ruby; with the other two they are about equal.

With ruby glass, as stated a week or two back by Mr. A. Pringle, in describing the work of a sort of committee of investigation of well-known photographers in the north, the result was that canary medium showed less actinic effect than ruby glass in proportion to its luminosity. That stained red and a yellow material like canary medium should be about equal is only what might be expected from the consideration that stained red is, as has been pointed out, an accumulation of yellow, and yellow light passes largely through it. To compare red light with yellow light a medium of true red colour should be used, and then the experiment comes out in favour of the yellow medium. There is another consideration which also tells in favour of the yellow. The plates we use, and to see which we require the illumination of our dark rooms, are of a greenish-yellow; and the reading tests, to be accurate for the work, should have been on paper of a colour similar to that of the plate. These tests were, however, made on ordinary printed matter, and when—with the only observers with whom I had an opportunity of trying, Mr. J. Cadett and Mr. J. J. Briginshaw—a gelatine plate with writing upon it was substituted for the ordinary printed paper, it was found that it had to be brought relatively nearer to the red than to the yellow light before the writing could be deciphered.

If the balance of photographic and luminous effect of yellow and red light were equal we should choose the former, on account of its cooler, less irritating character, and the comparative absence of feeling of strain or fatigue, which most people, at all events, feel when compelled to pass any length of time in one as compared with the other. When we add to this the consideration that it is probable that some are now permanently and hopelessly injuring their eyesight in the employment of dry-plate manufacturers and of busy photographers, I think great responsibility rests upon those who would strive to perpetuate the present state of things.

The following propositions may now, I believe, be considered as established:—That the great difference in relative sensibility to different colours stated to exist in the two substances, bromide of silver in gelatine and the ordinary bromo-iodide bath plates, does not so exist; and that, therefore, the difference in the colour of the illuminating medium said to be required is a mistake. That yellow light gives more luminosity, in proportion to its effect upon the photographic plate, than real red light. That stained red glass owes much of its luminosity to the fact that it is an accumulation of yellow medium. That green glass cuts off both ends of the spectrum, and, therefore, in addition to rendering the light cooler, is a considerable protection. That green glass used as a supplement to stained red allows more illumination to pass than cobalt so used, and is much more strongly protective of the plate by obstructing photographic power. W. E. Debenham.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 8,538.—"Preparation or Compound for Photographic Purposes." Jean Joseph Desiré Hutinet, Paris, France.—*Dated June* 3, 1884.

No. 8,566.—"Mechanically Shifting Photographic Scenes." George Wilson Morgan, Aberdeen, Scotland.—*Dated June* 4, 1884.

No. 8,643.—"Coating Photographic Plates or Paper with Gelatine Emulsion." (Complete.) Benjamin Joseph Edwards, Hackney, London.—*Dated June* 5, 1884.

No. 8,721.—"Photographic Cameras." W. S. Atwood and S. B. Goslin.—*Dated June* 7, 1884.

Our Editorial Table.

READY-SENSITISED PAPER. W. W. ROUCH AND Co., London.

WE have received samples of a new brand of ready-sensitised paper specially prepared for Messrs. Rouch and Co. It is fine in texture, possesses a smooth, even surface, and a high gloss, without the excessive tendency to crack which double albumenised paper exhibits. It prints rapidly and to a rich colour, and tones with readiness in any of the recognised toning baths. We have not yet had an opportunity of testing its keeping qualities, but they are said to be very good.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
June 17	Bolton Club	The Studio, Chancery-lane.
" 18	Photographic Club	Anderton's Hotel, Fleet-street.
" 19	London and Provincial	Masons' Hall, Basinghall-street.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

THE last ordinary meeting of this Society for the present session took place on Tuesday last, the 10th inst., at 5A, Pall Mall East, in the Gallery of the Royal Society of Painters in Water Colours,—Mr. James Glaisher, F.R.S., President, in the chair. The minutes of the last meeting having been read and confirmed, the Chairman called upon

Mr. J. R. SAWYER to read his paper, entitled *Commercial Fabrics Suitable for Dark-Room Illumination*. Mr. Sawyer, after deprecating the warmth which had been evident in the discussion of the use of various colours for illuminating the dark room, remarked that Mr. W. S. Bird had some little time ago called attention to the discrepancies exhibited by the statements of different observers in regard to the chemical action of the spectrum, and had stated his opinion that there must be something wrong in their knowledge of the facts, and especially as the deductions from spectrum analysis differed so much from what was gathered by putting the matter to a practical test. Further inquiry was certainly desirable. He had tried to perform such experiments as would make it possible to give a verdict as to what was the best fabric to use for dark-room windows out of those easily obtainable commercially. He wished to avoid all controversial points In the first place great stress had been aid on the hurtful effects of deep red light, but surely those who brought this matter forward were in the habit of gazing fixedly at the red light itself, which was by no means necessary. He believed that no harm came from the colour of the light but only from the rapid transition from a bright to a dull light, and *vice versâ*, the ciliary muscles not acting instantaneously in contracting or expanding the pupil as we come from a weak to a strong light, and *vice versâ*, but allowing us to be for a time dazzled in the first instance and unable to see at all for a time in the second. He (Mr. Sawyer) had read a paper before the Society more than a year ago, in which he had explained the effect of photographing bands of different-coloured ribbons. He had that evening with him the bands of ribbons and the photographs, and it would be seen that a light yellow ribbon, although immensely more bright to the eye than an orange or a ruby one, gave less photographic effect. This formed a powerful argument in favour of yellow light for the dark room. He had tried the effect of the following fabrics and combinations of fabrics, namely, ruby fabric, orange, yellow, ruby orange and yellow, orange and yellow, and ruby and yellow in combination; also yellow paper treated with aurine varnish, white paper similarly treated, the above together; the same, but with two thicknesses of orange paper. Plates which would give 24 on the sensitometer had been exposed at a distance of eighteen inches from each for a space of five minutes, the source of light being a bright lamp. The plates were placed during exposure behind stencils indicating by letters the materials used, and were afterwards all developed in the same dish, being forced to the utmost. The various fabrics and combinations were shown in front of the lamp which had been used in the experiments, and also the plates which had been exposed. The yellow paper, which could be obtained from Messrs. Spalding and Hodge, Drury-lane, although permitting much more luminosity to pass, gave a less photographic impression than either ruby or orange. The fabrics in which there was aurine were safer still, but gave much less illuminating power. In the case of the last two media mentioned the plates were not acted upon at all. As to the practical arrangement of the dark-room window, he considered a good plan to be to divide it by horizontal lines into three equal portions, the upper third being covered with one thickness of whatever medium was used, the central with two, and the lower with three. The top portion could be swung open to admit white light when desired. A roller blind worked from the top would allow the light to be very perfectly regulated. He had tried the effects of using greens, but would not enter into the matter then, except to show a dark green which gave a very considerable photographic effect, whilst a lighter one, allowing much more visual light to pass, gave less photographic effect. He hoped the meeting would consider that his experiments had been carried out in a fair and practical manner, and that he had proved it was possible to have in the dark room such an amount of light as would ensure no damage being done to the eyes from abrupt transition to the outer light, and which yet would be safe.

Mr. W. E. DEBENHAM wished to show an improvement which he had made on his composite lamp. His lamp, it would be remembered, was so constructed, that on a sheet of white paper there is received the light filtered through a red glass, and also the light filtered through a green glass. The coloured light received on the white screen is reflected on to a piece of tissue paper, and, combining, makes a white light. He had substituted for the white reflector a yellow one, and in front of the white tissue paper had placed a piece of golden fabric. The light even then appeared as white as that obtained by reflecting the light from a lamp turned low, from a piece of white paper on to a piece of white tissue paper. Experiments made at "reaching distances" gave the following results:—With the last mentioned light a transparency was obtained in one minute. With the composite light and yellow reflector, but no golden fabric, a faint image only in a quarter of an hour. With the yellow reflector and golden fabric no image in an hour's exposure.

Mr. C. RAY WOODS wished to draw attention to a few points in Mr. Debenham's paper, read at the last meeting. [See page 377 in the present number]. He had compared the results obtained by using canary medium, orange paper, and stained red glass. He found the orange paper to have a slight advantage over the canary medium, and the stained red to have a great advantage over the orange glass. He considered that Mr. Debenham had failed to get the same stained red glass which Captain Abney had used, and which was flashed with silver on one side, and on the other with copper. The stained red used by Mr. Debenham was flashed only with silver and permitted ultra violet rays to pass, which accounted for Mr. Debenham having found a result of greater safety by using green glass in conjunction with it than when using cobalt glass, as recommended by Captain Abney. He considered that he was justified in using the expression "cathedral green," as it was once employed in the glass trade.

Mr. J. CADETT said he had carried out some experiments on the subject under discussion, in which he had been assisted by two or three other observers. He found that, as compared with theirs, his eyes were very insensitive to red light. Still, in the experiments which he had carried out, there had been evident a very little advantage in the case of stained red as compared with canary medium. In the case of those with eyes more sensitive to red the advantages had been more marked. This was to be remarked, however—that the advantage which the red colour displayed over the yellow was only noticeable in the case of a bright light. When we came to the use of a feeble light the state of affairs was renewed. He believed this fact was the cause of many of the discrepancies evident. Yellow light had a decided advantage over red in that it was better for the *general* illumination of a room. Thus, for example, it would be best to use yellow light in a drying room and red light when we came to examine plates individually for defects. He would say a few words regarding the spectroscopes. Some people were always tending to extremes, and a certain few had gone so far as to say that because the spectroscope could not alone determine the best medium to use for illuminating the dark room it was, therefore, entirely useless. He thought this a great mistake. To take an example: it was extraordinary how much blue light the spectroscope showed to pass through canary medium, thus indicating in what direction to work to make this light safer than it is by using some medium which will absorb the blue. Again: it was remarkable to compare two lights so apparently similar as those got through ruby glass and stained red, and to see how much blue was in the former whilst there was none in the latter. The spectroscope used with discretion would be found most useful.

Mr. DEBENHAM, in reply, said that he had found, on looking into the matter, that the stained red glass which he had been using was of two different kinds—one, that described by Mr. Woods, flashed on both sides, and the other, that flashed on one side only, and with silver. He had written to Messrs. Chance and Co. about the first-mentioned glass, and had learned from them that it was described as "flashed ruby, one side stained, yellow the other." It so happened he found that the red glass used in the experiment with the green and cobalt glass was of this description. He had one piece of even a deeper red than Captain Abney's was, and with this the result of his experiments was still the same. He got much less illuminating power with cobalt in conjunction with it than with green, yet far more photographic effect. Mr. Debenham wished to ask Mr. Cowan if his reported statement that seven thicknesses of his (Mr. Debenham's) stained red were not as deep in colour as one of Captain Abney's was correct.

Mr. A. COWAN replied that he alluded to Mr. Debenham's stained yellow.

Mr. DEBENHAM said that Mr. Sawyer had referred to the discrepancies in the results obtained by scientific experiments and practical workers; but he would ask if the method of proceeding in which the visual powers of various lights were first standardised, and the photographic power afterwards taken, was not as scientific as any, and more so than determination by the use of the spectroscope. Mr. Sawyer's experiments had proved very powerfully the advantages of yellow light over red, and would have done so still more emphatically had allowance been made for the visual intensity of the lights, the plates being in all cases put at such a point that the illuminating power was equal in each. With regard to Mr. Sawyer's experiments with green light, he was not aware that any one had suggested the use of a green fabric alone. He certainly had not. When using a green it was necessary to have a yellow green—not a blue one. He did not consider it advisable to speak of glass as cathedral green, as, even if that name were once used at all, it would refer to half-a dozen different shades.

Mr. L. WARNERKE objected to the use of aurine, as the colour faded. He had been experimenting on different fabrics, and considered by far the best to be one got by impregnating paper with chromate of lead.

Mr. W. PEEK thought red light had no injurious influences on the eyes. He considered Mr. Debenham's plan of testing at a reading distance not a good one, as it permitted the influence of individual peculiarity.

Mr. Sawyer, in reply to the various speakers, said that with regard to the scientific aspect of the matter it might be more correct to test the plates at the reading distance from the source of light; but with reference to the practical side of the question they had in their dark rooms windows fixed and sinks fixed, and, therefore, he considered the method which he had employed the most suitable. He hoped Mr. Debenham would not consider himself neglected because the question of greens had not been brought forward more fully. He himself considered that green in combination with other colours reduced illumination without introducing corresponding advantages. He was sorry to hear from Mr. Warnerke that the colour of aurine (a substance which had been recommended by Mr. J. Spiller) was not permanent, but if it were not there was an end of the matter. He felt great curiosity concerning Mr. Debenham's composite white light, and would like to have an opportunity of trying it.

The Chairman asked for a vote of thanks to Mr. Debenham and Mr. Sawyer. He did not object to hear differences of opinion expressed, but hoped that discussions would always be carried on in a scientific manner, each trying merely to bring forward the truth of matters and avoiding any controversial spirit. His own experience had been that it was impossible to get any two samples of glass precisely the same, and that no two people saw in precisely the same manner with regard to colour.

The vote of thanks having been accorded,

The Chairman called upon Mr. E. Dunmore for his paper, entitled *Silver Prints*. He then vacated the chair, which was filled by Captain W. de W. Abney.

Mr. Dunmore wished to give a few supplementary notes on Mr. Spiller's recent paper on the fading of prints. The word "permanency" might have a very elastic meaning. It might be used as indicating indestructibility or durability. He understood it in the last sense. Many prints of old days had remained good to this day, and certainly if we could follow the precise method by which these were produced we could again get permanent prints. Mr. Spiller had long ago recommended alkali in the fixing bath. He (Mr. Dunmore) had at that time himself been using carbonate of soda, but had given it up for the ammonia recommended by Mr. Spiller. He found, however, that this resulted in a slight powdery deposit on the prints. Mr. Dunmore then traced the production of a silver print through all the processes. He pointed out that the manufacture of the paper, on which much depended, was the only thing which was quite beyond the control of the photographer, although the albumenising was also so in most cases, as few photographers albumenised their own paper. He recommended a strong sensitising bath as tending to permanency. In talking of the printing and toning of paper he pointed out the double nature of the image, there being one image in an organic salt and another in metal. This accounted for the fact that a print from a thin negative would not take a rich tone. The image was almost entirely composed of the organic salt and the gold was not deposited on it. In toning a print from a clear negative they should stop the process before the half-tones are bleached. In fixing it is important to use freshly-mixed hypo. and to give a sufficient time for fixing, which might vary from ten to twenty minutes. After that, if the prints were thoroughly washed, he believed they would be permanent.

The Chairman admired the manner in which Mr. Dunmore had brought forward his observations, and especially considered his remarks concerning the double nature of the image to test by most valuable.

It was announced that Saturday, October 4th, would be the date of the opening *soirée* of the Exhibition of the Society, and that Thursday, September 25th, would be the last day on which pictures would be received. The following gentlemen had been elected as judges:—The President, Messrs. W. Bedford, W. F. Donkin, W. England, J. E. Mayall, W. Mayland, and Andrew Pringle.

The following gentlemen were unanimously elected as members of the Society:—Messrs. W. Van Sommer and S. G. B. Wallaston.

The meeting was then adjourned.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

The ordinary monthly meeting of this Society was held at the House of the Society of Arts, John-street, Adelphi, on Thursday evening, the 5th instant,—Mr. F. York in the chair.

The Secretary having read the minutes of the last meeting,

The Chairman made a few remarks on the much-lamented death of an old member of the Society, Mr. H. Baden Pritchard.

Mr. E. W. Foxlee proposed that a letter of condolence be sent to Mr. Pritchard's widow, and Mr. W. Cobb seconded this motion.

The question of the annual trip of the Society was then discussed, and it was resolved that a meeting should be arranged for the last Saturday in July, unless Mr. Thornicroft could be persuaded to lend his steam launch to the Society for a day on the river, in which case the determination of the date would be left to that gentleman. It was suggested that the members of the Photographic Club be asked to join in the excursion.

A letter from the son of the Rev. F. F. Statham, the late lamented President of the Society, was then read.

The question of the presentation print to the members of the Society came up for discussion.

Mr. A. L. Henderson said he thought it would be satisfactory for all if a print from some negative of the late President were to form the presenta tion picture. He himself for one would like to have such a picture.

Mr. F. A. Bridge said that Mr. Henry Greenwood had been kind enough to present to the Society fifty prints of the Rev. F. F. Statham similar to those which had appeared in The British Journal of Photography, but on finer paper. He (Mr. Bridge) had unfortunately not brought them with him that night, but he would send them to the members.

On this intimation Mr. Henderson withdrew his proposal.

Mr. A. Cowan proposed that the presentation print be chosen from the competition pictures of the members, and further proposed that a committee be elected to choose the print.

The following gentlemen were then proposed and elected for the Committee:—Mr. F. York, Mr. W. M. Ashman, and Mr. W. K. Burton.

Mr. Bridge announced that the Council had determined to make the October meeting a special one to consider the future of the South London Photographic Society.

Some prints from paper negatives by Mr. Morgan, of Greenwich, were passed round. The general opinion was that no grains were visible in the prints. The paper for the negatives had been sensitised with gelatine emulsion.

The following question was then put before the meeting:—"What is the best developer for gelatine plates when copying engravings and line work?"

Mr. Henderson objected to the use of dry plates for such purposes. He would use wet collodion plates.

The Chairman pointed out that this was wide of the question, which asked for information regarding gelatine plates. He would himself use a ferrous oxalate developer.

Mr. Henderson suggested a slow emulsion.

Mr. Foxlee preferred the ferrous oxalate developer to any other.

Mr. W. K. Burton thought that if a sufficient exposure were given, and a pyro. developer were used strong in pyro. and restrainer but weak in ammonia, as dense a negative would result from sufficiently long development as with ferrous oxalate.

Mr. E. Cocking corroborated this statement.

The Chairman said that on account of the colour of the negative he would prefer carbonate of soda to ammonia. He used Mr. H. J. Newton's formula, and found excess of density rather than insufficiency to be his only difficulty.

Mr. Henderson differed from the Chairman on this point.

Mr. Foxlee said that in a line subject the great thing to do was to keep the black lines quite transparent.

Mr. W. Cobb thought that specially-prepared plates should be used.

Mr. Henderson asked the Chairman if the carbonate of soda did not cause frilling of the plates.

The Chairman replied that it did not if alum were used after development. It was curious that the plates took longer to fix when soda was used than when ammonia was employed.

Mr. W. Brooks would develope with ferrous oxalate, and would afterwards intensify with mercury.

The meeting was then adjourned.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Association, held on Thursday, the 5th instant, the chair was occupied by Mr. A. Mackie.

Mr. H. S. Starnes showed a dark slide made of tin plate. The advantages claimed for it were the small space it occupied and the cheapness with which it could be constructed. The plates were slid in at one end, which was then closed by a strip of velvet-coloured wood, leaving space only for the doors to slide on either side of it. A portion of the end of each door was bent over at a right angle to hold the strip of wood in place while the other door was open for exposure.

The Chairman considered that for a cheap dark slide it would be best to have a combination of wood and cardboard.

Mr. H. Moul said that it was most difficult to get card slides to work. Card was apt to buckle a little, and would then refuse to enter the groove at the end of the slide.

Mr. W. E. Debenham thought that the same objection held good with respect to sheet metal slides. He believed it would be better to make the frame somewhat thicker, so as to leave a space of about one-eighth of an inch between the front of the plate and the sliding door. The metal separating the plate from the door could then be folded, and at the end of the groove a little bevelled. This would allow the tin, although somewhat buckled, to find its way home.

The Chairman, referring to the screw-stoppered bottles now in common use for aërated drinks, said that he had requested the proprietors to make some bottles on the same system for chemical use, for which he thought they would be well adapted. He inquired whether any of the members could inform him of the nature of the material of which the bulk of the stopper was formed.

Some of the members thought that a gum resin or lac entered largely into the composition.

A short discussion took place upon the very divergent opinions that had recently been expressed with regard to a long washing of prints as an element of permanency.

Mr. Debenham believed that a long stay in the water was apt to cause fading—probably induced by the partial decomposition of the sizing of the paper. He had observed that prints left washing from Saturday to Monday commonly looked weaker than those which had only been in the water for a few hours.

A question from the box was read:—"Why does a very rapid plate take longer to develope when exposed with a drop shutter in the open air than the same plate given its proportionate exposure in the studio?"

Mr. A. L. Henderson said that this question assumed as a fact that which was not proved.

Mr. Debenham said that the conditions under which instantaneous outdoor photographs were taken were frequently, although not always, conditions favourable to the production of a weak image. In such a case if by time of development was meant time necessary to get up a certain amount of density, the matter was explained.

Mr. E. White was elected a member of the Association.

Correspondence.

June Meeting of the Photographic Society of France.—An Easy Method to Employ Eosine.—The Forthcoming Exhibition in Dublin.—Instantaneous Pictures by M. Braun.—M. Borg on Detaching Films.—Photocalque.—A Cheap Photographic Outfit.—Competition for Photographic Lenses Postponed until December, 1885.—Photographing Balloons.—M. Balagny's Films.—A Pocket Camera and Enlarging Apparatus.—Poitevin's Monument.

The Photographic Society of France held their monthly meeting on Friday, the 6th instant,—M. Davanne in the chair.

Among the correspondence which was read I gleaned the following:—That any commercial gelatino-bromide of silver plate can be rendered sensitive to the coloured rays by an immersion in a bath of eosine. It is preferable, however, says the writer, to put the eosine in direct contact with the emulsion. His bath is composed of—

Water	100 parts.
Eosine	30 ,,
Ammonia	10 ,,

If this simple immersion be all that is necessary it will greatly simplify the manufacture of eosine plates. The dye, when added to collodion or gelatino emulsion, causes great trouble by stains, in filtering, to the operator's clothes, hands, &c. I remember the difficulty I had five years ago, when I made plates for M. Ducos du Hauron, to induce an operator to work with the dyed emulsion, and one absolutely refused to have anything to do with it. The simple immersion will do away with all this, and will be a great boon to photographers who have to reproduce oil paintings or water-colour pictures, as they can dye the ordinary commercial plates themselves and use whatever purified photographic dye they may choose, according to the principal colours in the picture they have to reproduce. It is in the reproduction of polychromic pictures alone, in my opinion, that the introduction of aniline dyes will render service to photography. I have not yet seen any advantage in their use for landscape purposes.

I informed the members that I had received a letter from Mr. George Mansfield asking me to acquaint them that the Photographic Society of Ireland intended opening an exhibition in Dublin in November next, and that they should be happy to receive from France pictures and photographic apparatus and appliances. Any aid from their sister society would oblige.

The Chairman then replied that the Photographic Society of France would do all in their power, and ordered it to be inserted in the *Bulletin* of the Society.

M. F. Braun presented some very fine specimens of instantaneous photography, which were much admired.

M. Audra said that M. Borg, of Bordeaux, had intended to make a communication on the subject of a method by which the films of gelatino-bromide of silver negatives can be taken off their glass support without any previous preparation, such as the plate being collodionised, &c., &c. He (M. Audra) said he should have been most happy to have shown the members how to do it, but at the eleventh hour he had received a letter from M. Borg asking him not to communicate the secret. He could only show those present the results obtained by M. Borg. Loose films were then passed round, also films transferred to glass and paper, showing that the result was very satisfactory, and giving the idea that the "dodge" was a good one, making many regret the retractation of M. Borg (if it may be so called).

M. Cheysson was to make a communication on his process of *Photocalque*, as employed in government offices.

M. Davanne explained the process, which is too long to give here, but if found worthy will be inserted in full in The British Journal of Photography a little later on. M. Davanne then presented to the notice of the members a photographic outfit, given by a journal as a prize to yearly subscribers. He said that these apparatus gave a taste to youths to become amateurs, and was, so to say, a hot-bed for future members of their Society. The box contained everything necessary to make negatives, and positives were not lost sight of.

The gelatino-bromide plates of M. Hutinet and films of M. Bornstein were returned to the makers, as the Society is determined no longer to make a practice of giving their opinion upon the different commercial makes. The members are open to experiment privately upon any new preparation and give their opinions.

The Chairman informed the members that the competition opened by the Society and "Le Ministre de l'Instruction Publique" to obtain a new photographic lens has not gained the hoped-for result; therefore the committee proposed that the competition should be postponed until December, 1885. This was agreed to.

M. Balagny presented some negatives obtained on his gelatino-bromide of silver paper; also, some specimens of Tunisian ruins, &c. The tone of the proofs was very good. An inquiry being made, M. Balagny said that he had been inspired by the magnificent exhibit of Mr. Payne Jennings in the last Paris exhibition, and after many trials he has succeeded in obtaining a tone of picture similar to that gentleman's by means of a hot toning solution. Two solutions are prepared in advance:—

A

Water	1,000 parts.
Chloride of gold	1 part.

B

Water	1,000 parts.
Borax	30 ,,

B solution is heated to about 122° Fahr., and 200 parts of A added; the proofs are then plunged in and toned. They are then well washed and fixed in a hyposulphite of soda solution rendered alkaline by the addition of ammonia.

M. Vidal informed the members that it was the intention of the Chambre Syndicale de la Photographie to deliver a lecture on the 16th instant on the value of photography for reproducing works of art, to which all the members of the Photographic Society of France were respectfully invited.

M. Mosset presented some proofs of a balloon at different elevations, and showed the camera with which he had obtained the negatives—a quarter-plate camera, having in the place of the stand a small handle, and on the end of the tailboard a piece of wood by which the camera can be held to the shoulder like a gun. A "finder" is placed on the side of the camera in order to obtain the position of the balloon. M. Mosset employs a portrait lens, on the tube of which are marked or engraved different lines showing the position of the focus for a distance of 50, 100, 150, 200, or 300 metres. The shutter is on the guillotine principle. M. Mosset stated that the camera was aimed as soon as the start was accomplished, and when at a guess the balloon was about fifty metres from the earth the first picture was taken. The plate was then changed and the screw of the focus regulated, during which time the balloon had had time to rise another fifty metres, when a second "shot" was taken, and so on, until the balloon disappeared from view. The proofs were shown, but only the first or second were of interest, as a want of sharpness in the others was very conspicuous. The fault is in the lens employed being a portrait lens having a short focus. A long-focus rectilinear lens ought to be used. A larger image would result and a more perfect definition be obtained

M. Bardy presented a pocket camera made for M. Hutinet, the lens being the same as on M. Vidal's pocket camera, which I described in a former letter. The general opinion was that M. Vidal's pocket camera was far superior to the latter in weight and manufacture, the lens and dark shutter being the same. He (M. Bardy) then presented a new enlarging apparatus by M. Molteni for enlarging small negatives. The same instrument can be used as a magic lantern for parlour instruction and amusement. M. Bardy complimented the maker on having supplied a want, as he himself believed that ere long none but very small cameras would be used for landscape work. Many persons were working in that direction, and they had had cameras presented before them for that purpose. MM. Stebbing, Vidal, and Hutinet had all small cameras, but M. Molteni rendered such small instruments of service by inventing a cheap enlarging apparatus. The capabilities of the instrument were put to the test by projecting the images of some negatives upon a white ground. The uniformity of illumination was very apparent. The apparatus consists of an iron box, in the centre of which is a petroleum lamp. Behind the lamp is a concave silvered reflector, and before it is an achromatic condenser having the same concavity (towards the light) as the reflector. A camera with a movable bellows is adapted to the iron box. In front is placed any photographic lens which an operator may have at hand. The negative is introduced just in front of the condenser, and the rays are taken up by the front lens and then thrown upon the screen. The further the screen is from the apparatus the larger the image, and *vice versâ*. The great fault in this instrument is that only small negatives can be used. M. Hutinet's enlarging apparatus is superior from this point of view, as any size of negative can be employed.

M. Vidal, in the name of the committee for the erection of a monument to Poitevin, informed the members that the voluntary contributions amounted to 8,500*f.*, and that 1,500*f.* more were required to complete the sum demanded by the architect, which sum the committee hoped would be obtained, as several houses that had gained fortunes by Poitevin's invention had not yet come forward with one penny.

A pressing invitation is, therefore, made to the photographic community for funds. Any contribution from the readers of The British Journal of Photography will be thankfully acknowledged, and will be received by me in Paris or by the Editors in London. As the subscription is international, and many English photographers have already forwarded subscriptions, it would be well that their brethren who employ the carbon, photolithographic, and other permanent processes based upon the reaction of the chromic salts show their gratitude to the inventor of those processes, of whatever nation or country he may be.

25, *Rue des Apennins, Paris, June* 9, 1884. E. Stebbing, *Prof.*

THE PERMANENCY OF AURINE.

To the Editors.

Gentlemen,—In the paper read by me on Tuesday last before the Photographic Society of Great Britain upon *Commercial Fabrics for Dark-Room*

Illumination, and of which a report will doubtless appear in this Journal, I recommended the use of aurine, dissolved in negative varnish, to give a very non-actinic colour to paper and fabric for use in lanterns and dark-room illumination generally. In the short discussion that ensued Mr. Warnerke stated that he had found the aurine very fugitive in daylight. I have had really no experience with it in daylight, but it is perfectly stable with artificial light, and when introduced some years ago by Mr. Spiller was believed to be permanent under all conditions.

Upon inquiry I find that it is a permanent colour when used upon certain fabrics—silks and woollens, I believe, but not upon cotton goods—and according to Mr. Warnerke's experience not a permanent colour on paper. For all that it is exceedingly useful for artificial light work, and as I applied my aurine locked up with gums as a varnish I am not disposed without further trial to abandon it for daylight work. I shall expose one of my aurine screens to the full daylight and sunlight for the next two months, partially shielded, and with your permission report progress in the pages of your Journal.

I may mention that on receipt of a stamped and directed envelope I will send samples of the yellow fabric and yellow paper that I recommend, and which in my hands form a perfect and safe screen for making or developing the most sensitive plates. The paper is treated with a drying varnish to give it transparency.—I am, yours, &c., J. R. SAWYER.

Autotype Works, Ealing Dene, W.,
June 11, 1884.

THE PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN AND ITS REPORTS.

To the EDITORS.

GENTLEMEN,—Will you allow me space to make a few remarks upon Mr. Herbert B. Berkeley's letter on this subject in the last number of the Society's *Journal*, which has reached me today?

I gather from Mr. Berkeley's letter that some discussion must have taken place with regard to "errors and omissions" which occur in the reports contained in that *Journal*, as he alludes to a "conclusion" which has apparently been arrived at on another branch of the subject. As concerns errors and omissions, these may or may not be preventible; but they are, at least, open to correction when they do occur. I shall, therefore, confine myself to the "conclusion" which Mr. Berkeley now discusses.

Mr. Berkeley fails to see any logic in the conclusion that the suppression of the present reports in the weekly journals would constitute them, when they did appear, "stale news," and goes on to opine that it would be as reasonable to consider *the papers* when *they* appear "stale news." I venture to assert my own opinion—which coincides with those of many other members, though not with Mr. Berkeley's—that the papers as they now appear *do* form *unnecessarily* stale news, and are, moreover, in a certain sense, unnecessarily published; for the abstracts published, both of papers and discussions, by the weekly journals within three days of the meeting contain all that is necessary except to those who may be particularly interested in any special discussion. Such may refresh their memories or acquire more elaborate details when the Society's *Journal* appears—perhaps a month later.

The condensed reports, too, offer the advantage of being handy references by which the discrepancies arising between what actually occurs at a meeting and what appears in Mr. Berkeley's "full and corrected (presumably) report as having occurred." I thank him for the interpolated word, because it was a pretty general opinion when a recent case was partially discussed before the Society that the "weekly journals," three days after the event, gave a truer account of the matter called in question than did the Society's "full and corrected (presumably) report" *dated* (but not appearing) a month later. The charge fell through in consequence of what I may call a legal inaccuracy of description.

Mr. Berkeley's "best argument of all," based on the assumption of the meagreness and incorrectness of the weekly journals' reports, is the most singularly unfortunate he could have chosen; and I may conclude my references to his letter by stating, in reply to his last paragraph, that, as a member who attends the meetings and also as a "reader of the photographic press," I for one am anything but of the same opinion as himself upon these matters.—I am, yours, &c., A MEMBER.

June 9, 1884.

To the EDITORS.

GENTLEMEN,—I do not quite "see the logic" of Mr. Berkeley's letter in this month's number of the *Transactions* of the Society. That there is abundant room for reform in the management of the Society and its *Journal* no one will deny; but not in the manner suggested by Mr. Berkeley, namely, by giving the *Journal* a monopoly of the Society's reports, and keeping them from the public and country members for a month.

That there is a great deal of "staleness" about the Society's reports and about its whole proceedings is another undeniable fact which is solely and directly due to the Council's endeavours to perpetuate and render absolute the very course Mr. Berkeley now suggests.

It is a melancholy circumstance that the ordinary meetings of the representative (or what should be so more than in name) society of this country should be of so tame a character. The names of authors of papers and of those who regularly take part in the discussions may be very nearly counted on the fingers, and this in a society comprising four or five hundred members. This state of affairs is due to two causes, viz., the manner in which the ordinary meetings are conducted with a view of keeping them within the limit of one hour, and the present system of reporting. These I will take singly and offer a suggestion in connection with each.

One of the rules of the Society says that "the chair shall be vacated as soon after nine o'clock as may be convenient." The result is that in order to keep to this rule it is frequently necessary "to take a paper as read," or for the author to give an "abstract" of his communication. In the first case the paper is published in due course, and if the author be "nobody" there is an end of the matter. If, however, he be a person of importance, or of sufficient energy to demand it, a discussion ensues at the next or some subsequent meeting. In a recent instance the discussion took place *seven months* after the reading of the paper. In the second case the discussion may take place upon something that is entirely different from the paper actually published, as occurred a few months ago. Besides this the readers of papers are not unfrequently quite or nearly inaudible to all but those sitting on the Council benches, and the majority of the are consequently unable to take any part whatever in the discussion. Moreover, not knowing how much may have been keep back from the "abstract," many are unwilling to lay themselves open to the chance of being made ridiculous by the author informing them, in his reply, that "that is the opinion expressed in the paper, but for want of time omitted from the 'abstract.'"

It results from this that the discussions are too often perforce confined to those few who are in the habit of experimenting together or who may communicate their ideas one to another in private, and who, consequently, are in a position to know the contents of the unread paper. Thus Mr. A. delivers a brief *résumé* of a paper he has prepared and, upon his sitting down, a discussion is invited. After the members present have gazed stolidly before them for some time, Mr. B. rises and states that "by the courtesy of Mr. A. he has been permitted to witness some of his experiments, and is convinced that his deductions are quite correct." After another pause, Mr. C. (who is beyond the charmed circle) perhaps ventures to suggest that if such and such an experiment of Mr. A.'s has been conducted in a certain manner it is scarcely conclusive; when up bounces Mr. D. with the information that "he is in a position to state" that Mr. A. conducted the experiment referred to in a manner quite different from that suggested by Mr. C. If it be nine o'clock Mr. A. then replies generally, corroborating Mr. B. and Mr. D., and extinguishing Mr. C.; the Chairman declares the meeting adjourned, and a sigh of relief passes round the room as the members rise and form into groups to discuss matters of practical interest over a cheering cup of tea or coffee. If nine o'clock has not sufficiently approached when the subject is thus exhausted, Mr. E. utters a few mild platitudes which, by raising a discussion on a side wind, keeps the ball rolling until the meeting is abruptly adjourned at the usual time.

Now, if instead of, or in addition to, attaching so much importance to the rule I have quoted the Council would enforce another one—that which *suggests* that "communications intended to be read to the Society should be submitted to the Council one month in advance," and *directs* that "in no case can papers be read at any meeting which shall not have been received one week in advance," a different state of affairs would arise. It would then be easy to have the papers printed before the meeting, and printed copies distributed to the members present; or, better still, issued by the Secretary with the notice of meeting, when the members would arrive with the subject well studied, and fully prepared to enter into an interesting discussion. Then, indeed, the paper might be "taken as read" with actual advantage, and the time saved.

With regard to the reporting: the plan I have suggested would enable the papers read to be published in the weekly journals (and, for that matter, in the official organ also) the same week, which, as Mr. Berkeley points out, is the proper plan. If the editor and publishers of the Society's *Journal* cannot manage to get through their work in the same week, then by all means let the more energetic weekly journals, if they be willing, do for the members what the publication their subscriptions go to support cannot. If the *Journal* must cost upwards of £100 a year to the Society it need not also prove an injury to the members' interests.

Few of the members besides Mr. Berkeley would object to the publication of the papers a day or two after they are read and while the subject was still fresh, accompanied though they might be by the "meagre and incorrect" reports of which he complains. The "full and corrected" official report would still remain, if published only once a year, to supply the coveted fullness and accuracy.—I am, yours, &c.,

June 9, 1884. ONE WHO SELDOM MISSES A MEETING.

To the EDITORS.

GENTLEMEN,—Allow me to call your attention to Mr. H. B. Berkeley's letter in the present number of the Photograpic Society's *Journal*, and to add my complaint and suggestion.

I do not know whether he includes amongst his omissions the fact that no report is ever made in any of the journals of the proceedings after the Chairman has vacated the chair. This is the period when, in addition to the attractions of the refreshment table — always welcome after the intellectual drought of the previous hour—more luminous ideas are evolved and more really practical information passes from one to another in a single evening than, perhaps, in a complete session of the Society's formality.

To supply this would not, I imagine, cause you more trouble than to give the full and accurate report of each speaker's remarks *as delivered*, which seems to be so much desired. In this portion of the verbatim report, too, the speakers would be less likely to appear as if sometimes suffering from some temporary impediment of speech, or to have lost themselves in a sort of "Rosamond's bower" of verbiage than in the earlier proceedings. But we should have precision of diction, which is, after all, the main thing.—I am, yours, &c.,

June 9, 1884. A LOOKER-ON AND LISTENER.

[We have received two or three other letters on this subject all in much the same strain, but the above represent all that is to be said on the subject. The anonymous writer of an attack upon some of the leading members will understand why we take no notice of his communication. Our own word in the matter will be found in another column.—EDS.]

IODIDE OF SILVER IN EMULSION.

To the EDITORS.

GENTLEMEN,—I have been interested in your articles on *Iodide of Silver in Emulsion*, and have endeavoured to introduce a small quantity of the iodide by mixing with a bromide emulsion a small quantity of a separately-formed iodide emulsion. I succeed to a certain extent, but it seems to me there is great loss of silver in consequence of the coarseness of the iodide, much of which is filtered out. Can this be prevented?—I am, yours, &c.,

June 11, 1884. W. H. C.

Notes and Queries.

P. B. J. asks if the preparation of nitrous oxide is a matter of much difficulty.——In reply: There is no difficulty whatever in its preparation. All that is necessary is to place a quantity of crystals of nitrate of ammonia in a retort and apply heat. The gas is then evolved in great abundance and in a state of purity. Our correspondent is doubtless aware that this is the "laughing gas" of the lecture-room of a former period, its uses at present being mainly confined to anæsthetic purposes in connection with surgical operations of the minor class, such as the extraction of teeth.

C. O. E. A.—This correspondent wishes to know if the process of rendering photographs transparent by varnish after pasting them on glass, pigments being afterwards employed to colour them, is secured by patent.——In reply: There are more patents for this special department of photography than for any other; but, seeing that the process as described in the question of our correspondent was published more than once long previous to the first patent having been applied for, it follows that any one who is enamoured of this particular style of painting is quite at liberty to adopt it in everyday practice.

"WHAT is the readiest method for me to employ in converting a solution of nitrate of silver into metallic silver?—O. N. C."——In reply: Immerse strips or slips of clean copper, and the silver will immediately become precipitated upon it. The action that takes place is this:—The silver of the nitrate leaves the nitric acid with which it was previously combined, the acid in turn dissolving some of the copper. The precipitate is, therefore, metallic silver, and the solution becomes one of nitrate of copper, acquiring, of course, the greenish-blue colour characteristic of the presence of the copper salt. If the precipitate be washed and fused it will yield a button of pure metallic silver.

THOS. B. HUNT says:—"I do not quite understand what is meant by the spherical aberration of a lens, and would beg for a few words of explanation, thanking you doubly in advance if you will make such explanation capable of being comprehended by one who lays no claim to the possession of any scientific knowledge whatever."——In reply: We scarcely know what terms to employ in describing this phenomenon plainer than those already made use of, but we shall try. Spherical aberration means the inability of a lens to bring to a focus at one point all the rays of light which fall upon it and are transmitted. When the margin of the lens causes the focus of *their* rays to be nearer to the lens than those transmitted near the centre the aberration is *positive*. When, on the contrary, the marginal rays come to a focus at a greater distance than those of the centre, *negative* spherical aberration is indicated.

GEO. SANDERSON writes:—"One has sometimes proverbially to go far from home to hear home news. Some time ago I read in an American journal that the details of a recently-invented plate-coating machine, an invention by an Englishman, were to be published. Can you inform me if such an invention *has* been published or even completed, or must we regard it as as a *façon de parler?*"——In reply: We are not aware of publication having been yet made. We understand that certain mechanical details in connection with the machine probably referred to are in course of being perfected, and until this has been completed it would not be wise to bring it before the public. But from a perusal of our list of new patents in the present issue, it will be seen that a dry-plate manufacturer, Mr. B. J. Edwards, who, it is well known, prepares his plates by machinery, has secured a patent for the invention as, doubtless, worked in his own establishment. Seeing that Mr. Edwards has lodged a complete specification, our correspondent and those interested will have to wait only a short time until the specification is published.

J. H. B. says:—"I have a number of half-plate negatives of landscapes and street scenes from which I want, if possible, to produce lantern slides of the usual size. Can you oblige by advising, through the medium of your valuable Journal, the simplest method of effecting the reduction? I may mention that I exclusively use gelatine plates, and my negatives vary very much in density. I have looked through your ALMANACS and also the *Year-Books* for the past three or four years, but cannot find any way of reducing, although, of course, plenty of methods for enlarging are given."——In reply: In each of our ALMANACS there is invariably given a table of both enlargement *and reduction*, from which our correspondent ought to have deduced what he requires. But for his benefit, and that of any others who may be similarly situated, we shall endeavour to make the matter plain. Let the negative be erected in front of the camera and under such circumstances as to have a white or bright ground behind it at a distance of a few feet. This ground may either consist of a mirror reflecting the sky or a sheet of white cardboard upon which light falls. To the negative thus arranged the camera is pointed. If the camera be a small one having a lens to correspond the probability is that, if it be four feet away, the image will be too small; but in proportion as the camera is approached towards the negative so the dimensions on the ground glass increase. When in this manner the size desired has been obtained, all that is necessary is to insert a sensitive plate in the camera and expose. The photograph which results from this treatment is a transparency, and, if clear and bright, it will be adapted for exhibition in the lantern.

QUERIST.—A very good idea of the portable camera holder of Messrs. Oakley and Co. may be had by examining the diagram and reading the description of the same given on page 122 of our ALMANAC for this year. There is no patent restriction on its manufacture or employment.

WILSON NOBLE writes:—"I have a fancy for long-focus lenses, but I experience a certain difficulty in getting what I want. I use an $8\frac{1}{2} \times 6\frac{1}{2}$ camera, and for landscapes (I never take portraits; my friends find them so good when I do that they want too many copies) I use a 10×8 rapid rectilinear, eighteen inches focus, and a portable symmetrical, seven inches focus, and in preference use the latter without the front lens, thereby getting a lens of fourteen inches focus. What I want is a single combination lens of sixteen or seventeen inches focus—not to cover more than 10×8. A narrow-angle lens could be made with a large aperture, thereby having considerable rapidity; but in this I may be wrong."——In reply: Our correspondent should procure a single achromatic lens of the focus desired. It will not tax the powers of any working optician to grind a lens of this class, inasmuch as it is intended to include only a very small angle of view. The dimensions of the lens need only be small. One of this class, which we have mounted in a cell as a supplementary lens to screw into a whole-plate rapid symetrical mounting, has a diameter of an inch and five-eighths, its focus being sixteen inches. But our correspondent is wrong in supposing that a single lens of the focus he desires (seventeen inches) will bear a larger aperture than, or even so large as, the eighteen inches rapid rectilinear of which he is in possession. This being the case, he has nothing to gain, but everything to lose, by adopting the use of the single achromatic. True, with lenses of the combination class mentioned a flare spot not unfrequently appears in the centre of the plate; but this may be easily got rid of by adopting a supplementary mount, the length of which is a little greater than that of the original mount, which must on no account be tampered with. The separation of the lenses of an objective of the *genus* "rapid," by whomsoever manufactured, not unfrequently effects a total cure of the flaring propensity so common in this class of lens, although we have also done so by diminishing the distance between them.

Exchange Column.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPHS REGISTERED.—

Edmund Eccles, Broad-street, Bury, Lancashire.—*Four Photographs of Sir Henry James, G.C., M.P.*

John William Watson, 2, Garden-street, Bury, Lancashire. — *Three Photographs of Sir Henry James, G.C., M.P.*

Frederick Argall, High Cross, Truro.—*Photograph of Dr. Wilkinson, Bishop of Truro, and Chaplain Rev. Maxwell-Lyte,* also *Rev. A. J. Mason, Vicar of Barking and Canon of Truro.*

D. T.—Keep the chloride of gold in solution as directed. Add a couple of drops of hydrochloric acid to each fifteen grains of gold.

L. S. A.—Without the permission of the authorities you will not be permitted to photograph in the grounds or buildings of the Health Exhibition.

THOS. J. WISTON.—If you refer to our volume for last year you will find that a very great deal has been published on the subject of photomicrography.

J. HUFF.—The prints in question are probably rolled with very heavy pressure on a highly-polished plate. The kind of paper will not account for the difference.

HY. YOUNG.—For ordinary carbon printing you cannot do better than employ the common bichromate of potash. There is, for this purpose, no advantage in using the more expensive salt—the bichromate of ammonia.

WILSON NOBLE.—The carbonate of potash used in combination with pyro. is far more prone to discolour and produce stains than any other form of alkali we have tried in development. It is energetic, but apparently little under control.

A. B. Z.—Soak the glass for a few hours in a strong solution of common potash; the films will then be easily removed. After that place the glass for a few hours in dilute sulphuric acid, and then dry and polish with tripoli as usual.

C. E. F. N.—Evidently the plate had not been cleaned before the emulsion was applied. This is the only suggestion we can offer. All solutions containing citric acid are liable to become mouldy by keeping. We have not noticed it with common alum and citric acid, but we have with chrome alum.

C. TUCKER.—The ordinary "white-lead" varnish of the oil shops, when diluted with methylated spirit, will, it is true, make a varnish that may be used for negatives. But such a varnish will certainly not prove a very durable one if the negatives are subjected to much rough usage, as they frequently are, in printing.

T. C. L.—The fault is in the manipulation and not in the chemicals. You have prolonged the development too much. Had you brought out the pictures quicker you would have avoided the staining. If in future you resort to such slow development, you must employ a much larger proportion of bromide to keep the shadows clear.

B. R. WILSON.—For enamelling silver prints you should employ a gelatine as free as possible from colour—one that is transparent. What you have been trying is quite unsuitable (though a very strong and good gelatine of its kind), because it is opaque and has a considerable amount of colour; hence you do not get so good results as those you so much admire.

W. M. J.—It is quite possible that the india-rubber has had an injurious action on the silver solution; indeed, from what you say, it is more than probable it has. Have you, for the water-tight top of the bath, used pure or only the vulcanised rubber? If the latter, the trouble is fully accounted for. The vulcanised rubber contains a large proportion of sulphur. This reacts on the silver solution, and in a short time renders it useless.

FALSTAFF.—One of the easiest methods of recovering silver from waste emulsions is to melt them and then stir in about four ounces of sulphuric acid to each pint. This will react upon the gelatine, and render it so limpid that the bromide of silver will quickly sink to the bottom. The liquid portion is then decanted, and the bromide rinsed in two or three changes of water. It is then collected and added to the other residues, or dried and sent direct to the refiner.

F. MUNCEES.—1. All will depend upon the size of the negative to be enlarged. If it be very small then you can employ the quarter-plate portrait lens; but if the size exceed (say) three inches and a-half, you had better employ your whole-plate rectilinear. Practical enlargers, as a rule, always employ a lens which is capable of taking a negative a size or two larger than the one to be enlarged.—2. If the lens be a good one it will not require much stopping down.—3. Keep the solutions separate, and mix as required.

A. VILLARS.—The trade mark is that of one of the foreign opticians. We have seen some lenses bearing it which were very good in quality. We do not see what difference it can make whether you purchase the lenses you require direct from the maker or through an agent. Of course they are all of the same quality. First-class opticians do not make two qualities of photographic lenses. The colour of the blinds must, in a great measure, depend upon the aspect of the studio. If you have to stop off direct sunshine you will require an opaque and dark material. A dark green is as good a colour as any. If only a north light, pale blue or white may be used.

T. LEYLAND.—From what we can see there is very little doubt that the stains on the prints are due to careless manipulation. This we judge from the general dirty appearance of the prints. They are covered on the back with finger-marks and other evidences of clumsiness.

RECEIVED.—Andrew Pringle; W. H. Harrison. Thanks.

A PHOTOGRAPHIC MEETING.—We learn through a correspondent that the *employés* in Mr. W. W. Winter's establishment at Derby made their first annual excursion to Dovedale a few days ago.

ANTWERP INTERNATIONAL EXHIBITION, 1885.—Messrs. C. B. Pare and Co., 126, London Wall, E.C., have been appointed official agents to represent British exhibitors and facilitate the transport of their exhibits to the Antwerp International Exhibition of 1885.

PHOTOGRAPHIC CLUB.—At the forthcoming meeting of this Club, at Anderton's Hotel, Fleet-street, on Wednesday next, the 18th inst., the subject for discussion will be—*On Printing-in Skies.* Saturday afternoon outing will be held at Waddon. Trains from London Bridge at 2.35. Finish at Carshalton.

GREENWICH OBSERVATORY.—The annual visitation took place on Saturday last, 8th inst., when Mr. W. H. M. Christie, the Astronomer-Royal, read his annual report. From this it appears that photography continues to occupy a prominent position in the work of the Observatory. Solar photographs were taken at Greenwich on 215 days during 1883, and on 125 of the remaining days. Indian photographs were available to fill the gaps; so that but twenty-five days of the whole year remain without solar photographs for measurement. For this special purpose a new photograph micrometer, by Messrs. Troughton and Simms, has been added to the apparatus of the Observatory during the year, which is capable of measuring photographs up to a foot in diameter. The continuous records kept by means of photography during many years past have been followed up during the past year; in fact, it would now be impossible to dispense with them. On the whole, photography may be said to have improved its position at Greenwich.

KEEPING QUALITIES OF GELATINE PLATES.—Mr. G. A. Addenbrooke says, in the *Journal of the Photographic Society*:—The following experience regarding the keeping qualities of gelatine plates may, perhaps, be worth noting:—A friend lately gave me an unopened packet by a well-known firm, stating positively that they were purchased before the summer of 1880—how long prior to that he could not remember. He says they were taken no particular care of, having lain for some months in a cupboard too damp to keep clothes in, and the remainder of the time in his dressing-table drawer. The first plate tested developed well but blistered all over in the fixing bath; the second was immersed in strong alum before fixing, and proved a very good negative, with the exception of an insensitive and fogged rim about a quarter-of-an-inch deep all round. The rapidity seemed about one-quarter less than the average rapid plate in the market now. I must confess I was not prepared to see the plates turn out as they did, and felt very gratified to find that so exquisitely delicate a thing as the sensitised gelatine film would keep so long a time with such slight precautions, if well prepared.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. STEWARD, Optician,
For three Weeks ending June 11, 1884.
THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

May	Barometer.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max Shade Temp.	Min. Tem.	Remarks.
22	30.46	E	60	53	110	73	48	Bright & Clear.
23	30.27	E	63	57	116	78	50	Bright & Clear.
24	30·05	E	64	57	117	80	52	Hazy.
26	30.19	E	55	52	109	69	48	Bright & Clear.
27	30.34	E	54	50	104	70	45	Bright & Clear.
28	30·23	E	59	45	—	—	44	Overcast.
22	30 17	E	51	47	71	56	47	Overcast.
30	30 05	E	55	50	111	69	45	Cloudy.
30	30·02	E	54	49	75	58	43	Cloudy.
June 2	29·67	SW	57	53	107	69	47	Overcast.
3	29 57	E	58	53	91	65	50	Cloudy.
4	29·75	NE	54	51	—	—	51	Raining.
5	29·82	NW	57	54	104	64	51	Cloudy.
6	29·77	W	50	50	83	55	47	Raining.
7	29·58	E	49	47	90	59	46	Raining.
9	29·87	N	50	47	86	59	45	Overcast.
10	30·11	E	55	52	100	66	49	Cloudy.
11	30·12	W	61	55	108	69	50	Bright & Clear.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1259. Vol. XXXI.—JUNE 20, 1884.

FILTERING AND CLARIFYING SOLUTIONS OF GELATINE.

It is frequently desirable, even if not absolutely necessary, to clarify a solution of gelatine; that is to say, to remove every trace of matter which tends to make it opalescent, and to render it bright and transparent. Now, while this is an easy matter when comparatively dilute solutions are in question, it becomes considerably more difficult when the viscidity or state of concentration is increased. As a familiar example of the first we may instance the culinary operation of clarifying jelly, which is performed by the joint agency of coagulated albumen and straining through flannel. But if the same means be applied to a thicker solution of gelatine—say, even of the strength of an ordinary emulsion—it would be found to be wholly inadequate.

Albumen is undoubtedly the best method by which the clarification can be effected, if only the coagulum itself can be removed from the gelatine after it has done its work. In passing from the soluble to the insoluble state under the action of heat, the albumen collects together, as it were, the excessively-minute particles of matter which are to be removed, and which from their minuteness are beyond removal by filtration. In a non-viscous liquid the coagulated albumen at once separates into clots, which are readily filtered out and the liquid left perfectly clear and bright. In a viscid solution like gelatine, however, the result is the formation of a sort of emulsion, the clots of coagulated matter being formed in a very minute state of division and held in suspension in the thick liquid, from which it is extremely difficult to remove them.

Some time ago a method was described in these columns in which albumen is mixed with the gelatine solution and the whole beaten into a froth, the temperature being kept just below the point of coagulation. The proper state of "froth" having been reached, the temperature is suddenly raised in order to effect the coagulation of the albumen, which, upon allowing the mixture to rest, rises to the surface in the form of a scum, carrying with it all impurities. This method, however, is only practicable on a large scale, and requires a considerable amount of skill and judgment in its execution.

Having recently had occasion to utilise the albumen method of treating gelatine we have endeavoured to substitute for the method just described the process of filtration under pressure, a very simple means of performing the operation being now available to every one in the apparatus described by Mr. C. Beckett Lloyd in our pages twelve months ago. But even filtration under pressure proves successful only under favourable conditions, which we shall describe.

In the first place, the albumen must not be added in excess of what is requisite, and must be most intimately mixed with the gelatine before it commences to coagulate; in other words, it must be added to the gelatine when the latter is at a comparatively low temperature, and, after thorough incorporation, the whole must be rapidly raised to the temperature of coagulation.

With regard to the quantity of albumen necessary: this will vary according to circumstances—that is, according to the quantity of foreign matter to be removed, and also, to some extent, to the hardness or otherwise of the gelatine. The white of one egg beaten up with four ounces of water to a stiff froth and allowed to subside is what we have employed, and of this mixture one drachm suffices for ten ounces of a twenty-grain solution of Coignet's "gold label" gelatine.

To apply the process the gelatine is first of all dissolved, and it should be dissolved in the largest quantity of water allowable. The albumen is then added at a temperature not exceeding 120° Fahr., and thoroughly mixed either by stirring or shaking. Have at hand a vessel of boiling water kept in a state of ebullition by suitable means. Into this the jar or beaker containing the gelatine and albumen is plunged, the stirring being kept up continuously. Albumen coagulates at a temperature considerably below that of boiling water; hence the heat available will be ample for the purpose. But a sufficient time must be allowed, as the process of coagulation is by no means instantaneous. Here is one of the chief causes of failure.

When the gelatine is first immersed in the boiler no immediate change will be apparent; but after stirring for some time, and when the temperature has reached 150° or 160° (perhaps before), the mixture will commence to turn opalescent, and will rapidly become quite opaque from the formation of finely-divided coagulum. As soon as the opalescence commences to appear cease stirring, and continue the action of the heat for at least another five minutes.

In very rare and favourable cases the gelatine solution will be nearly transparent, the albumen separating into distinct clots; but in the majority of instances it will be found to present more the appearance of a tolerably-fine emulsion, and will require very close and careful filtration to render it clear. For this purpose we have recourse to the "steam-exhaust" filtering arrangement described by Mr. Beckett Lloyd, or, rather, to a modification of it.

In its simplest form Mr. Lloyd's filter (figured on page 220 of our current Almanac) consists of a glass flask, to which a funnel is attached by means of a perforated cork. The flask being filled with steam the funnel, previously plugged with cotton wool, is fixed tightly in its neck, and as the steam condenses a vacuum is formed which draws through the filter any liquid that may be poured into the funnel. In the first place, the glass flask is not strong enough to sustain the pressure from outside when it reaches a certain point; it is not, in fact, adapted for slow filtration, and the plug of cotton wool is liable to clog on the one hand or filter imperfectly on the other. If a filter-paper suitably protected to prevent its breaking under the pressure be used air will gain access to the flask between the funnel and the filter, and so destroy the vacuum without effecting the desired end. For these reasons we have modified the arrangement in the following manner.

Instead of the flask a porcelain or earthenware jar or bottle is employed, taking care to select one with as narrow a neck as can be conveniently be employed. This is fitted with a good cork, thoroughly saturated, by boiling for some time, with paraffine. This is bored with two holes, through one of which is passed one leg of a "thistle-headed" funnel previously bent into ∩ form; through the other a tube bent at a right angle and fitted with a tap or cock, the joints being made secure by melting more paraffine on to them. The tube connected with the funnel reaches nearly to the bottom of the jar, the funnel itself reaching down to about the same height outside; the other tube, which may be of brass or copper, passes through the cork only.

In order to use this funnel a piece of thick felt, two thicknesses of filter paper "sandwiched" between muslin or calico to give strength, or any suitable medium, is tied over the "thistle" of the funnel, and the latter is dipped into the solution to be filtered contained in any suitable vessel—a cup or beaker, for instance—of such depth that it will reach to the bottom, and so take up all the liquid. The second tube is now connected with a small glass flask containing water, which is brought to the boiling point, sending a stream of steam into the large jar, and thence through the funnel into the liquid to be filtered. When the steam is seen to be passing freely into the liquid the cock on the bent tube is closed, the heat removed from the water flask, and, as the contents of the jar cool, a vacuum arises which causes the liquid to be filtered to pass through the filter and into the jar. Upon the perfection of the joints depends the degree of thoroughness to which the filtration may be carried. If only moderately good an immense pressure is brought to bear upon the liquid, sufficient to force it through almost any medium that is at all pervious.

Another application of this method of close filtration is in connection with the cure of "pits." So far as we have been able to ascertain with a number of samples of gelatine liable to the fault, it proves an infallible cure. It must be applied to the gelatine, however, and not to the emulsion, otherwise a large portion of the silver salts will be removed.

PRACTICAL DETAILS OF ALBUMENISING PAPER.

Redeeming the promise we made last week, we shall now proceed to describe the working details of the preparation of albumenised paper.

The first thing is to decide how much albumen has to be prepared to coat the quantity of paper required. As a guide, it may be mentioned that a ream of paper will consume from a gallon and a-half to two gallons of albumen; and, as one egg yields from three-quarters of an ounce to an ounce of albumen, according to its size, it is easy to arrive at the number that will be required to coat a given quantity of paper, bearing in mind that more than is actually consumed by the paper must be prepared—sufficient to well cover the bottom of the dish when the last sheet is floated. Thus, a couple of quires of paper (a convenient quantity for an amateur to prepare at a time) will take something like a quart of albumen; this, on an average, will be obtained from about fifty eggs. If the paper be coated in the whole sheet of course considerably more than this will be necessary; but, for the nonce, we shall assume that the paper will be prepared in quarter sheets, as that will be the most convenient size for the novice to commence with.

Fresh white of eggs can now be purchased in any quantity, the egg merchants finding it to their advantage to break the eggs and sell the albumen and yolks separately, as there is a large demand for both, but for different purposes—the former for albumenising paper for photographic purposes, and the latter in the preparation of kid leather for the manufacture of gloves. Therefore, when the albumen can be conveniently purchased separately it will be found more economical. However, we shall assume that this cannot be done, and therefore the eggs must be broken by the operator himself. Here some little dexterity is required in order to avoid the yolk getting mixed with the whites. The best plan is to break the egg by giving it a smart tap on the edge of the cup, and then drain the albumen into it, retaining the yolk in the shell. By draining the white from each egg first into a cup, the yolk, if it be accidentally broken, does not get mixed with the bulk of the albumen. The yolks can, of course, be transferred to the culinary department, where they will doubtless prove acceptable.

It is generally recommended, in breaking the eggs, to separate the germ from the albumen, but this is never done in actual practice. With regard to the kind of eggs to be used: good ordinary French eggs will answer quite well, and they will be found practicably as good as the more expensive "new laid." The requisite quantity of albumen being obtained it is well stirred up, and to each quart three hundred grains of chloride of ammonium, dissolved in the smallest possible quantity of water, is added. The whole must now be converted into a perfect froth. Unless this part of the operation be very perfectly performed it will be quite impossible to ensure a perfect coating. Professional albumenisers usually employ an American churn for this purpose; but, on a small scale, the domestic egg whisk borrowed from the kitchen will answer quite as well. The whisking must be continued until the vessel containing the albumen can be inverted for a minute or two without any of the albumen draining out. The vessel is then placed away in a cool place for three or four days according to the temperature, to allow the albumen to subside. By this time it will have become very limpid. If the albumen be kept in a cool place, and the eggs be tolerably fresh when broken, it will keep the above length of time without fear of decomposition. It could be used after a day's keeping, but it would be next to impossible to obtain a coating perfectly free from streakiness.

Some albumenisers, we believe, keep the albumen for a much longer period than that named—or until it has become quite putrid—before use, as then it is more easy to manipulate, and produces a finer gloss. We have been given to understand that dried blood albumen is sometimes added to thicken that obtained from the eggs, so as to obtain a still higher surface. However, the employment of decomposed and blood albumen was spoken of last week, and it need not be further alluded to here, the object of the present article being—assuming the paper such as that supplied some dozen years or so ago cannot now be purchased—to show how anyone may prepare it for himself. The proportion of chloride recommended above will give seven grains and a-half to the ounce of albumen, and will, therefore, be suitable for a sixty-grain sensitising bath similar to the one in vogue about that time.

Leaving the subject of the albumen for a few minutes, it will be well to direct attention to the paper itself. It is tolerably well known that the two sides of a sheet of paper are different, one being very smooth, while the other possesses a certain amount of roughness, due to the web upon which it was dried in its manufacture. Of course it is the smoother side which is to be albumenised. As the reams are received from the mill the smoother side is always packed in the same direction; but when the ream is broken, and the paper sold in small quantities, it frequently gets mixed. Therefore it is necessary to examine each sheet separately, and in cutting it up—supposing it is to be prepared in less than the whole sheet—to take the precaution that the smoother surface is arranged all one way, so that no mistake need be made in floating the wrong side on the albumen.

The albumen having stood the requisite time, it is now carefully strained; a fine cambric handkerchief will form a good medium for the purpose. After straining, the most careful albumenisers filter the albumen through a sponge; but this is scarcely necessary if the cambric be close in texture, and the albumen has been carefully decanted without disturbing the sediment. It is now poured into a dish of a suitable size, avoiding the formation of air-bubbles as much as possible. After standing for a short time, to allow any minute ones that may be accidentally formed to come to the top, the albumen is carefully skimmed by drawing a piece of blotting-paper along its surface. It is now ready to receive the paper.

In floating the paper some little dexterity is required to avoid bubbles, and many operators have different plans of placing it upon the albumen. Some bend the paper in a curve and apply the middle first, and then gently lower the two ends. Others, holding it by opposite corners (diagonally), bend it, and apply first one of the free corners, gently lowering it to the other, and finally lower the two corners by which it is held. Many apply the paper in this way, and it is the plan we prefer:—Holding the sheet by its two ends they place one on the surface of the albumen at one end of the dish and gently lower the remainder. By this method any air-bubbles, should they be accidentally formed, will be driven towards the end of the sheet, where they can easily be forced out by gently tapping the back of the paper with the tips of the fingers; whereas if any be formed when the middle of the sheet is applied first they are not so easily noticed, or expelled when they are.

When the paper is first applied—particularly if it be very dry—it will probably curl up and leave the albumen at the edges, but it will speedily flatten out again. It must not, however, be removed until it lies uniformly flat; otherwise the coating will prove unequal in thickness when dry. In practice it is advantageous to employ two dishes, and it will then be found that by the time the second sheet is floated the first one will have become flat and ready for removal, and thus time will be considerably economised. If the paper be floated for too long a time the albumen will sink deeply into it, and thus, to some extent, prevent a high gloss being obtained.

As there are many little manipulatory details of importance in connection with the removal of the paper from the albumen, and the drying of it, which pressure on our space precludes our entering into now; and, as we are anxious to make the instructions as explicit as possible, we defer until next week the final portion of the subject.

THE INFLUENCE OF A LENS SUNSHADE.

It is always a safe practice to prevent, by means of a suitable hood, any more light from falling upon a lens than that which comes from the subject to the reproduction of which the photograph is to be confined. Anything beyond this is of no utility, and, under certain circumstances, may prove mischievous.

It cannot have escaped the notice of our readers that whereas in front of some lenses the mount projects so far as to form quite a deep hood, in others the lenses are brought up to the end of the tube in which they are contained, and no more of the tube remains projecting than is barely sufficient to shield the convex surface of the glass, and protect it from being scratched if laid down upon its end. Now, in such a case as this, it follows that the lens is totally devoid of the protecting agency of the hood as a sunshade, by which is here understood any means to screen the lens from a bright sky.

Having observed on one occasion that two negatives of the same subject—the lens in one case having been carefully screened, while in the other it was not—were alike equal in brilliancy, we have been led to bestow some attention upon the subject of the uses of sunshades.

The function of the hood, in addition to its forming a place for the cap, is to prevent more light from entering the lens than is requisite in forming the picture. There is an idea prevalent that if the light from the sky strike the lens it will, in some measure, tend to fog the photograph. In ascertaining the precise degree of truth contained in this surmise it is necessary to take an extreme case, and we have done so by directing the camera towards a view possessing an abundance of deep shadows as well as high lights, removing, for the purpose of our experiment, the hood of the lens and permitting the direct rays of the sun to fall upon its surface. The lens employed upon the occasion to which we here refer was one of the well-known "rapid" type. This, it will be admitted, was, indeed, an extreme case.

Having first of all attached to the front of the lens a movable skyshade, which was "set" in such a manner as to cut off all that was not intended to be included in the photograph, we examined the image on the ground glass. While engaged in doing this a friend, by arrangement, turned up the skyshade so as to permit a beam of direct sunlight to fall upon the lens. There was a slightly appreciable increase in the illumination of the foreground shadows, showing that the direct sunlight upon the front lens had exercised some degree of agency of an adverse character. To ascertain the immediate cause of this increase in illumination, the ground glass was removed and the appearance of the lens observed, when the eye was placed in the line of light reflected from the lens. The impact of the solar beam did not appear to affect the instrument itself in the slightest degree; neither was there any reflection from the edge of the lens, which was not only well blackened with varnish, but had an annulus of blackened brass inserted in the cell, so as to cover up the margin of the lens completely. But from the fixed central stop in the lens, composed of an unnecessarily thick pair of plates of brass, and upon the edge of which the solar beams impinged, there was a reflection of a decided description, and it was this that caused the illumination of the shadows of which we have spoken.

When the lens had been unscrewed from the camera and special precautions taken to prevent this reflection from the edge of the fixed stop, by painting the brasswork with a very deep, non-reflective black varnish, the cure of the evil was effected. There was then no difference perceptible between two negatives, one of which was taken with the lens entirely shielded from the sun's rays, the other with the rays allowed to enter obliquely as already described. Of course, in no case was the light of the sun permitted to pass through the lens on to the plate; all we aimed at was to secure its transmission at an angle so oblique as only to impinge upon and illuminate the sides of the mount.

The whole of the evil attributable to the impact of strong light upon the anterior surface of a lens such as we have been speaking of is not caused by any internal or other reflection of an optical nature, but arises solely from the mount. To demonstrate this we arranged a lens in relation to the direct solar rays, so as to give the maximum of reflection or flare. Then, without disturbing the camera, we unscrewed both lenses from the mount, which we replaced by two boards that might be represented by the top and bottom of a cigar-box, and, in truth, formed the arrangement in this case. Here, then, we had the lenses separated from each other to the same extent as in the original mount. They were inserted in apertures made in the top and bottom of the box directly opposite each other, without the slightest chance of any reflection being caused from the sides of the box. In this experiment, no matter to what extent or at what angle the sun's rays were permitted to fall upon the front lens—so long as they were not permitted to have access to the second—none of such rays seemed to have the slightest influence upon the image on the ground glass, which was quite bright and sharp, no matter whether the solar rays fell upon the anterior lens or were prevented from so doing.

There are, however, circumstances in which this immunity from fogging will not be secured. Unless the anterior lens be not only polished in a most perfect manner, but is also quite clean at the time of the trial, it will become not alone a transmitter of light but a radiant that diffuses in every direction, in a greater or less degree, the light falling upon the surface. It is under these circumstances that fogging is induced by the impact of light upon the front surface of a combination.

From what has been said it follows that, if a lens be well polished and properly mounted, there exists no necessity whatever for having a prolongation of its mount in front; for a hood does not in the slightest measure diminish the chances of fogging when the sky is bright, or the direct rays of the sun are absorbed by the anterior element of the combination.

A NEW GELATINOUS MATERIAL.

The uses to which gelatine and similar substances are put in photography are so manifold and so important that an account of any addition to the list naturally possesses great interest. We gave details last week, gleaned from Mr. Stanford's paper read before the Society of Arts, of the connection between seaweed and the important elements bromine and iodine; and today we purpose bringing before our readers particulars which suggest a practical outcome in photographic directions of that gentleman's investigations upon the gelatinous materials to be obtained from seaweed.

Many inquiries have of late been made about gelatinous substances from Eastern sources, but of whose actual origin little seems to be known, the so-called "Japanese isinglass," sometimes termed "gelose," being one of them. This remarkable substance which has been successfully tried in emulsion-making, is extracted from a species of seaweed to be found on our coasts, though not very readily, the particular plants to which Mr. Stanford directed his attention being of common occurrence, and found in practically illimitable quantity. The well-known orders of *Fuci*, familiar to a dwellers by the shore as "wrack," "bladder-wrack," &c., at one time furnished all the seaweed used for making kelp; but they are now entirely neglected, and the *Laminaria*—the red weeds found growing only under water, though often torn up by storms and cast ashore as "tangle"—are employed in their stead.

The extraction of iodine is the chief object of the collection of this weed, but this new gelatine is now proposed as an equally important product by Mr. Stanford, who has devoted a lifetime to the investigation of the weeds and their economic applications.

Before describing its properties in detail it may be well to refer to the properties of the gelose alluded to, as tabulated in comparison with other similar substances by that gentleman. He finds 1,000 parts of water to require of—

	Parts.	Proportion.	Melting Point.
Gelose	4	1	90° F.
Gelideum corneum	8	2	90° „
Irish moss...........	30	7·5	80° „
Isinglass	32	8	70° „
Gelatine..............	32	8	60° „
Carragheenin........	36	9	70° „
Agar-agar...........	60	15	90° „

Gelatine is a very wide term, but the table gives, no doubt, an average.

Coming, now, to the mode of procuring this new material, it may be briefly described as the gelatinous matter mixed wiih cellulose that remains after the weed has been maccrated with water to remove the salts, and the name "algin" is proposed to be given to it. Algin is a combination of calcium magnesium and sodium, with a new acid to be called "alginic acid," and it is extracted by macerating the plant in carbonate of soda, and by a peculiar process separating the cellulose. The liquid obtained is precipitated by hydrochloric or sulphuric acid. The alginic acid separates, and is washed and pressed into a compact cake, in which state it may be sent into the market, or it may be easily bleached first. It may also be saturated with soda and sent out as alginate of soda. It is thus seen that it possesses the great advantage of being a strictly-defined chemical product, which might be expected to be made by purification of uniform character. We do not forget that the same remark was made of gelatine as opposed to pyroxyline, though it was quickly discovered that no such expectation could be realised.

With regard to the properties of sodium alginate: it will be seen that they are very remarkable, and, either as a medium for emulsion or as a mounting material, the substance evidently deserves a thorough trial. It forms a thick solution when of two per cent. strength, and when above five per cent. it will not pour. Its viscosity is extraordinary. It was compared with well-boiled wheat starch, and with gum arabic in an ordinary viscometer tube. The strengths employed were as follow. It was found impossible to make the algin run at all over the strength employed:—

			Seconds.	
Gum arabic solution...	25 per cent.	took	75	= 1 in 3,
Wheat starch...........	1·5	„	25	= 1 in 8,
Algin	1·25	„	140	= 1 in 112,

so that algin has fourteen times the viscosity of starch and thirty-seven times that of gum arabic. The evaporation of the algin so as to form sheets is performed in a similar manner to that adopted with glue, and the sheets are almost colourless and very flexible. It possesses several remarkable properties which distinguish it from all other known substances.

Algin, or sodium alginate, is precipitated among other things by alcohol and collodion, but not by ether. Many acids, silver, and other metallic salts precipitate it; alkalies, pyrogallic acid, bromine, iodine, or chlorine water, &c., do not precipitate it, nor does tartar emetic, thus being distinguished from gelatine, and also by not being acted upon by tannin. It most resembles albumen, but is not coagulated by heat; and, unlike gelose, it does not gelatinise on cooling. In this particular it is more like tragacanth—a much-neglected mounting material. It is not dissolved by boiling water.

Among its other properties is a power of forming a compound with aluminium, which is soluble in ammonia, and forms when dry an insoluble varnish. With chromium it forms a compound soluble in cold water, which is rendered insoluble by boiling. It behaves in a similar manner to gelatine when mixed with bichromate, becoming insoluble under the influence of light. The silver alginate is stated to darken very rapidly under exposure to light. Finally: Mr. Stanford says—"It forms a singular compound with shellac, both being soluble in ammonia. It is a tough sheet, which can be rendered quite insoluble by passing it through an acid bath."

Thus, as a possible substitute for and improvement upon gelatine for emulsion, for mounting, sizing, varnishing, and other purposes, algin or sodium alginate promises to be a most interesting and valuable addition to the list of photographic chemicals.

Our friend Dr. Liesegang recommends in another column, as a protection to the surface of collodio-chloride prints, the application of an extract of *Semen psyllii*. As many of our readers may be ignorant of the nature of this substance, and probably cut off from sources of reference, we may say for their benefit that the seed referred to is that of *Psyllium pulicaria*, belonging to the order of *Plantageneæ*, and commonly known as *Fleawort*. The seeds are remarkable for their mucilaginous character, and have been used as a substitute for linseed and marsh-mallow in the concoction of demulcent potions. The extract or decoction is also used as a substitute for starch in the getting up of some of the finer forms of linens and muslins.

Few people are unacquainted with the difficulty and trouble attendant upon the want of adhesion of labels to metal and to glass bottles where exposed to variety of temperatures; hence any new mode of meeting the difficulty will be useful. For glass bottles a solution of chrome alum and gelatine is, perhaps, as good a damp-resisting mountant as any. Metal always presents difficulty, especially when exposed to damp; but, according to a foreign contemporary, it can be overcome by the use of albumen for the purpose. White of egg well beaten up is diluted with its own bulk of water and applied with a brush to the surface to be united; and then, before it is dry, a hot iron is passed over the paper so as to coagulate the albumen. It is also suggested that, by means of successive layers of paper and albumen, waterproof boxes, &c., may be formed.

Visitors to Padua are familiar with the church of St. Antonio (the Santo), where are to be found some of the most beautiful *bas-reliefs* and statues by Donatello—marvels of delicacy and perfection of execution, forming most attractive objects to the student. They are, however, in many instances, placed most awkwardly for obtaining sketches, and a demand for photographs has often been made. According to the *Athenæum*, well-known Italian photographers have been applied to for photographs of the many objects of interest in the Santo, but have been met with the invariable response that neither their position nor the light they receive permits their being executed with any chance of success. The result has been that, so important are these bronzes considered in the world of art, they have been repeated in plaster, for the purpose of the plaster cast being photographed. This has been done very successfully, and a series of twenty-five *photogravures* have been obtained which exhibit the qualities of the original in a high degree. We are, however, quite one with the *Athenæum*, which, speaking of a particular subject, says:—"Supposing, now, that this altar front was set in a fair light before a photographic camera, although in the reproduction some of the detail would be lost, on account of the varying colouration, yet the gain in depth of tone would more than counterbalance the trifling loss of some minor incidents."

The names of Swan and of Edison are inseparably connected with the electric light, and more particularly with the incandescence forms which may be said to have been brought to perfection by these gentlemen. It is stated, however, that Mr. Edison is changing his views upon the advantage of the incandescence system, and is about to introduce an arc light.

We would call the attention of our readers to a most interesting extract [see page 395] from a lecture by Dr. Gill, whose photographic work at the Cape in connection with the great comet of 1882 will, no doubt, be fresh in our readers' memories. The growing—indeed, we may say the paramount—importance of photography in astronomical operations is shown in a strong yet lucid manner, and the utmost emphasis is laid upon the actual necessity for its employment and the important place it will occupy in the future. So much, however, have photographic processes advanced that we are strongly of opinion that, at no distant date, trained specialists in photography will be needed in addition to the

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J. W. SWAN.

INK-PHOTO, SPRAGUE & Co LONDON.

ordinary astronomical staff to obtain the highest results of which photography is capable. The time must come when training in photography will be almost as important as in chemistry, and steps will have to be taken for establishing a centre of teaching.

Cadmium is filling a new function in forming, in the metallic state, one constituent of a very fusible alloy. Professor Guthrie, in the course of an investigation upon the behaviour of salts in solution, carried his experiments into the region of metals in a state of fusion, and devised one alloy which melts at an extraordinarily low temperature—160° Fahr. This, it will be seen, is far below the temperature of boiling water, and, if the alloy were available otherwise, there would be no obstacle in the way of obtaining a mould from a gelatine relief. It is composed as follows:—47·38 parts of bismuth, 13·29 of cadmium, 19·36 of lead, and 19·97 of tin. It would, however, be rather an expensive metal when required in quantity, otherwise many very useful applications might be found for it in photographic processes.

MR. J. W. SWAN.

There are few names in contemporary photographic history that are more familiar or have been longer known to the readers of this Journal than that of Mr. J. W. Swan, the subject of our illustration this week. First known in connection with the late Mr. John Mawson, of Newcastle-on-Tyne, as a member of the firm of photographic chemists in that city whose collodion and other products have gained for them a reputation wherever photography is practised, Mr. Swan upwards of twenty years ago devoted his energies specially to the solution of one of the problems of the day, and the result of his devotion to progressive photographic research was the publication of the first practical carbon printing process.

Utilising the discoveries of Poitevin, Mungo Ponton, and others, and working on somewhat the same lines as Fargier, in France, he was the first to bring carbon printing within the domain of daily practice, by not only recognising the necessity for, but actually carrying out the development of, the "tissue" from the back, and thus rendering it possible to secure natural half-tone where hitherto it had been only possible to secure black and white. Swan's patent, taken out in 1864, formed the basis of the present process known as "autotype," and the company still in existence bearing that name was founded for the purpose of purchasing his patent.

Since that period Mr. Swan has lent his energies to many applications of chromated gelatine and mechanical printing processes, as well as to other branches of photography. He was one of the earliest to recognise the value of gelatine dry plates, and his firm was among the first to place them commercially before the public.

To the outside public—that is, to the non-photographic public—the name of Swan is as familiar as it is to photographers, through his connection with electric lighting. Swan's "incandescent lamp," though an outcome of the most modern advances in electrical science, is no new idea to its inventor, as the first publication of the principle of incandescent lighting came from Mr. Swan as far back, we believe, as 1847 or 1848. But at that time it was unfortunately impossible to carry out the idea, owing to deficiencies in the mechanical appliances as well as in the scientific knowledge of the day; but the introduction and rapid development of dynamo electric machines, and the consequent cheapening of the production of electricity, with the improved methods of exhausting the globes of the lamps, no less than the great rage for electric lighting, combined to render the Swan mode of lighting a great success.

Mr. Swan is a Fellow of the Chemical Society and of the Institute of Chemists; a member of the Society of Telegraph Engineers and of the Society of Chemical Industry. He was President of the Newcastle Chemical Society in 1882. Last year, in recognition of his services in the interests of science, the University of Durham conferred upon Mr. Swan the honorary degree of M.A.

Our portrait is from a photograph by Mr. E. D. Lavender, of Bromley.

LIME-LIGHT EXPLOSIONS AND THEIR PREVENTION.

In repeating the experiments of my last paper with oxyhydrogen gas instead of ether, I did not think it necessary to record the whole of them, but merely a few of the most distinctive.

The results obtained were different from what I expected, for I have often noticed that a flame of ether burning at the orifice of a jet is easily blown out by the breath or by a puff of wind; whereas a flame of hydrogen seems to cleave to the tip of the jet and is not so readily extinguished. I expected, therefore, to find that the oxyhydrogen would be more difficult to deal with than the ethoxo gas, and would force its way through a longer safety tube. The contrary, however, appears to be the case, as the following experiments will show:—

No. 1. A balloon filled with explosive oxyhydrogen gas and attached to the tap of the jet. The flame burns at the orifice of the jet as long as the pressure keeps up, but as soon as the sides of the balloon collapse it passes back with a loud report.

No. 2. Same as the last experiment, but with a piece of cane an inch long attached to the tap of the jet. Flame stops at the cane and does not enter the balloon.

No. 3. Same as No. 2, but balloon filled with an explosive mixture of *coal gas* and oxygen instead of oxyhydrogen. Flame passes through the cane and bursts the balloon.

No. 4. A safety tube half-an-inch in diameter and half-an-inch long, filled with tin filings screened as before described, and placed in the *front* part of the jet immediately below the mixing chamber. Balloon filled with coal gas and oxygen, as in the last experiment. Flame arrested by the tin filings and does not enter the balloon.

No. 5. Same as No. 4, but balloon filled with ethoxo gas instead of coal gas and oxygen. Flame passes through the tin filings and destroys the balloon.

No. 6. Same as the last experiment, but granulated pumice used instead of tin filings. Flame arrested and balloon saved.

No. 7. Ditto, ditto, but screened scrapings of slate pencil substituted for pumice. Flame extinguished as before.

No. 8. Ditto, ditto, ethoxo gas being used, but tube filled with a substance known in commerce as "flared glass," screened as described in my last communication. Flame passes through the glass and shatters the balloon.

No. 9. Same as No. 8, but the tube containing the glass removed from the front part of the jet and attached to the tap at the other end. The flame is now extinguished and the balloon saved.

No. 10. Same as No. 9, but with eighteen inches of vulcanised tubing between the tap and the safety tube to increase the volume of the explosive ethoxo gas. Flame extinguished and balloon saved.

The "flared glass" above referred to was sent to me by Messrs. W. H. Oakley and Co.'s assistant. It consists of rounded particles of coloured glass which pass through a sieve containing thirty-six meshes to the inch, but are retained by one of sixty meshes. As it is quite free from dust and not liable to be acted on by the gases it seems likely to be a useful material for the purpose we are now considering. It is not, however, equal to pumice granules nor to scrapings of slate pencil in its power of arresting the ethoxo flame, and it reduces the pressure of the gas to a somewhat greater extent (about twenty-five per cent. for a tube half-an-inch long).

No. 11. Two balloons of the same size, filled respectively with ethoxo gas and oxyhydrogen. The balloons are attached alternately to the tap of the jet without any safety-tube, in order that I may count the number of seconds which elapse before the flame passes. The difference is at once obvious, the ethoxo gas exploding in the balloon whilst still half-full, whereas the oxhydrogen burns at the mouth of the jet until the balloon is comparatively empty and the pressure has nearly ceased.

In considering the results of these and many other experiments I notice, in the first place, that the effect of placing the safety-tube in the *front* part of the jet is not what I anticipated. I expected by so doing to give it an advantage, but it proved to be quite the contrary. The explanation of this discrepancy between theory and practice is not obvious, but I may remark that the tube was placed for the sake of convenience *beneath the mixing chamber;* whereas I suggested in my last communication that the right position for it to occupy theoretically would be *above* the mixing chamber, and between it and the nipple.

If any of your readers should be disposed to repeat these experiments I may mention for their guidance that I prepared the hydrogen gas in the way I usually do for lantern work, namely, by the action of dilute sulphuric acid on iron filings. The gas so obtained is not pure, but it answers very well for the lime light.

To find the proportions for giving the greatest explosive power I turned on the oxygen tap of my biunial lantern until the little cone of imperfect combustion at the base of the blowpipe flame *just began to disappear*, and the flame became solid throughout. Repeated trials with a little more H or a little more O satisfied me that this was the best point to hit, namely, sufficient O to burn the H without any assistance from the external air.

In the case of coal gas and ether, both containing carbon, the penetrating power of the explosive flame is greatest when the dark cone at the tip of the jet is about one-sixteenth of an inch long. And if you wish to drive the flame through the cane you must attend to this point very carefully, since the smallest excess of either coal gas or oxygen will cause the flame to stop when it reaches the cane, although it will still explode in the mixing chamber when you turn off the tap of the jet.

The sum of the whole matter, so far as I have been able to ascertain, is as follows:—That the flame of oxyhydrogen gas is more easily arrested by these safety tubes than that of oxygen and coal gas, and oxygen and coal gas more so than the ethoxo gas.

The best materials which I have tried for stopping the flame are pumice and slate scrapings, and next in order metal filings and "flared glass." Porous wood like cane and small shot are not without effect, but stand lower down in the list.

A safety tube properly made and attached to each tap of the jet may be relied on for stopping any of the above-mentioned explosive flames; and the pressure of the gas is not so far reduced as to make the process unworkable.

In my last communication an error occurred in correcting the proofs. In the thirty-fifth line from the top, instead of "No. 6 same as No. 4," it should be "*No 6 same as No. 5.*" As it now reads the addition of a Chadwick back-pressure valve is said to weaken the safety tube; whereas the experiment merely showed that it did not materially strengthen it. T. FREDERICK HARDWICH.

EXTRACT OF *PSYLLIUM* FOR PROTECTING THE SURFACE OF COLLODIO-CHLORIDE PRINTS.

IN a former communication I have recommended to soak the washed collodio-chloride prints in an ammoniacal solution of bleached lac, which imparts to them a very hard surface like that of albumen prints. As this solution is not easy to prepare, and as it changes through the evaporation of ammonia, I have been induced to find another medium, and I think the best of all I tried is an extract of *Semen psyllii.*

A quantity of this is covered with ten or twelve times its volume of cold water, and, after standing for a day, interrupted by occasional shaking, the liquid is filtered, a small quantity of methylated spirits being added. Those who prefer to mount the prints when dry may add some glycerine. After washing the prints are soaked in this fluid for a few minutes and dried. Even prints made on paper prepared with soluble gelatine may, after this bath, be treated like ordinary albumen prints without the collodion film breaking.

If it be desired to give the prints a coating of varnish I find a solution of one pound of copal in two pounds of linseed oil gives a splendid and most resisting covering, if applied with a pad of cotton or a brush. Prints treated in this way may be considered as permanent—neither light, nor air, nor humidity having the least influence upon them. ED. LIESEGANG, Ph.D.

MISTAKES IN EMULSION WORK.

IT is curious, in looking back on the last few years of experimental work in connection with gelatine emulsion, to see how many conditions have from time to time been laid down as essential to success which have afterwards turned out to be by no means so. I cannot, I am sorry to say, claim that I have not been among the mistaken ones; for I find that at times I have insisted on certain conditions which I now consider to be quite unnecessary, or even believe objectionable.

I would take several of the conditions which it was at one time thought essential to observe when great sensitiveness was required and say a few words on each, giving the results which have been indicated by recent experiments.

It was generally considered, some years ago, that if an emulsion were to be rapid the excess of bromide should not be very great; that no iodide be introduced; that the solution be neutral or but slightly acid; that the amount of gelatine used in emulsification and subsequent boiling be small; and that the amount of gelatine in the finally-finished emulsion be not great in proportion to the amount of bromide of silver in suspension. I do not mean to say that all these conditions were insisted upon by any one experimentalist, but I think they represent pretty fairly the general opinions held about two or three years ago.

To take first the excess of bromide: it is now pretty well recognised that sensitiveness is more rapidly gained with a large excess than with a small one; and now it is the rule to allow a large excess in almost all formulæ which are published. I am by no means certain, however, that we are not going too far in a direction opposite to that towards which we tended some time ago; that is to say, we incline to use now too large an excess of bromide. There is no doubt that by the employment of a very large excess we have a most rapid transition from the red bromide to the blue (by transmitted light); but when we have gone beyond a certain length in the matter of excess the image which is developed on the plate appears to suffer, becoming thin. Recent experiments incline me to think that a good amount of excess to have is about ten per cent.; that is to say, let there be used ten per cent. more bromide of ammonium or potassium than would be required to convert the whole of the silver nitrate to silver bromide. This will give sensitiveness in a fairly short time, and will produce a plate giving good density. I lay down the ten per cent. excess merely as an approximation, because the excess required or permissible may vary with other factors.

With regard to the introduction of iodide in emulsions it appears unnecessary to speak, as the subject has been treated recently by the Editors. I may just say, however, that I can corroborate their statement that a more rapid emulsion can—under certain circumstances, at anyrate—be made when iodide is present than when it is not; in fact, I consider iodide a necessity if we wish a very rapid plate of good quality. As to the amount: I could recommend, if potassium salts be used, three to four per cent. of the quantity of soluble bromide.

I now come to the question of acidity of the solutions, and here I must say that I have got some results which have surprised me very much. Before, however, taking into consideration the acidity of solutions, I would say a few words on the effect of one of the constituents of an emulsion which requires more attention than has been given to it. This is none other than the water which is used to dissolve the chemicals. This little matter has had but small attention, having been once or twice casually mentioned, but, so far as I know, never having received any considerable share of consideration; yet it is the one which ought in reality to have, perhaps, more than any other ingredient of the emulsion.

It may surprise some emulsion experimentalists to hear that, allowing the quantities of all the constituents of emulsions, with the exception of the water used in emulsifying, to remain the same, and varying the water only within the limits found in published formulæ, we may get two emulsions—one of which will require five hours of boiling to produce sensitiveness, whilst the other will require but ten minutes! This is an enormous difference, as will naturally be observed. Still I have found it so. The largest total quantity of water which I remember to have heard recommended for an emulsion in which 400 grains of silver nitrate are used is twenty ounces. The smallest is seven ounces. With the first-mentioned quantity it will usually be found that several hours of boiling are necessary before the blue silver bromide is produced. With the latter quantity only a few minutes is necessary. I must state, however, that I have never been able to cause the silver bromide produced from 400 grains of silver nitrate to suspend itself in seven ounces of water and gelatine. Eight ounces is the least quantity in which I have been able to emulsify 400 grains of silver.

To return to the acid, however: I was astonished to find in recent experiments that, when concentrated solutions are used—when, for example, we dissolve 400 grains of silver nitrate and the corresponding bromide solution each in four ounces of water—we may use a very considerable quantity of acid without much increasing the time necessary to gain sensitiveness. I have recently used as much as twenty minims of strong hydrochloric acid with the quantity of emulsion indicated above, and found, to my surprise, that after five minutes' boiling the colour of the emulsion by transmitted light was nearly blue, and that a fairly-rapid emulsion was the result. After a quarter-of-an-hour's boiling the change of colour was complete, and the emulsion decidedly rapid. At the end of half-an-hour's boiling it was very rapid, and here the experiment stopped; but from the quality of the plates, which would stand very great forcing without showing fog, I have no doubt that boiling might have been continued much longer. The plates were marvellously bright, and gave good, clean images. I consider the use of this large amount of acid mentioned to be most useful.

Another point on which opinion is rapidly changing is with regard to the amount of gelatine present during emulsification and boiling. It was until recently considered that the smaller the quantity of gelatine used at this stage of the process the more rapid would be the emulsion, or, at anyrate, that sensitiveness would be the more rapidly gained. I have always held that the amount of gelatine might be increased considerably beyond the minimum which it is necessary to use to keep the silver salts in suspension without in any way retarding the accession of sensitiveness; but it was not till recentlythat I discovered to how great a length we might go in the direc ion indicated. I think the best plan will be to give at this stage a formula which incorporates the several points that have been, or are to be, mentioned, and which I should have pronounced had I seen it a month ago to be one quite incapable of giving a rapid emulsion:—

A.

Silver nitrate	400 grains.
Water	4 ounces.

B.

Bromide of potassium	296 grains.
Iodide of potassium	20 ,,
Nelson's No. 1 gelatine	200 ,,
Hydrochloric acid	20 minims.
Water	4 ounces.

C.

Heinrich's gelatine	800 grains.

Water to soak this.

Now, it will be seen that in this the amount of gelatine used in emulsification is very great indeed; yet the formula is the very one used when I got the results mentioned in connection with the large quantity of acid used.

It may be asked—Why use so large a quantity of gelatine if less will serve to suspend the bromide of silver? I believe that not only do we get as great sensitiveness with the large quantity as with the small, but that we secure possibly more, whilst we certainly get more density of image. This I believe to be due to the partially-decomposed gelatine which results from the boiling.

I have proved to my own satisfaction that decomposed gelatine has the property of giving dense negatives in the following manner:—An emulsion was prepared by precipitation. A certain quantity of meta-gelatine was prepared by adding ammonia to a gelatine solution, and boiling till all trace of ammonia fumes had disappeared. This meta-gelatine added to the emulsion prepared by precipitation increased sensitiveness a little, and density of image somewhat more. It also brought about green fog; but, possibly, had the meta-gelatine been produced by long boiling instead of by the use of ammonia the result would have been different.

With regard to the point which is last mentioned, namely, the amount of gelatine finally put into the emulsion: it will be seen that in the formulæ given this is unusually large. In spite of this I find that the emulsion is certainly not made any slower by the use of it, nor is there any thinness of image produced, whilst, of course, a larger quantity of emulsion is obtained.

In conclusion: I would ask your readers to give the above very unpromising-looking formula a trial, and report results. I think I can guarantee that the emulsion will stand an hour's boiling without showing any fog. W. K. Burton.

ALTERING THE DENSITY OF GELATINE NEGATIVES.

[A communication to the London and Provincial Photographic Association.]

It may well be imagined that, as the post of lecturer has previously been filled by so many able men, I naturally feel a certain amount of hesitation in attempting to follow in their wake, and I must confess that my native modesty would have prevented me from so doing but for the following reasons, which I must ask you to hold as sufficient excuse for occupying your time this evening.

In the first place: I have always held the theory that each member of a society such as this should endeavour to do something to make its meetings interesting, even though he may not be able to impart much information. We cannot all read papers detailing original and elaborate experiments, nor discourse learnedly and eloquently on scientific subjects; but everyone, amateur or professional, should at least *try* to do more than simply absorb as much as possible from the brains of others without, in return, doing his share in bringing forward matter for profitable discussion.

Another reason is that I thought possibly the example of one of the rank and file might induce others to come forward who, till now, have kept too much in the background. Under these circumstances it was somewhat difficult for me to find a satisfactory excuse when our indefatigable Curator wished to press me into the number of monthly lecturers.

Our subject this evening is *Altering the Density of Gelatine Negatives*. Some there are who say they scarcely ever require to do this; but it may, I think, be taken for granted that, notwithstanding improvement in the quality of plates and better illumination of the dark room than formerly, it is still adviseable frequently to slightly modify the density of the image after fixing, if the best results be desired. What constitutes "proper printing density" I shall not attempt to define. No two photographers taken at random would be certain to agree on that point, and I shall content myself with alluding to the means whereby we may secure the end, without taking upon myself to set up a standard.

Inasmuch, however, as *lowering* rather than *increasing* the opacity is the easier (if colour and permanence are to be taken into account), it is preferable to make sure of sufficient density to start with, and *reduce* if necessary, than to stop development too soon and have to intensify.

Reduction of density may be obtained in several ways; and the following remarks will apply pretty equally to negatives or positives (with, perhaps, the omission of lantern slides), and, excepting the action of acid, to results obtained by pyro. or oxalate development. Negatives may be uniformly too dense, or have the high lights too thick and the half-tones thin; or there may be excess of detail with, at the same time, too great general opacity. The treatment of the negative must depend, therefore, on the existing gradation.

We will consider, first, the cases in which a thin layer of the deposit may be removed from the whole film, without injuriously affecting the gradation. On most pyro.-developed negatives acid will produce a change of colour dependent on the amount of yellowness present, and the strength of acid or time of immersion in it. This may be usefully taken advantage of, where only a slight reduction is required, by employing a weak acid (five per cent. will do), and removing and washing the plate as soon as the action has gone far enough. Owing to the tendency of acid alone to produce frilling, it is customary to dilute it with a strong alum solution instead of water.

The weakening effect of acid not being always sufficient, it is desirable to be able to have recourse to other means. These may be—attacking the image only, or removing a layer from the film itself. Hypochlorite of calcium (chloride of lime), hypochlorites of the other alkalies or of zinc, and ozone bleach have a solvent action on the gelatine, and will remove a thin skin from the negative, carrying with it, of course, the silver contained in that portion of the film so dissolved. I have used this method, both successfully and otherwise, but do not recommend it. It was very well till we knew of a better. Gelatines are not equally acted on, the softer kinds yielding too freely. The harder sorts are more tractable; but if hardened still more by alum the softening of the gelatine is likely to proceed but slowly, and then all at once the film commences to come away rapidly, so that great care is necessary to ensure a uniform and certain result. If a heavy stream of water be allowed to fall upon the plate when it is desired to arrest the action by washing off the bleach, the film sometimes gets carried away more in one part than another; and even in holding the negative up to watch the progress of the operation there is a liability to have the film drip off in little rivulets, giving streaky marks. A fine spray from a rose should be used for washing. Ozone bleach may be diluted with about six or eight parts of water. A saturated solution of chloride of lime should be diluted with twelve parts of water.

The methods of acting on the silver alone are many. The metal itself may be dissolved away by cyanide of potassium, or a portion converted into chloride or bromide and dissolved out by hypo. or cyanide. For this purpose ozone bleach with chrome alum has been recommended and employed, but it possesses no advantages over other chemicals more agreeable to use.

Some metals—such as copper, iron, and gold—form two kinds of chlorides (and bromides), one containing more chloride than the other; and when the one with the larger quantity of haloid (that is, the cupric, ferric, or auric chloride) is brought into contact with silver, it gives up a portion of its chlorine to the silver, being itself converted into cuprous, ferrous, or aurous chloride. According to the extent to which this proceeds the image becomes changed into chloride, and, therefore, soluble when placed in the fixing solution. An alteration in colour is produced without dissolving out the chloride of silver; but this would probably darken if left in the film, so should be removed. It is desirable to wash thoroughly before commencing to reduce, in order to prevent stains.

Chloride of copper or cupric chloride is of the three, perhaps, the best to use. Gold is expensive. Iron is, I fancy, more likely to give a yellow colour to the negative than copper. Five grains of ferric chloride to one ounce of water is a good strength. A few drops of hydrochloric acid in addition has been recommended. It may, if preferred, be mixed with the alum solution. If any pyro. stain exist it should first be removed with acid. The solution can be used until it becomes weak, and then strengthened or thrown away. Ferric oxalate, as you are aware, is also used. Its action is similar to that of the chloride. Captain Abney drew attention some two or three years ago to the fact that its presence in old oxalate developer was a cause of thin images, the metallic silver being attacked as soon as formed.

Cupric chloride is a very nice reducer—easy and clean to use. I have employed it for some time, and find a suitable strength to be—

Copper sulphate	4 grains.
Sodium chloride	6 ,,
Water	1 ounce.

The stock solution may, if preferred, be made more concentrated and diluted for use. If a good quantity be kept in the dilute state it can be used over and over again for some time without getting weak. When it is thought tha the silver has been sufficiently acted on, the negative is washed and flowed over with, or placed in, clean hypo. If not reduced sufficiently, after washing the operation should be repeated.

The cuprous chloride formed is not readily soluble in water, but is easily washed out if the plate be dipped into weak acid and alum after the hypo. has been removed. As the cuprous salt while in the film gives a slight brownish tinge its removal lowers the density a trifle more, and a little allowance should be made for this. With practice there is no difficulty in obtaining any required reduction. Should the solution by any chance be used too strong, or from unequal wetting of the plate with it the negative be more affected in one part than another, the plate should be left in till the image is bleached right through, and then, after treating with acid and washing, be redeveloped, again washed, and the reducing resorted to. If washing between each operation be not pretty thorough, stains will probably make their appearance.

I now call your attention to an exceedingly easy, clean, and practical method to which publicity was given by Mr. E. Howard Farmer in the *Year-Book* for 1884. The reducing agent is ferrid-cyanide of potassium; and, as this can be mixed with hypo. and will remain clear for some time, we have the very decided advantage of requiring only one solution instead of two. The slight uncertainty which always exists where reducing consists of two operations is here removed. I had been experimenting a little in this direction last year, but on the appearance of Mr. Farmer's article I found that someone else had forestalled me.

Mr. J. Spiller's modification of the chloride of copper process, published in the ALMANAC at the same time, was an attempt to do away with the use of hypo. by employing a saturated solution of common salt along with the chloride of copper. In my hands the strength of cupric chloride recommended by him is too great for the operation to be well under control, and the action of the sodium chloride does not seem to keep up with the copper, so that the image gets converted into chloride of silver faster than the sodium chloride will dissolve it out. Possibly an alteration of the proportions might give satisfactory results. The ferridcyanide of potassium I prefer to use rather stronger than suggested by Mr. Farmer, namely, about three grains to one ounce of a five-per-cent solution of hypo. It must be used fresh, and the negative is allowed to remain in this till sufficiently reduced, and then well washed. As there is then a slight yellowish tinge imparted to the film the plate may be dipped in acid and alum after previously washing it. The ease and certainty of this process will commend it to all who try it.

The double oxalate of iron and potassium found in old oxalate developer has been recommended when dissolved in water with hypo. This, it is said, will keep. As it does not appear to possess any advantage over the process just named, and as those who do not use oxalate developer will find it easier to obtain the ferridcyanide (red prussiate of potash) than this double salt, I have not thought it necessary to do more than allude to it.

Cyanide of potassium alone will act on the silver, but not quickly, and I think on the finer details most. I am speaking now of a solution applied to the plate. Mr. A. L. Henderson has told us that it may be better employed by exposing the plate face downwards to the fumes arising from a strong solution. One of the conditions of success is that the film must be thoroughly wet right through, so as to be soft and easily permeated by the fumes, and that the surface of the negative should be wiped free from drops of water; otherwise the reduction will not take place uniformly. Some of Mr. Henderson's experiments do not, when repeated by others, quite tally with his own; but in this case, as the negative I send round shows, if the details are attended to any amount of reduction can be obtained. Strength of solution, about one in six; distance of plate from liquid, perhaps three-eighths to half-an-inch. At the end of fifteen minutes no change observable; in three-quarters of an hour, some reduction; in an hour and a-quarter, a considerable lowering of density had resulted. Still it does not come up to the ferridcyanide of potassium and hypo. method. The time required is too long for anyone to stand by and watch it, and if the dish be placed on one side there is always the possibility of forgetting it till the action has gone just a little too far; whereas Mr. Farmer's process is quick or slow, according to the strength of the solutions, and quite under control. It is, therefore, equally applicable to large or small plates. In using the plain cyanide it is advisable to lift the plate up frequently, as, if the air charged with cyanide fumes long remains stationary, irregular markings might be produced.

Local Reduction of Density.—When the dense part is of a fair size a good way is to flow over first with a weak solution of the chemical employed, and then to pour on and off a stronger solution, letting the liquid impinge on the plate where most reduction is needed. When, however, the too intense portion is of small dimensions, as in the case of a hand or finger, it is better to partially dry the negative, so that the liquid shall not readily spread, and apply with a brush, keeping the outline sharp. A still better way is to paint carefully with a tough varnish round the part to be reduced, and when it has hardened to brush over with the reducing agent. Unfortunately, ordinary spirit varnish has a tendency to split up when wetted with water, so that there is danger of the chemical finding its way through the cracks and producing markings where not wanted. For this reason I think a thin asphalte or turpentine varnish is the most suitable to use. After the plate has been washed and dried the surface should be cleaned by rubbing with spirit or turpentine and varnished in the ordinary way.

Selective Reduction.—Thinning the shadows more than the high lights, or *vice versâ*. The building up of the image in development commences at the surface and proceeds gradually down through the film; the silver forming the detail in the half-tones and shadows, therefore, lies pretty much on the surface. As in most reducing processes an even layer of silver is attacked, it follows that the shadows lose proportionately more than their share, so that there is rarely any occasion to act specially on them. It may happen, however, in the case of a much over-exposed and over-developed negative that it would be improved by a little thinning down, chiefly in the shadows. Such a negative would, perhaps, be best treated by reducing it altogether—which would, of course, leave the shadows barer—and then intensifying what is left of the image.

Reducing the high lights only is much more difficult. The theory is good, but the method of carrying it out requires perfecting. In a leading article in THE BRITISH JOURNAL OF PHOTOGRAPHY for April 20th, 1883, it is suggested to convert the whole of the silver into chloride and then redevelope with ferrous oxalate, using a large amount of restrainer. When all is developed except the highest lights the negative is washed and dipped in hypo. to dissolve the remaining undeveloped chloride. In this manner the detail in the shadows would be preserved. Easy as this looks on paper it is not so easily performed in practice.

At a meeting of this Society sometime last autumn, at which I was not present, I saw by the report that a discussion took place on abrading the film with hard powder rubbed on with the finger or a stump. If any present have tried this method perhaps they will give us the benefit of their experience. Cigar ash appears to me best suited for the purpose. I have tried it on waste negatives, but without sufficient success to warrant me in using it on a negative of any value.

Intensification of Negatives.—On this subject I have less to say than on the preceding one. When it can be seen while developing that the image is showing on the back of the plate before the details are out, a more brilliant print will be obtained if the developer be washed off as soon as sufficient detail appears and intensification resorted to than if it be attempted to get printing density by allowing the plate to soak till it has acquired enough pyro. stain to make it dense. Granted that a negative is to be strengthened, the question arises what shall be used. There are in the market some preparations the composition of which has not been made public. Of these I shall say nothing.

If a very little additional density be needed it will suffice, after fixing, to dip the plate in fresh hypo. solution containing about five or ten per cent. of ferrous sulphate. This is rather of the nature of a stain than a deposit on the silver already forming the image, so does not impart much brilliancy; but it is, nevertheless, useful at times, when the negative is merely thin but not over-exposed. Where more than a slight increase of intensity is required we must resort to other methods, of which we have several to choose from. The principal qualities desired are permanence, a suitable colour for retouching, and ease of application. Unfortunately, these do not always go together. The first is nearly always wanted for any class of work; the second is immaterial for general landscape and architectural purposes, copying, &c.; but for portraiture a good colour is very important.

Silver intensification has always been recommended by the editorial department of one of our photographic journals. The chief condition necessary to success is that all hypo. should be thoroughly removed from the film. It does not, however, follow that all makes of plates are equally amenable to this treatment. Those which have a matt surface take the silver best, and some gelatines are much less liable to stain than others. If the negative be not filled up much in the shadows, and possess proper gradation, silver intensification is certainly to be recommended. It must be borne in mind, though, that since the silver is deposited on the surface there is a tendency to flatten the image, as the half-tones receive nearly as much fresh silver as the high lights. For this reason it is less suitable for over-exposed, flat negatives than some other methods. Bleaching the image with an iron or copper salt and redeveloping has been recommended. I do not find that after clearing with acid to remove the discolouration of the film which is produced there is much increase in opacity.

Negatives intensified with uranium salts are, I believe, found to get denser by keeping. The colour also is objectionable for portraiture. Two processes which give very similar results are Monckhoven's and mercuric chloride, followed after washing by ammonia, the negative being then placed in water containing a few drops of a solution of sulphuretted hydrogen in diluted glycerine. The colour with either of these is a nice brownish black. I have here a series of little negatives, intensified about eighteen months ago by various intensifiers, and so far as I can judge there has been no deterioration in those treated by the two methods just named. These, however, will not always impart sufficient density to very thin, over-exposed negatives. For this there is nothing, I think, so useful as bichloride or iodide of mercury, followed, after a thorough washing, by Schlippe's salt. I do not recommend this for portraiture where it can be avoided, because of the reddish-yellow colour which renders the retouching of such negatives a matter of difficulty. So far as preserving gradation and being under control is concerned it answers every purpose. I was somewhat surprised to see some little time back, in the "Answers to Correspondents" given in a photographic journal, the statement that this intensifier was only suitable for line work on account of the great density produced. Since the density is easily regulated with a little care and practice, it seems to me that for exceedingly-thin portrait negatives (which, of course, are only obtained now and again through accident) and for general outdoor work (on which retouching is not generally required), more especially for large plates on which it is somewhat difficult to use silver, mercury and Schlippe's salt form a serviceable permanent intensifier.

WILLIAM COLES.

THE OXYHYDROGEN EXPLOSION AT DRURY-LANE.

MOST of the readers of this Journal will have read in the daily or weekly newspapers of the explosion which occurred at Drury-lane Theatre, on Wednesday, the 4th inst.; but as no technical particulars were given, I thought I would attend the inquest on the body of the poor man who succumbed to the injuries he received, to ascertain, if possible, the cause of the explosion, and get any information that might be of value to the lanternists and photographers who employ the lime light.

By the courtesy of the authorities I was enabled to view the scene of the explosion and the materials employed. The room in which the two lime-light men were working was underneath the stage, and had a gas bracket with a wire guard over it placed about four feet from the ground on one side, and a large supply pipe coming down the end wall of the room to the bottom, where there was a large outlet and T connection. I soon found that the accident had not happened while working the lime light—as one would naturally suppose from reading the accounts published—but while preparations were being made for the performance.

The plan adopted at Drury-lane Theatre appears to be that the gas required to be used for the lime light has to be taken into the theatre before the performance, and any left is supposed to be taken out afterwards. There were remnants of two bags on the floor—one (the oxygen) split into shreds, and the other (the hydrogen) rent and injured, but retaining its wedge-shaped form. The oxygen gas bag must have been by some means partly filled with hydrogen as well as oxygen, and one of the attendants must have applied a light for some purpose to the nozzle, or by pressing on the bag while it was connected with the large supply pipe and then withdrawing the pressure drew down the flame to the bag and so ignited what had become, by mixing, an explosive gas. Or it may be that the light caught some part of the material of the bag, set it on fire, the oxygen feeding the flame and becoming so rarefied that it soon burst. From the fact that the poor fellow that died having been very much injured in the lower part of the body it seems likely that he was standing over or behind the bag with his legs apart, probably giving some attention to the bag when the explosion occurred.

I noticed that the bags were about the same colour; that the stopcocks were the same size and colour; and that although there was an "H" on the hydrogen bag, which was the larger one, it was only temporarily marked—not in a bold and unmistakable manner. This being so, the question arises—What precautions can lime-light operators take so as to secure the minimum risk? I would suggest—

1st. That each bag should be marked with an "H" and an "O" respectively, so that it could be seen *at once* in a very faint light—a good block letter of a large size on both sides of the bag; and it would not be amiss, as an additional precaution, if on the wedge as well. If the bags be black or brown, the letters should be in white paint; and if a light-coloured or chequered bag, then black paint.

2nd. That the tap or stopcock of the hydrogen bag should be of a different pattern and size to that of the oxygen bag, so that a connection could not possibly be made unwittingly from the hydrogen or house gas supply to the oxygen receptacle.

3rd. That the colours of the taps and fittings of the two gases should be different—all the hydrogen being bronzed and the oxygen lacquered bright, so as to be distinguished at a glance.

4th. That in *no* case whatsoever should a light ever be applied to the tap of a gas bag, or should any connection be made to a pipe or service on which a jet may be *alight* if there be any chance whatever of the gas bag, while filling, being disturbed.

5th. That if any doubt exist as to the nature of the gas in the gas bag or holder, it should, before applying a light to any attachment to the outlet pipe, be passed through a water interceptor, so made that only a small quantity of gas could collect above the water, and this, in the case of ignition if it exploded, would blow out a cork or india-rubber bung lightly fitted in an aperture at the top.

Nearly all the serious explosions I know of or can learn anything about have been the result of accidental mixing of gas in the bags or holders, or the choking up of the pipes while making oxygen gas. With care this should not occur; but, as apparently inexplicable things do sometimes happen, I would impress on all lime-light operators the necessity of having safety-valves or vents to *each* part of the apparatus where an explosion could occur, and from its construction, by blowing about any portion, do serious damage. For instance:—The retort for oxygen making should have inserted in the top a tube three or four inches long, lightly covered by an india-rubber cap, cork, or spring valve, so that when the pressure of gas became greater than would naturally pass through the outlet the cork would rise and form a vent. The purifier or wash-bottle should also have a bung inserted to form a vent; in fact, it is better to use more than one purifier, so that the gas may be thoroughly purified and dried. I would therefore suggest that two should be of the ordinary form, having an inlet pipe going to nearly the bottom, and an outlet pipe inserted at the top, and the third a water interceptor.

One of the ordinary purifiers I would have empty when making oxygen, and place it next the bag for filling; the next should have water in; and the third, that nearest the retort, lime dust and water or caustic soda. The result of this would be that the chlorine in the oxygen gas would be stopped by the purifier next the retort, the gas would be cooled in the second, and dried in the one next the bag. There is no doubt that having an empty purifier next the bag saves the material of the gas bag from wear very considerably, by stopping the particles of moisture which tend to rot it if deposited inside; and any one who uses this plan can testify that often there is a measureable quantity of water in the purifier that was empty before commencing operations.

I fear there are a great number of oxygen retorts still in use that have no safety outlets if the delivery tube get choked, and I would advise all who have such to get them altered at once. It is a matter of duty to do so. I recently saw an apparatus, issued by the Government for some special work, and this had no safety-valve; and when we remember that one fatal accident occurred some years ago through the retort toppling on one side and the delivery tube getting choked, it cannot be urged too strongly by all interested in the lime light—in fact, insisted on—that the apparatus employed shall be the safest possible. No steam-engine is without its safety-valves; so no oxyhydrogen apparatus must be without means to render mishaps comparatively harmless.

To sum up: I am of opinion that no lanternist or photographer need hesitate to use the lime light if he will, first of all, master the principles on which the light is worked and the nature of the gases employed. But what is to be deprecated is the haphazard employment of apparatus new to the operator without having received proper instruction in the use of the same. There is something to learn in everything, and it is not because an explosion of ordinary gas occurs in a house, through a tap having been left turned on or through some other accidental occurrence, that the use of gas for illumination is to be prohibited. So with regard to the lime light: it must not be admitted for one moment that prohibition can be tolerated. The great thing is to exercise care in all details, and remember that under no circumstances are the oxygen and hydrogen gases to be allowed to mix until the moment they are emerging from the jet to produce the light.

G. R. BAKER.

WE have received the following report of the adjourned inquest from a correspondent who was present:—

LONDON not being troubled enough by explosions caused by "dynamitards"—whose proper appellation is certainly "fools"—must occasionally have a further addition in the way of lime-light bursts caused by gross negligence and the employment of incompetent men. Such an one occurred on the afternoon of the 4th instant at Drury-lane Theatre, resulting in the death of one man within twelve hours, and such injuries to the other that from his appearance the meeting of the "mates" in the "great beyond" will not be long delayed.

The coroner's inquest commenced on Monday, the 9th instant, at King's College Hospital, where both the injured men—Harris and Creed—were conveyed after the "incident," as a theatrical contemporary called it, but was adjourned, after the body of poor Harris had been identified by his brother, for the dual purpose of getting Creed's evidence and communicating with the Home Secretary, the Coroner (Mr. St. John Wontner) stating that the affair came under the Explosives' Act. James Harris's trade was given as that of a "boot finisher."

After the adjournment the jury proceeded to the theatre to view the *debris*. After descending a flight of stairs, and being guided along a narrow and tortuous passage, a cellar fourteen feet by ten feet was reached, where the "incident" occurred. One wall slightly bent; the plaster from the ceiling transferred to the floor; the laths hanging in grotesque fashion, resembling an uncombed head of hair; fragments of what had been a gas bag, with another one split in twain up the gusset, lying in the centre of the room; and the door off its hinges—all these attested the fact of the two gases having been in loving company in one receptacle.

On Monday last, the 16th instant, the inquest was resumed. The Coroner read a letter from the Home Secretary, who stated that as the matter was not within the scope of the Explosives' Act of 1875 it was unnecessary for any one to attend from his office.

James Creed, who is still suffering severely from his injuries, was the first witness. He was a painter by trade, but had also been working the lime light for eighteen or nineteen years. Three hydrogen bags were employed; but on this particular afternoon he only saw two, and remarked to Harris—"Jim, there is something wrong; we must be careful and see what's the matter, as there were three here last night." Thereupon they both together tried one bag, which proved to be oxygen. He then saw the gas drawn to the other, cried—"Look out, Jim!" and remembered nothing for two or three minutes, when he cried for help and was rescued by the fireman of the theatre. Replying to several questions, it seems the *modus operandi* was to have five bags—two for oxygen and three for hydrogen; that after the lights had been used in the flies the bags were conveyed to the cellar, where the oxygen was transferred to one bag, the other being replaced by a full one sent from Mr. Kerr's factory daily. The hydrogen bags were replenished in the dungeon bearing the *soubriquet* of the "lime-light room," doubtless on account of its darkness. Harris being on the prompt side, got into the cellar first, and commenced transferring. He was followed by Creed, who, of course, could not account for the explosion. It might have been during the transferring process, or a bag might have been sent mixed; but he could not say how it went off. He had never had an accident before. He received 1s. 6d. for each performance. All the bags were one colour, not marked, and had taps alike, though the rule was that they should be different colours and marked, as well, "O" and "H."

Thomas Donovan, a private fireman at the theatre, heard the explosion and saw the scenery in the "scene dock" jerked from side to side. He went below and rescued the men from their perilous position. The next "room" was found damaged.

Mr. James Matthews, Assoc. M. Inst., C.E., the gentleman employed by the renters of Drury-lane Theatre as gas engineer, happened to be in the house when the explosion occurred, and, guessing its cause, hurried downstairs and turned off some twenty-five burners which had been extinguished in the passages. As he heard the sound of escaping gas in the room, he felt down the wall and discovered an aperture connected with a T-piece provided with a cock for the express purpose of filling the bags. Not finding a plug at hand the right size, he inserted a tap from one of the bags, of which he noticed five, two being dismembered, one marked "H," and the other three filled—one with oxygen, two with hydrogen. He had them placed in Vinegar-yard. Replying to a juror, he stated that the men who worked the light were recruited from all trades on account of cheapness; that they soon acquired enough skill to work it; and that there was absolutely no danger.

Mr. Walter Kerr, whose apparatus was used, supplied the oxygen from his factory at Adelphi Arches, Strand. He described how the gas was furnished, the hydrogen being taken from the main. When asked why he did not use bags of different colours he stated that the black ones did not last. [A desultory wrangle here ensued, it being suggested that they were marked, as sheep are, with red chalk.] The bags were new. No competent man would try gas by putting a light to the bag, but would fill an india-rubber tube, put one end in the mouth and blow it through a gas flame! He considered the men he employed were competent, and adduced the fact of Creed's experience of nearly twenty years.

After the doctor had stated the cause of death, Mr. Baker (representing Mr. J. H. Steward, the lantern specialist), kindly offered by the aid of a pair of model bags to explain the effect of suction, &c., but the jury considered the evidence sufficient and retired to consider their verdict, with which they returned in a few minutes, and which was that death was caused from an explosion of gas, the origin of which the evidence was not sufficient to prove. A rider stated that the lime light was worked at Drury-lane Theatre by incompetent men, and in an unfit place under the stage.

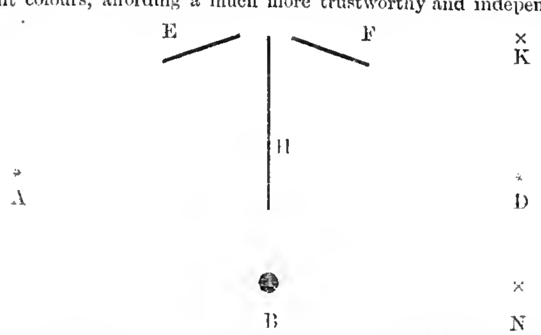
From the contradictory evidence it will be seen that no one knew how the accident occurred, further than that it was clear enough that a bag of mixed gas had a light applied to it. How much longer theatrical managers are going to have such things as bags, and "boot finishers" and "painters" to use the light, is hard to tell. These folks show the crassest ignorance of science, and when as occurred within my knowledge, "them 'ere lime lights"—as the artist in charge called the apparatus, consisting of lens, box, two bags, pressure-boards, and six fifty-six-pound weights—fell on the stage just as an actor (fortunately for him) made his exit, it seems time that such antique machinery should be consigned to oblivion in some "lime-light room" where they never more would cause trouble by their explosive presence.

SIRIUS.

THE ROYAL INSTITUTION.

A PHOTOMETER FOR COMPARING COLOURED LIGHTS.

ON Thursday, the 5th inst., Professor Dewar closed his series of lectures at the Royal Institution on *Flame and Oxidation*. In the course of the last two lectures the chief matter of interest to photographers dealt with by him was a photometer for measuring the relative intensities of lights of different colours, affording a much more trustworthy and independently



verifiable method of comparing them than that at present in use, during experiments in developing-room illumination, by ascertaining the distance from a screen at which small print can be read by an individual. Professor Dewar said that it was impossible to compare the relative intensities of lights of different colours, except by means of a "shadow" photometer, one of which he had fitted up behind the lecture table. It consisted of a fixed coloured light A, and a movable one D. At H is a screen, consisting of a piece of cardboard with a star cut out of its centre; over the cardboard, on each side, is then pasted a very thin piece of translucent paper. The eyes of the observer are at B, and he sees both sides of the screen H by reflection from the two mirrors E, F. By shifting the light D until the lights are so balanced that the star can no longer be seen on either side of the screen H, the relative intensities of the two coloured lights are ascertained by their relative distances from the screen. The mechanism was of such a nature that he could also shift the light D in the direction K or N, so that when desirable he could measure its intensity when it fell upon the screen H at other than a right angle.

The lecturer said that in flame the combustion is not perfect except near its apex; near its root a certain amount of dissociation is going on, and the heat of the flame is greater where the combustion is less perfect. Combustion often takes place more quickly with hydrogen than with carbon; for instance, an explosion travels more rapidly through a long pipe filled with hydrogen and oxygen than through a similar tube filled with carbonic oxide and hydrogen. Many varying conditions come into play in obtaining the maximum possible light from coal gas. One way is to pass the gas over napthaline crystals placed in a bulb near enough to the burner to be slightly warmed by it; this much increases the illuminating power and promotes economy. He spoke favourably of the fishtail burner for common gas.

Professor Dewar also gave the results of some experiments he had been trying as to the influence of the London combustion of gas and coal on the local atmosphere. A sheet cleaned with carbonate of soda, then well washed in changes of clean water, and when dry painted with paraffine, was stretched over a part of the roof of the Royal Institution to catch the rain-water of showers, and the water thus collected ran into a bottle through a hole in the middle of the sheet. The rain, of course, washed the air through a great height, and brought down its soluble contents. The first shower brought down more impurities than succeeding showers; these impurities consisted of sulphurous acid, sulphuric acid, ammonia, and albumenoid ammonia. The slightest trace of sulphurous acid in the air has great influence in promoting dense fog; aqueous vapour by itself is not nearly so mischievous in this direction. He proved this by experiments showing the condensation of pure aqueous vapour in a bell jar, and also its condensation when mixed with a trace of sulphurous acid. He then exhibited a method of cooling flame, so as to vary the character of its combustion, and to permit different parts of it to be examined by the spectroscope. The plan consisted of causing a thin sheet of water to flow down one side of a glass plate, the flame being then laid against the sheet of water, and examined from the other side of the glass. The flame of cyanogen has a purple colour, and a much higher temperature than any ordinary flame; it also gives a most magnificent and remarkable spectrum, due perhaps to a complicated molecule of carbon. This flame contains no hydrogen, so is in reality a flame of pure carbon. The chemical reactions taking place within it differ from those in any other carbon flame.

THE PLATINUM PHOTOMETER.

Professor Dewar stated that at present all statements of illuminating power are in England referred to a standard candle—a crude method, because the quality of the candle cannot be guaranteed; it also does not give a steady light, and is affected by currents of air. The French early adopted a flame from the combustion of oil, and their standard—the Carcel lamp—is undoubtedly steadier than ours. At the Electrical Congress it was proposed to adopt some better standard, and the light from a measured surface of platinum at its melting-point was suggested, the surface of platinum being so unalterable. The present best standard of white light is, therefore, that of platinum at its point of solidification. An error is abroad in the supposition that this standard is supposed to be in direct use by everyone who makes photometrical experiments. It is not so. The platinum standard is for the purpose of verifying the accuracy of the Carcel lamps employed; it was never supposed that every experimentalist would carry fusing platinum about with him. He then fused a piece of platinum, and said that in previous experiments he had found the following to be the light radiation of platinum:—

Temperature. Degrees Centigrade.	Luminous Intensity.	
	Red rays.	Green Rays.
954	1·00	1·00
1,045	3·27	3·64
1,500	154·00	219·00
1,775	507·00	809·00

$I = m\,T^3\,(1 + ea^{-T})$ when T = absolute temp. Luminous intensity above 500° increases as the T^6 for red rays and as T^7 for green rays. As the proportions of the coloured rays to each other vary at different temperatures, mean white light is taken as a photometric standard, and not individual rays.

The lecturer then proved by experiments that by diminishing the pressure of the air round a candle perfect combustion will still go on steadily and without smoke, but the intensity of the light is diminished. Probably, however, a new kind of combustion is set up. In the course of some experiments with acetylene, he passed the latter into a solution of oxide of silver in ammonia; a white precipitate of acetylide of silver was the result. He did not say whether it had any photographic properties. He stated that the oxyhydrogen flame does not give a continuous spectrum, especially in the invisible part, and the bands are chiefly due to water. When gases contain ammonia, and the temperature of the flame is not very high, prussic acid can usually be drawn from the centre of the flame. He closed the lecture by describing the principles of combustion in gas engines, and by giving a description of the new source of supply of petroleum from Southern Russia, near the Caspian Sea. It was shown to give a slightly better light than American petroleum.

DR. GILL ON PHOTOGRAPHY AND ASTRONOMY.

[Extract from a Lecture delivered at the Royal Institution.]

I wish briefly to allude to another engine of research in sidereal astronomy which quite recently has received an enormous development, and whose application appears to offer a rich harvest of results. I refer to the application of photography to astronomical observation.

Your respected member, Mr. De la Rue, is the father of this method. Time does does not permit me to dwell on his early endeavours and his successful results, but they are well known to you all. He opened up the field, and he cleared the way for his successors.

The recent strides in the chemistry of photography and the production of dry plates of extreme sensibility have permitted the application of the method to objects that formerly could not be photographed. Here, on the screen, are the spectra of stars photographed directly from the stars by Dr. Huggins, the lines which tell of the chemical constitution and temperature of the star's atmosphere being sharply defined.

Here are photographs of the great comet of 1882, which, with the co-operation of Mr. Allis, of Mowbray, I obtained at the Cape, by attaching his ordinary camera to an equatorially-mounted telescope, and with its aid following the comet exactly for more than two hours. Each one of the thousands of points of light that you see is the picture of a fixed star. The photograph suggests the desirability of producing star maps by direct photography from the sky.

Here on the screen is a photograph of the great nebula of Orion, or rather a series of photographs of it, made by Mr. Common, of Ealing. You will note the gradual development of detail by increase of exposure, and the wonderful amount of detail at last arrived at. Here are photographs from drawings of the same, and you will note the discrepancies between them; and here is a photograph of a star cluster, also by Dr. Common.

No hand of man has tampered with these pictures. They have a value on this account which gives them a distinct and separate claim to confidence above any work in which the hand of fallible man has had a part.

The standpoint of science is so different from that of art. A picture which is a mere copy of nature, in which we do not recognise somewhat of the soul of the artist, is nothing in an artistic point of view; but in a scientific point of view the more absolutely that the individuality of the artist is suppressed, and the more absolutely a rigid representation of nature is obtained, the better.

Here is a volume compiled by one of the most energetic and able of American astronomers—Professor Holden. It contains faithful reproductions of all the available drawings that have been made by astronomers of this wonderful nebula of Orion from the year 1656 to recent times.

If now we were to suppose one hundred years to elapse, and no further observation of the nebula of Orion to be made in the interval; if in some extraordinary way all previous observations were lost, but that astronomers were offered the choice of recovering this photograph of Mr. Common's, or of losing it and preserving all the previous observations of the nebula recorded in Professor Holden's book, how would the choice lie? I venture to say the decision would be—Give us Mr. Common's photograph.

Is it not, therefore, our duty to commence a systematic photographic record of the present aspect of the heavens? Will not coming generations expect this of us? Does not photography offer the only means by which, so far as we know, man will be able to trace out and follow some of the more slowly-developing phenomena of sidereal astronomy?

Huggins has shown how the stars may be made to trace in significant cipher of their spectra the secrets of their constitution and the story of their history. Common has shown us how the nebulæ and clusters may be separately photographed, and it is not difficult to see how that process may be applied, not only to special objects, but piece by piece to the whole sky, till we possess a photographic library of each square half-degree of the heavens. But such a work can only be accomplished by consummate instruments, and with a persistent systematic continuity which the unaided amateur is unable to procure and to employ. It is a work that must be taken up and dealt with on a national scale, on lines which Huggins and Common have so well indicated, and which has already been put in a practical form by a proposal of Norman Lockyer's at a recent meeting of the Royal Astronomical Society.

I would that I had the power to urge with due force our duty as a nation in this matter, but my powers are inadequate to the task.

I employ rather the words of Sir John Herschel, because no words of mine can equal those of him who was the prose poet of our science, whose glowing language was always as just as it was beautiful, and whose judgment in such matters has never been excelled. They were spoken in the early days of exact sidereal astronomy, when the strongholds of space were but beginning to yield the secret of their dimensions to the untiring labour and skill of Bessel, of Struve, and of Henderson. Think what they would have been *now* when they might have told how Huggins' spectroscope had determined the kinship of the stars with our sun, how it had so far solved the mysteries of the constitution of the nebulæ, and pointed out the means of determining the absolute velocity of the celestial motions in the line of sight. Think what Herschel would have said of those photographs by Common that we have seen tonight of that nebula that Herschel himself so laboriously studied, and whose mysterious convolutions he had in vain endeavoured adequately to portray; and think of the lessons of opportunity and of duty that he would have drawn from such discoveries, as you listen to his words spoken forty-two years ago:—"Such results are among the fairest flowers of civilisation. They justify the vast expenditure of time and talent which have led up to them; they justify the language which men of science hold, or ought to hold, when they appeal to the Governments of their respective countries for the liberal devotion of the national means in furtherance of the great objects they propose to accomplish. They enable them not only to hold out but to redeem their promises, when they profess themselves productive labourers in a higher and richer field than that of mere material and physical advantages. It is then, when they become (if I may venture on such a figure without irreverence) the messengers from heaven to earth of such stupendous announcements as must strike every one who hears them with almost awful admiration, that they may claim to be listened to when they repeat in every variety of urgent instance that these are not the last of such announcements which they shall have to communicate; that there are yet behind, to search out and to declare, not only secrets which shall increase the wealth or power of man, but TRUTHS which shall ennoble the age and country in which they are divulged, and, by dilating the intellect, react on the moral character of mankind. Such truths are things quite as worthy of struggles and sacrifices as many of the objects for which nations contend, and exhaust their physical and moral energies and resources. They are gems of real and durable glory in the diadems of princes, and conquests which, while they leave no tears behind them, continue for ever unalienable."

David Gill, LL.D., F.R.S.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 8,771.—"Manufacture and Subsequent Treatment of Sensitive Paper for Copying Drawings, Documents Written on One Side, or the like, by Photography." H. J. Shawcross, Lord-street, Liverpool.—*Dated June* 10, 1884.

No. 8,852.—"Uncapping and Capping Lenses." F. W. Branson, Leeds.—*Dated June* 11, 1884.

No. 9,026.—"Producing from Photographic Negatives Blocks or Plates Suitable for Typographic Printing." H. Gardner; communicated by G. Sutherland, journalist, Adelaide, S. Australia.—*Dated June* 16, 1884.

Obtaining Incised or Raised Designs on the Flat or other Surfaces of Steel, &c.

Provisional Specification of Joseph Brown.

In carrying out my invention the improved process is as follows:—

I take a hand drawing, print, or engraving, from which I obtain an engraved plate in one or more sizes by any of the well-known or ordinary methods either by photography, lithography, or copper-plate. From this plate or printing surface I obtain an impression in a bituminous asphaltum, or resinous varnish or material sufficiently strong to be acid-resisting. I then take this print in bituminous or other varnish and transfer it, by slight pressure, on to the surface on which I intend the drawing to be reproduced; the paper being removed leaves me the impression in the bituminous ink or varnish perfectly intact on the plate. I then proceed to protect those parts not forming the design with a wax or other protective varnish, and the print thus transferred to the plate is then gently sprinkled with bituminous powder, should the case require it.

The plate or metal surface in its thin condition is submitted to the action of acids, or an electric battery, or any well-known mordant, until such parts unprotected by the bituminous varnish are acted upon until the required depth is obtained.

This process particularly applies to the production of plates for pottery printing purposes, calico or other textile printing, the production of *cloisonné* of mosaic work in enamels, for the preparation of dyes, for metal and paper printing and stamping, for leather stamping, and for obtaining designs on any other metal above referred to.

Also for obtaining designs on cylindrical rollers either for repeated patterns or otherwise, as well as for producing raised type printing blocks.

In places where the pattern repeats itself I build up as it were or repeat it by multiplication to any extent required.

Improvements in the Production of Surfaces for Printing, &c.

By Joseph Julius Sachs.

My invention has for one of its objects to produce reproductions from photographs, drawings, paintings, or the like, in which reproductions are obtained of the half-tones, full-tones, and lights and shades, so as to give a faithful representation of the original. In order to effect this it is necessary to print from the original, or a transparent reproduction of the same, upon a sensitive ground (such as one of chrome gelatine) with the interposition of a transparent medium, upon which is made a number of fine dots or a grain. This grained or dotted medium it has been proposed to obtain by means of prints from surfaces which have been lined or "cross hatched" by hand and in any other ways, but hitherto it has been impossible to obtain satisfactory results by these means. According to my invention I obtain a dotted or transparent medium as follows:—

I take a metal roller, or other surface of metal or hard material, and I submit it to the action of the impact of hard particles, such as is obtained by the projection of sand propelled by a blast against the said surface. I thus obtain a grained surface of a degree of fineness in accordance with the fineness of the hard particles employed. I then roll over the surface thus obtained, or cover it with ink or an opaque substance, and I take an impression therefrom upon a transparent medium, such, for example, as upon paper or the like prepared as described in the specification of my Letters Patent, No. 3,948, dated 14th August, 1883. I take the transparent medium thus covered with an opaque grain, and I cover it over or place it upon the photograph, drawing, painting, or original to be copied, and then place these together over a sensitised layer such as chrome gelatine, which will become hardened on exposure to light; and I thus obtain by the light passing through the grained surface and the photograph, drawing, painting, or the like, a reproduction of the same upon the sensitive layer which, when it is upon or has been transferred to a roller or other surface and this is treated and etched according to any suitable process (such, for example, as is explained in the specification of my prior Patent, No. 266, dated 21st January, 1881), will give a printing or embossing surface from which impressions can be taken resembling the original. For the purpose of the transfer to the roller or other surface the sensitive layer may, before exposure, be covered with a film of asphaltum or other suitable resist. The grained print or reproduction from the surface treated by the sand blast may be obtained by direct printing upon a transparent medium or by any suitable direct or indirect process of transfer, or it be may printed directly upon the photograph, drawing, painting, or the like without the intervention of a special transparent medium.

In order to give a colour-holding surface to the design eventually produced upon the roller or other surface, I may treat the same (after it has been etched in the etching bath) with the sand blast so as to give a roughened surface to the sunk parts, the raised parts being protected by the original or a special resist or covering.

A further object of my invention is to obtain ornamental effects upon metal surfaces to resemble inlaid work.

According to this part of my invention I take a metal surface and I roughen it by submission to the sand blast or the impact of hard particles, and I then cover it with a sensitive layer which I expose to the action of light beneath the negative or design to be reproduced, whereby the parts exposed to the action of light are hardened. I then roll over or cover the sensitive film thus treated with a resist or ink which adheres to the hardened parts of the sensitive layer, but not to the unhardened parts, which latter may be then removed by washing or in any suitable way leaving the metal at these parts exposed. A metal preferably of another colour or kind may then be deposited by electro-deposition upon the exposed parts, and then on removing the resist and hardened gelatine from the other parts the metal surface will have the appearance of inlaid work. Instead of the process of electro-deposition, I may bite into or through the metal at the exposed parts, whereby I obtain perforated ornamental work resembling lace patterns or other designs which give very beautiful effects when used for decorative purposes. In the process wherein electro-deposition is used the metal at the exposed parts may, before undergoing the process of electro-deposition, be again submitted to the sand blast to give different grains for the design and the ground.

Having now described and particularly ascertained the nature of my said invention, and the manner in which the same is or may be used or carried into effect, I would observe, in conclusion, that what I consider to be novel and original, and, therefore, claim as the invention secured to me by the hereinbefore in part recited Letters Patent, is:—

1st. In the production of rollers or surfaces for printing or embossing purposes, obtaining by means of the sand blast or the impact of hard particles a surface from which a dotted or grained medium is produced, which is placed together with a photograph, drawing, painting, or the like upon a sensitive layer or material which is upon or is afterwards transferred to the roller or surface to be etched, and afterwards treating and etching the said roller or surface, all substantially as and for the purpose hereinbefore described.

2nd. In the production of rollers or surfaces for printing purposes obtaining a colour-holding surface by submitting the said rollers or surfaces to the action of the sand blast or the impact of hard particles, after the design has been etched or produced on the said rollers or surfaces, and whilst the parts which are not to hold colour are protected by a material or substance capable of resisting the action of the said sand blast or impact, substantially as hereinbefore described.

3rd. Obtaining ornamental work by first roughening or graining a metallic surface by the sand blast or the impact of hard particles, then covering it with a sensitive layer and exposing it to the action of light beneath the negative or design to be reproduced, then rolling over or covering the same with a resist or ink, and then removing the soluble parts of the sensitive layer and afterwards submitting the exposed parts to a process of electro-deposition; or of etching or biting through, or, as an alternative, submitting the said exposed parts again to the action of the sand blast or the impact of hard particles, and afterwards to a process of electro-deposition, all substantially as hereinbefore described.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
June 24........	Bolton Club........................	The Studio, Chancery-lane.
,, 25........	Bristol Amateur....................	Studio, Portland-st., Kingsdown.
,, 25........	Photographic Club	Anderton's Hotel, Fleet-street.
,, 26........	London and Provincial (A. Meet.)	Masons' Hall, Basinghall-street.
,, 26........	Liverpool Amateur	Free Library and Museum.
,, 26........	Oldham...........................	Hare and Hounds, Yorkshire-st.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society, held on the 12th instaut, the chair was occupied by Mr. A. Cowan.

Mr. A. L. Henderson produced two negatives upon plates which had been exposed to the light and initialed by some of the members at the previous meeting. The effect of the previous exposure had been removed by an immersion in a ten-per-cent. solution of bromide of potassium acidulated with nitric acid. After this treatment they had been washed for about an hour, and dried previous to receiving the second exposure. The sensitiveness was very much reduced, necessitating an exposure of about twenty times that originally required by the same plate.

Mr. W. K. Burton inquired whether Mr. Henderson attributed the action that had taken place to the bromide or to the acid.

Mr. Henderson replied to both.

Mr. J. Barker thought the action was caused by free bromine.

Mr. Burton said that free bromine would eliminate an undeveloped image and even a developed one, but for the latter purpose the solution must be so strong that the whole film might be destroyed.

The Chairman then called upon Mr. W. Coles to deliver his lecturette on *Altering the Density of Gelatine Negatives.* [See page 391.] Mr. Coles illustrated his remarks by demonstrating most of the methods to which he had referred. At the conclusion of the lecture.

Mr. Henderson said that the clearing effect of solutions of citric acid and alum or hydrochloric acid and alum went off if the plate were long washed afterwards. As to reducing the density of negatives: he had saved many by the use of ozone bleach; but since he had found the reducing effect of the vapour from cyanide he preferred, on the whole, that method. A wash of ozone bleach was useful as an application to a negative before intensifying. An objection to the use of the bleach was that with some gelatines it would cause frilling.

The Chairman said that almost all gelatines would stand ozone bleach. He had successfully treated some which were so intense that they would not print in a week before reducing.

Mr. W. Cobb was rather surprised to hear Mr. Henderson say that ozone bleach caused frilling. If the plate were dried before its application there was no danger on that score.

The Chairman's experience confirmed that of the last speaker.

Mr. Burton observed that some gelatines were so hard that they might be immersed in hydrochloric acid (British Pharmacopeia strength) without dissolving.

Mr. A. Mackie said there was a method of treatment which gave some density, but which also allowed of density being reduced if followed by alum and acid. He referred to the method with sulphate of iron.

Mr. W. H. Ashman inquired whether the lecturer had tried reducing intensity by cutting down the surface of the film with an abrading powder. He had treated many in that manner, using either powdered resin or cuttle-fish bone.

Mr. W. E. Debenham said that, in introducing ozone bleach for photographic purposes, he had been influenced by several considerations to select that rather than the hypochlorite of lime solution referred to by the lecturer. Commercial chloride of lime is a compound of variable composition. In any case a saturated solution made from it would probably be saturated with caustic lime, and some carbonate might be deposited in the film. One of the purposes for which it had been brought forward was to decompose and remove the last traces of hypo. from the negative preparatory to silver intensification, when it was intended to use that method.

Mr. Coles said it was true that ozone bleach was a more definite solution than that formed from chloride of lime. The amount of lime deposited in the film from the latter solution was so small that he did not think it was important.

The Chairman objected strongly to any method which would deposit sulphur in the film, such as the employment of an alum bath before the hypo. had been effectually removed.

Owing to the lateness of the hour at which the lecture had terminated it was arranged that the discussion that evening should be confined to the question of reducing density only, and the one upon increasing intensity should be deferred until next meeting.

In reply to a question, Mr. A. L. Henderson said that he intended leaving for New York on the 11th of next month, and while in that city his address would be Grand Central Hotel.

THE POSTAL PHOTOGRAPHIC SOCIETY.

The annual general meeting of this Society was held on Monday last, the 16th instant, at 3, Plowden-buildings, Temple.

Dr. Horace Day having been voted into the chair, and the minutes of the previous meeting read and confirmed, the Hon. Treasurer reported as to the progress and position of the Society, and handed in the following balance sheet, which was approved:—

Balance Sheet of the Postal Photographic Society for the year ending June 18, 1884.

Received.	£	s.	d.	Expended.	£	s.	d.
Entrance fees—46 at 2/6........	5	15	0	Petty cash, stamps, stationery, &c.	10	5	1½
Annual subscriptions—75 at 5/-	18	15	0	Printing, circulars, notices, &c.	1	18	4½
Half-yearly do.—16 at 2/6......	2	0	0	Albums, note books, &c.	4	2	11
One honorary do..............	0	10	0	Prizes...........................	4	19	0
Prize Fund—Donations........	3	1	0	Pall Mall Exhibition	3	0	0
Do. Entrance fees....	6	9	6	Late Sec.'s clerk, and boxes, &c.	2	2	6
Sundry receipts	0	5	0				
	36	15	6		26	7	11
Balance from last year	5	19	2½	Balance—			
				In Bank........ £15 0 0			
				Cash in hand 1 6 9½	16	6	9½
	£42	14	8½		£42	14	8½

Examined with books and vouchers and found correct,
Walter Withall, *Auditor.*

The balance of £16 is forestalled for prizes of competition now in circulation.

The question of appointment of an Hon. Secretary was then brought forward, and it was pointed out that by the resignation of both the

President, Mr. Pocock, who had hitherto pasted the prints into the albums, and of the Hon. Treasurer, the duties of this office would be so much increased that no gentleman would be prepared to devote the necessary time for such a purpose. In the end it was unanimously resolved that Mr. W. M. Baylis be elected Hon. Secretary and Treasurer; and that a sum of three shillings per week be paid by the Society for assistance in the secretarial work and pasting prints into albums, &c., Mr. Baylis stating that he could obtain such assistance for that amount.

The vacancies in the committee, caused by the resignation of Messrs. Pocock, Senior, and Cowley, were filled up by the following gentlemen being elected in their stead:—Mr. Harris Heal and Mr. J. C. Cohen in place of Messrs. Pocock and Senier respectively, for London; and Dr. H. A. Roome, of Guildford, in place of Mr. F. Cowley, for the country.

Some discussion followed upon the present system of competitions, &c., and it was unanimously resolved that in future one album per month (at least) should be issued, and that there should be two prizes—one of ten shillings and one of five shillings—awarded by the members to the two best pictures in each, and that entrance fees for competitions should be abolished.

In order to stimulate the production of various classes of photography Mr. Bankart's suggestion was adopted, and it was decided that every alternate album should be composed of pictures of some one particular class, such as land and water subjects, interiors, architecture, portraiture, &c., and the dates and subjects of these special albums were decided upon for the ensuing year.

On the motion of Dr. Day, the Hon. Secretary was requested, on behalf of the members of the Society, to convey to Mr. Pocock their thanks for his services connected with the initiation of the Society, and to express the great obligation they were under to him for having discharged the unenviable duty of pasting some 1,400 prints into twenty-four albums; and also their great regret that his connection with the Society was about to terminate, this step being imperative in consequence of increasing business engagements.

After some general conversation, the meeting was dissolved.

MANCHESTER PHOTOGRAPHIC SOCIETY.

The second outdoor meeting for the present season of the Manchester Photographic Society took place, under the leadership of Mr. Coote, on Saturday, the 14th inst., in the form of an excursion to a district which has on more than one occasion previously proved a delightful hunting ground, namely, Siddington, Marton, and Gawsworth.

The party, which included four ladies, left London-road station by the one o'clock p.m. train, and, on arrival at Macclesfield, were met by Mr. E. Woodward, who had bespoken wagonnettes for the drive, which covered a distance of some twelve miles.

Leaving photography out of the question, the weather was all that could be wished for as a typical summer day; but the object of the journey being of a purely photographic nature, it is to be regretted that the stiff and continuous breeze which prevailed throughout the afternoon rendered the work of the camera—at least in such a district—almost futile.

The first serious attempts at exposures were made at the famous "Marton oak," referred to in a previous account of a visit to the locality; but not a momentary lull was perceptible in the violent motion of the branches, during which the most rapidly-efficient exposure could have been made. This was the more disappointing as the freshness and beauty of its foliage were, probably, never seen in greater perfection; the ladies were, however, posed in the hollow of the trunk, which is one of considerable capacity, and several plates were "shied" on the group so arranged. After some further exposures on the rustic cottages which here abound, with their characteristic patches of flower garden, Marton Hall was visited. The building is one of the numerous half-timbered structures of the Elizabethan period which are met with in many parts of East Cheshire and Lancashire, and is by no means a bad subject for the camera. Unfortunately on this occasion the sun had got behind the subject, and it required considerable skill to shield its rays from the lens without cutting off a portion of the sky. Several plates were, however, successfully exposed.

The journey was then continued to Gawsworth, where it was hoped, by reason of its more sheltered situation, the high wind which had hitherto been so troublesome would no longer prove an inconvenience; but on arrival there the hope was soon found to have been a delusive one. The foliage of the splendid avenue of lime trees which forms the western approach to the church was found to be sufficiently unsteady to make photographic work difficult, and the two beautiful ponds in front of the church were so rippled with the breeze that the charming reflections which, under more favourable conditions, form so attractive a feature were only momentarily recognisable.

A detachment of the party paid a visit to the grave of Samuel Johnson, which is situated in a plantation skirting the Macclesfield road, and only a short distance from the church. The place is vulgarly called "Maggotty Johnson's grave." The eccentric individual who chose this "sylvan spot," for his last resting-place, is described under the *alias* of "Lord Flame" as a poet, wit, and player, and is supposed to have been a *protégé* of the Harrington family, lords of the manor, about the middle of the last century. The ladies were much interested in conning over the curious epitaph, and were afterwards photographed in a group at the head of the tombstone.

At the hostelry, whilst tea was being prepared, Mr. Garnet showed some very beautiful prints of instantaneous and other subjects. He also exhibited and described a very simple contrivance by which he was enabled to take four dissimilar subjects on one plate. The arrangement consisted of a sheet of vulcanite the size of the plate used, with a corner one-fourth of its superficial area cut away. This is inserted in a rebate made for the purpose inside the camera, and immediately in front of the sensitive plate. The cut-out portion of the vulcanite permits only one quarter of the plate to be exposed at one time, and by a sliding arrangement at the front of the camera the lens can be centered for each of the four quarters of the plate, which may be exposed in succession by simply changing the position of the vulcanite in front of the plate. The arrangement was much commended both for its simplicity and usefulness.

The next outdoor meeting will take place at Miller's Dale, on Saturday, the 21st instant; train from Central Station, Manchester, at one p.m. Members intending to join were requested to facilitate arrangements by giving in their names not later than Thursday, the 19th instant.

HALIFAX PHOTOGRAPHIC CLUB.

The usual monthly meeting of the Club was held on Tuesday, the 10th inst.,—Mr. T. Birtwhistle in the chair.

Mr. Councillor John Smith gave a practical demonstration of the Stannotype process of Messrs. Woodbury, Treadaway and Co. The great simplicity of all its working details, and the beauty of results, at once commanded the admiration of all present, the unanimous verdict being that a great future lay before the process.

A vote of thanks was passed to Mr. Smith for his very exhaustive lecture and elaborate preparations.

The thanks of the Society were heartily accorded to the patentees for the kind manner in which they had responded to Mr. Smith's invitation to send samples illustrating the mode of working their process.

The meeting was then adjourned.

ST. HELENS ASSOCIATION FOR THE PURSUIT OF SCIENCE, LITERATURE, AND ART.

Photographic Section.

A meeting of this Section was held on Wednesday, the 28th ult.,—Mr Heather in the chair.

It was stated that the Association had held its first field day at Knowsley Park on May 11. The members, favoured by fine weather, were busy all afternoon taking views of the hall, grounds, &c., with cameras ranging in size from $7\frac{1}{2} \times 5$ up to 12×10. A large number of prints and negatives of these views were shown at the meeting and much admired.

Mr. Brook exhibited a number of mounted prints of woodland scenery at Upholland taken with his 12×10 "instantograph," which were very pretty, but each had a light spot about two inches in diameter in the centre, which somewhat marred the picture.

Mr. Taylor exhibited a transparency, $7\frac{1}{2} \times 5$, of an exceedingly pretty rose-coloured tone, which he attributed to a finely-divided deposit of silver—an opinion shared by most members present. He intended trying to get the same tone again, and, if possible, to reduce it to a method of working, as it would be a very effective tone for lantern slides of autumn scenery.

Mr. Brook asked for information as to the best method of packing plates for safe carriage after exposing, as he intended taking a trip to Canada and the United States this summer, and did not intend developing until he arrived home.

A variety of plans were suggested, but all appeared to have some defect, taking up too much room, rubbing, &c. (Will any reader kindly oblige by giving a few hints on a plan he has tried?)

Mr. Sherlock forwarded the following communication on a *Process for Photographic Printing in Colours*:—

In this process it is necessary to use *coloured negatives*—that is, ordinary negatives which have been hand-painted in their proper tints with transparent colours.—1. Take a piece of ordinary sensitised paper and wash it to remove any free silver nitrate.—2. Place the washed paper in a solution of protochloride of tin, and expose to weak light until the silver chloride is reduced to sub-chloride, and the paper assumes a uniform grey colour.—3. Float the paper in a mixed solution of chromate of potash and sulphate of copper, and dry in the dark.—The paper is now sensitive to all the colours of the spectrum, and by printing on it with a coloured negative the colours of the negative will be reproduced. After printing wash with cold water and dry.

A discussion then took place on the process, but was adjourned until the members had tried it.

We learn that at the previous meeting of this Association, held on the 31st April,

Mr. Sherlock distributed a number of plates of his own manufacture to members present to try them. They were made by the aid of a naked spirit lamp, a salt of strontium having been dissolved in the spirit. His method of manufacture was original to the members of the Section. Mr. Sherlock dispenses with washing, dries quickly, and brushes the crystals of nitrate of potassium off when dry. He promised to demonstrate his method shortly. The plates were very good and rapid.

BERLIN ASSOCIATION FOR THE CULTIVATION OF PHOTOGRAPHY.

The annual general meeting of this Association was held on the 4th April,—Professor H. W. Vogel in the chair.

Herr Tonndorff, of St. Louis, U.S.A., forwarded a number of postage-stamp portraits with perforated edges and gummed on the back.

Herr Mandel, New York, sent some specimens of a dusting-on process, which the Chairman thought seemed to be identically the same, or at least very like, Captain Pizzighelli's process.

Herr Grimm, of Offenburg, presented a copy of a work entitled *An Atlas of the Hair of Human Beings and of Animals*, by Professor Waldeyer, profusely illustrated by photomicrographs.

Herr Gaillard showed a specimen sheet of his new autotypes.

The Chairman laid on the table a splendid album, bound in red velvet, containing M. Schapiro's pictures illustrating the *Life of a Madman*, with accompanying text by Gogol, in Prussian and French. He (the Chairman) also exhibited a new specimen of his process for photographing coloured objects with their true values of tints. It was a picture in the Japanese style, with yellow, green, and blue birds, and rose-coloured and dark blue flowers upon a yellow ground. The contrast between a photograph taken of this arrangement upon ordinary portrait collodion and one upon the specially-stained collodion was very striking. In the former many of the blue parts seemed over-exposed and the yellow under-exposed. In the latter the light parts came out light and the dark parts dark, except the vermilion red, which had hardly acted sufficiently. The Chairman explained that this was only a first result, and that in it he had not yet perfectly succeeded in managing the red, as the substance he added to the collodion in order to absorb red had decomposed the silver bath. In the dry method he had, however, secured the required action in the red.

Herr Joop remarked that, in spite of this still-insufficient action in the red, the results were surprising. Others spoke in similar terms, and the whole assembly rose to their feet to cheer Professor Vogel.

The Chairman replied, thanking them for their words of encouragement to persevere with his experiments, and said that he had already published what he had done and the substances used to attain this end.

Herr Quidde remarked that what was wanted was perhaps not so much a list of the names of the substances used and a bare enumeration of principles perhaps already known, but a thoroughly-worked-out, systematised process.

The Treasurer (Herr Bergmann) then presented his accounts, and the Librarian (Herr Haberlandt) and the Custodian (Herr Halwas) of the sample and travelling collection, presented their respective reports.

The office-bearers were then elected for the ensuing year as follows:—*President:* Professor Vogel.—*Vice-President:* Dr. Kayser.—*Treasurer:* Herr Bergmann.—*Secretaries:* Herren Quidde and Schultz-Hencke.—*Committee:* Herren Graf, Haberlandt, Halwas, Joop, and Milster. Professor Vogel has presided over this Association for twenty-one years.

Correspondence.

A SODA DEVELOPER.

To the Editors.

Gentlemen,—In some very delicate photomicrographic work lately, by artificial light, a soda developer was used which furnished finer gradation under my hands than the usual pyro-citric acid and ammonia solution under the same conditions; hence it may, perhaps, prove useful to others, and in other ways. It is a modification of several formulæ, therefore nothing new is claimed.

The pyro. solution is made somewhat after Edwards's plan, thus:—

No. 1.

Pyro	32 grains.
Glycerine	1 drachm.
Alcohol	5 drachms.
Distilled water	2 ,,

No. 2.

Sodic sulphite (Hopkin and Williams') ... 480 grains, dissolved in ten ounces of hot water.

No. 3.

Crystallised washing soda	480 grains,
Potassic bromide	3 ,,

dissolved in ten ounces of hot water.

(Genlain's formula, which he recommended with dry pyro.) Each filtered when cold.

For use: pour water on the gelatino-bromide plate; then take (say) for a quarter-plate, half a drachm of No. 1 and two and a-half drachms of No. 2, with five drachms of water. Pour the water off the plate, and pour on the mixed solutions (1 and 2). Let it stand for a minute or more; then pour into the rinsed developing glass two and a-half drachms of No. 3. Pour off the mixed solution (1 and 2) into the glass and return to the tray.

The development is gradual if correctly exposed. If over-exposed, add about ten drops of an eight-grain bromide solution. Well wash before passing to the hypo., and do the same before passing to the alum and citric acid bath. Afterwards soak well.

The solutions, used thus, permit of easy modification. Trusting it may prove useful to others, with every apology for trespassing on the spare corner,—I am, yours, &c., R. L. Maddox, M.D.

P.S.—To distinguish easily, *by touch*, between two similar bottles in use in the dark room, place a rather thick india-rubber band round one.—R. L. M.

"ENGLISH MISSTATEMENTS ABOUT THE LANTERN IN THE UNITED STATES."

To the Editors.

Gentlemen,—Under the above heading is given, in what appears to be a private trade journal, published by a C. T. Milligan, of Philadelphia, some attempt at a reply to a letter by me published in your issue of February 15th. Previous to dealing with it let me, first of all, say that I have had letters of thanks from photographers in the United States for having, as stated by one writer, "struck a blow which may prove the breaking up of the lantern ring." Although I was not previously aware of the fact, it seems feasible enough that a "ring" may indeed have been formed there to keep up prices. This, however, is a matter with which I do not, and shall not, concern myself.

In my letter of the date before mentioned I specified certain prices that were charged in the United States for both English and American productions, contrasting such prices with those charged in England. The statements I make and the prices I quote are characterised by the writer of the chief article in the trade journal in question (and which adopts as its title the *Exhibitor*) as erroneous, but which "would have been true about eighteen years ago, when war prices prevailed." Let us see.

The Milligan *Exhibitor* says:—"Statuary with black backs are seventy-five cents each, and *have not been higher for ten years.*" It will be in the recollection of those interested that I said the American price was "a dollar and a-quarter, or five shillings and twopence-halfpenny each." Upon looking at the nicely-printed "Catalogue of magic lantern slides manufactured and for sale" by E. L. Wilson, of Philadelphia, a townsman and, as proclaimed by C. T. Milligan, a patron of the last-named individual—a catalogue bearing date 1880—I find at page 69 the announcement that *statuary* "with backgrounds touched out" are, per slide, \$1·25, a list of seventy-two being given on that page, forty more following on page 70, prefixed by "\$1 25 each."

In the preface to the catalogue to which I allude the compiler of the work refers to the fact that "our long connection with photographers all over the world secures to us unequalled facilities for knowing not only where the best subjects are to be had but *how to get them at the lowest prices.*" This, I believe, will effectually dispose of the reckless statement made by the writer as to the prices not having been higher than seventy-five cents for ten years. As I am quoting the prices of one with whom he proclaims his business connection, I think I am justified in assuming that he has the means of verifying such quotation now that his attention is directed to his erroneous statements.

I spoke of "comic slip slides of good quality, lantern conundrums," and subjects of a similar description, as selling for a dollar and a-quarter each. This I am told is incorrect, and that comic slip slides are \$7·50 per dozen, *and have not been more expensive for twelve years.* Having the catalogue already mentioned as published in 1880 now open before me, I turn it up, and what do I find? At page 64 I read—"comic movable slides, coloured, \$1·25 each." On page 63 "lantern conundrums"—which, as my expert readers well know, are the simplest and cheapest affairs conceivable as regards cost of manufacture—are quoted at \$1·25 each. The English price of the class last mentioned is about equal to the price just mentioned if the odd dollar be thrown off, and be it well understood I speak of retail, not wholesale, prices. In short, every sale price quoted by me, and to which exception is now taken, is more than verified by reference to the catalogue from which I am now quoting.

It follows, therefore, that the writer of the leading article in the C. T. Milligan trade pamphlet, the *Exhibitor*, is either quite ignorant of the prices which prevail in his own city and among his own business *confrères* or otherwise entertains a charming disregard for facts. He says:—"We do not know Mr. J. Traill Taylor;" but he speedily makes it apparent that he does know that person by the palpable sensation evinced at the exposure made of the vendor of the bogus Morton condensers, concerning which, in the interest of the writer of the article in question, I draw a veil.

Perceiving that he is about to send you an American lantern catalogue, which, he says, "is about four times as large" as any English catalogue that has found its way to the American side of the Atlantic, and knowing precisely the catalogue to which reference is made, I ask you, gentlemen, if the said catalogue would, if added to one of the larger English catalogues, make it sensibly larger?

I have referred to letters I had received from America from photographers who desire to see the lantern "ring" broken up. Permit me to here acknowledge one in particular addressed to "C. T. Milligan" (presumably for publication in his *Exhibitor* for the next quarter), a copy of which has been sent to me by the author, Mr. C. Ferris, Malone, New York. As this gentleman, although a stranger to me personally, is a reader of this Journal, I doubt not that he will excuse the liberty I take in giving extracts from his letter which show very clearly the comparative state of the trade in both countries. Addressing Mr. Milligan, he enters fully into the prices charged by him, and makes no secret as to his estimate of the quality of wares for which he has had to pay so high an amount. By quoting the prices from contemporary Philadelphia catalogues he shows how reckless are the statements made by the writer of the Milligan article. After some remarks complimentary to myself he addresses Mr. Milligan thus:—"The trouble with you is that Mr. Taylor treads on your toes a little too hard when he referred to the exorbitant prices charged for lanterns in this country. But in this he was not very wild either, for lanterns that are catalogued at \$45 in this country are catalogued at \$20 to \$22·40 in London, and they are both *identically the same thing.* I speak of what I know, for we have one of each in town. One was bought in Philadelphia at \$45, the other in London at \$21, and in consideration of the purchaser being a clergyman they put in a dozen of Valentine's Scotch views. I wish you could see these views. They make yours look pretty sickly when thrown on the screen together." No more need be added.—I am, yours, &c.,

Woodgreen, London, June 17, 1884. J. Traill Taylor.

[Having received from Mr. J. T. Taylor the various documents referred to in the foregoing letter, and having also received Mr. Milligan's price list and *Exhibitor*, we are in a position to attest the accuracy of the prices quoted by Mr. Taylor.—Eds.]

"ON ALBUMENISING PAPER."

To the Editors.

Gentlemen,—Brilliant prints of deep purple tone, as in the old days, could be as easily obtained now if photographers would (one and all) express their wishes for such a change; *but* they must be prepared to assist, as well as albumenisers.

Paper, as now prepared with weak salting solutions, requires only a weak silver sensitising bath, and the result of such a weak state of things is—weak prints (deep purple tones are out of the question); and last, but not least, the pictures are not so permanent.

Increase the salting solution, *using pure albumen only*, and float on a silver bath of seventy to eighty grains—then we shall see better prints, rich, deep tones, and permanency better secured.

As regards "ready sensitised paper," the above remarks apply just the same. The demand nowadays is for everything cheap. The supply comes to hand, the buyer complains, and the vendors cannot alter it (at the price). If everything must be had cheap the materials lack quality, and the consequence is that everyone suffers in the end.

It rests entirely with the public to ask for better goods, consenting to pay a better price; *then* the change will gradually come. The cheap and nasty will disappear, smiling faces and fuller pockets will be the one general and universal result; at least such is the humble opinion of—Yours, &c., W. H. Hunt.

Willesden, N.W., June 17, 1884.

JOURNALS OF PHOTOGRAPHIC SOCIETIES.

To the Editors.

Gentlemen,—As one of the "country members" so touchingly alluded to in your leading article in last number, as well as in the character of one who takes a lively interest in the welfare of all that is photographic, I crave your permission to make a few remarks on photographic societies in general and on their system of reporting proceedings in particular.

Mr. H. B. Berkeley's remarks having been, as he avers, wrongly reported in the *Journal* of the Photographic Society of Great Britain, he (Mr. Berkeley) has certainly a grievance of some weight; but his suggested cure for his grievance would, in my opinion, constitute a very serious and lasting grievance on the photographic public in general. If Mr. Berkeley will excuse the remark, I would say that his letter to the editor of the Parent Society's *Journal* is not written in his usual clear style, and I had to read it repeatedly and carefully before I arrived—or thought I had arrived—at the writer's meaning.

So far as I can gather Mr. Berkeley's suggestion is two-fold:—First, that papers to be read at meetings of societies should be printed before the meeting; and, second, that the public periodicals should not be allowed to publish remarks until they are issued in the Society's *Journal*. Mr. Berkeley's first suggestion is so curious, so unexpected to me, that I don't know what to say to it, except that it seems to me impracticable and undesirable, because a speaker often, while speaking, introduces matter which has occurred to him, and very valuable matter, during the remarks of others preceding him or even during the progress of his own remarks. I fancy Mr. Berkeley's second suggestion—the muzzling for a time of the public press—has been mooted before; but I, for one, would deprecate such a law, and fight it with all my force.

You, gentlemen, and other photographic editors, have reporters at the meetings of all societies; and your reporters, trained to their business, give, soon after the meetings, an account, more or less accurate, of what passed at the meeting in question. Your account and that of your contemporary "opposition," circulate throughout the country, wherever photographers are, a day or two after the meeting. If your reports are "meagre and incorrect," the Parent Society's *Journal* coming some weeks later, but to members only, is welcome and advantageous; but if your reports, as I must say I have always found them, are fair, accurate, condensed reports of what was said and done, the Parent Society's *Journal*, dropping in casually after the affair is past and almost forgotten, is of little or no use to anybody except to the members of that Society who take neither of the public photographic periodicals, and how many are there in that position? I think I have put the matter fairly.

I suppose that if the authorities of the Photographic Society of Great Britain saw no use for the Society's *Journal* they would not publish it, especially when its cost amounts to so serious a sum as £100 per annum, as is stated by one of your correspondents. The Edinburgh Photographic Society also sends out printed *Transactions*; but what the cost is I am not able to say. I confess myself that I cannot see why so large a sum as £100—or even £10—should be annually spent on what is, at the most, little more than a reprint of what appeared a month before in the public press. Greater accuracy might be expected, but from Mr. Berkeley's complaint is apparently not gained; while, as a rule, papers read are all the better for condensation. And why should not the editors of the weekly periodicals have access to the papers as soon as read, so that the public would *immediately* have accounts accurate and sufficiently detailed of all that was said and done at any particular meeting of any society?

And, once more: what is the reason we have not either at Pall Mall or at St. Andrew's-square shorthand writers? Surely that would be a "happy issue out of all our woes," and there would be no necessity for slips being sent out to some and not to others, as appears to be the system at present. Surely in the 500 members of the London, and the 600 of the Edinburgh, Societies there is one man who can write shorthand and would do so for a consideration. If there be not such a man the editors in the one case, and the secretary in the other, should be "told off for shorthand duty," or find a substitute.

In short, I think that the *Journal* of the Photographic Society of Great Britain should either appear immediately after the meetings, and in an accurate form, or else be discontinued, and the money now spent on it applied to some purpose conducive more directly to the good of photography and to the sustaining of the Society's character as the representative of British opinion and British work. I have always thought thus; but it is only now, when the pool is troubled, that I have ventured to dabble in it.—I am, yours, &c., Andrew Pringle.

Craigcleugh, N.B., June 16, 1884.

P.S.—My remarks do not apply so strongly to the Edinburgh Photographic Society, for there are many members not in a position to take a weekly journal; but any one paying one guinea a year subscription to the Photographic Society of Great Britain must take more than a passing interest in photography, and be a man beyond the necessity for petty economy.—A. P.

To the Editors.

Gentlemen,—With reference to the suggestion, made by Mr. Herbert B. Berkeley, that the weekly journals should wait for the "full and corrected" reports of the meetings of the Photographic Society of Great Britain published in the Society's own *Journal*, allow me to state that I have on more that one occasion been so misrepresented in these "corrected" reports, owing to an alteration of what had been said by a previous speaker, that if the circulation of the Society's *Journal* had not now sunk to such a low ebb I should have felt bound to try to set myself right with its readers.

On one occasion I was made to say that the "ferrous oxalate is not a modern developer." I certainly never either thought or said so. Nevertheless, I do not think that the plan of sending slips of their own remarks to individual members to correct is a good one, or one that ought to be tolerated, although in the instance mentioned, if I had been one of the favoured ones, I could have corrected the mistake referred to. A speaker may, by "correcting" his remarks, make those of other speakers appear pointless and absurd. By the putting into one sentence the observations of a speaker made before and after my remarks I have been represented as asking a question that had just been answered. The report should be that of what has taken place, and not of what each speaker would like to have said if he had had the benefit of hearing what subsequent speakers had to say.

I might have brought up the matter in question at one of the meetings of the Society, but that I was officially informed that such a subject would only be allowed to be entered into at the annual meeting. When it is considered that the annual meeting consists chiefly of the officers of the Society, who occupy the evening in mutually congratulating and in passing votes of thanks to each other, it will be understood what sort of reception anything in the nature of a complaint is likely to meet with at such a gathering.—I am, yours, &c., W. E. Debenham.

June 17, 1884.

Notes and Queries.

"How can I polish a small spot in the centre of my ground glass, as described by you, for purposes of accurate focussing? I may say that I have succeeded in obtaining a microscope which is well suited for the purpose.—E. P. H."——In reply: Try the effect of cementing a short piece of brass tube as a guide-piece upon the centre of the ground glass, and then working inside of this with a flat plate of brass or glass attached to a suitable handle, employing at first fine washed flour emery and then putty powder and water. Previous to applying this last-named powder let the glass or metal rubber be faced with pitch. In this way a fine surface will be obtained, which will be confined within the space bounded by the guide-piece, and not only act well, but look well. This, at any-rate, is our experience.

"I am extremely desirous of obtaining a powder which will give an instantaneous flash of the greatest possible actinic power—one by the light of which I can take a negative of an object in motion. Can you give me a receipt for making such a powder?—S. T. Brown."——In reply: Several years ago the best ingredients and proportions of a pyrotechnic powder for actinic illumination were carefully worked out by repeated experiments, and the following formula was the consequence of such investigation:—

Chlorate of potash (dried and powdered)........	4 ounces.
Sulphide of antimony..........	2 ,,
Sublimed sulphur..	1 ounce.
Magnesium filings..	1 ,,

Let these be carefully incorporated by mixing with a bone paper-knife. This powder flashes rapidly, giving an intensely luminous flame having a slightly violet tinge.

"I have taken several architectural photographs during the past few months, but the firm for whom I took them complain that they are faulty in consequence of the perspective being too sudden. They characterise them as 'distorted.' Now as I have read somewhere in the pages of The British Journal of Photography that, by adopting a certain process of recopying, the distortion in a photograph can be cured, I respectfully apply to you for aid in this annoying case.—Zeta."——In reply: This is a matter the proper remedy for which consists in the retaking of the negatives. The "distortion" spoken of is not correctly designated by this term, inasmuch as the photographs are a truthful rendering of the subjects as seen from a certain standpoint. The mistake lies in "Zeta" having selected the point of view too near the buildings, thereby producing a violent perspective; and, as we have said, nothing remains but to take them over again from a more distant point of view. From a portion of "Zeta's" letter which we have not given we find that he is inclined to attribute the fault to the employment of lenses of too wide an angle; but in this surmise he is mistaken. Had a narrow-angle lens been used the only difference in the result would be that from the standpoint taken the whole of the edifice could not have been got in; but the portion that was delineated would have had precisely the same violence of perspective as that in connection with which the complaint was made. It is quite true we have said that a distorted photograph could be cured by recopying, and we have on a previous occasion described the manner of doing so; but the distortion to which we then alluded was that of curvilinearity—not of perspective. If an architectural photograph be taken with a single lens the sides of the building will, if near the margin of the plate, be curved instead of being absolutely straight. The repairing of this by copying it with a lens arranged to give distortion of an opposite character, and to the proper extent, is a matter involving no difficulty; but to remedy an imperfection in perspective is impossible.

GEO. A. KEITH inquires if a microscopic objective, sufficiently powerful for photographing the general run of objects, cannot be made by mounting three or four short focus stereoscopic single lenses together.——In reply: Such a combination will answer exceedingly well for the larger class of objects, such as flies, fleas, and minute flowers, and we have known many excellent photomicrographs obtained by such agency. But a combination of this class will not be suitable for high-power objects, such as diatoms; for these a properly-constructed microscopic lens of short focus will be necessary.

J. CHAMBERLAIN writes:—"Can you give me a little advice with regard to the following questions, for which I shall feel very much obliged, being quite a novice? I have a vignette of a friend who is deceased, and it is the only one there is of him. How can I copy it? Ought it to be copied on to a gelatine dry-plate first? I tried in my printing-frame with some paper, and you can tell the result: it was what you would call a positive on paper. What exposure should I give, and can I take a copy by gas-light? What is the cause of the stains on the photograph enclosed? They come red in the toning bath, or, in fact, do not tone at all. I sometimes fancy that it is in connection with the paper, which is procured ready sensitised. What is the cheapest enlarging apparatus in existence, and could an ordinary view lens be used for the purpose?"——In reply: To copy the vignette proceed as follows:—Place it in front of the camera under such circumstances as to enable a beam of direct sunlight to be reflected upon it from a mirror, which may be held in the hand during the operation. If the copy is to be the same size as the original it will be necessary to expand the camera to double the focus of the lens, which with the camera you are using can scarcely, we imagine, be done unless your lens is of short focus. With a very small stop and a gelatine plate give an exposure of from six to ten seconds, and develope by a tentative system; that is to say, let the strength of the ammonia be such as to cause the development to proceed very slowly, thus allowing plenty of time for the addition of either bromide, pyro., or ammonia as required. For such copying a landscape lens will answer the purpose quite well. The stain on the print enclosed appears to be the result of contact with a minute portion of hyposulphite of soda. The cheapest form of enlarging camera is that constructed on the principle shown at page 221 of our ALMANAC for 1884; but a portrait lens should be employed.

Exchange Column.

I will exchange a four-wheel dark carriage (can also be used as a wagonette) for a 10 × 8 landscape camera with double dark slides.—Address, B. C. D., Athenæum, Bristol.

I will exchange a carved cabinet, with five changes, for anything useful in photography; a good 10 × 8 camera preferred.—Address, GEORGE READ, photographer, Market-place, Preston.

I will exchange a new mahogany sliding-body camera, fitted up with half-plate lens, for a good violin and case.—Address, JAMES ALSTON, 80, Kemp-street, Fleetwood, Lancashire.

I will exchange a whole-plate camera, half-plate ditto, and a quarter-plate ditto, for a 5 × 4 rapid rectilinear, by Dallmeyer, or backgrounds.—Address, BINDON, photographer, Egham, Surrey.

I will exchange a whole-plate lens, by Charles Chevalier, and a cabinet lens, by Ed. Burton. Wanted, grass and fur rugs, or any good studio accessories.—Address, F. V., Southwark Park-road, S.E.

I will exchange a thorough good cabinet lens, by a good maker, for a good Victoria camera and lenses; also several books on chemistry in exchange for anything useful in photography.—Address, S. HYAMS, Guernsey.

I will exchange a good revolving walnut stereoscope, by Dallmeyer, for a large-size binocular field glass, external condition no object if optical arrangements are all right; also Robinson's *Picture Making* and *About Photography and Photographers*, for *Monckhoven's Traité Pratique de Photographie au Charbon*.—Address, HARMER, Wick, Littlehampton.

I will exchange a good whole-plate camera, mahogany, double swing-back, bellows-body (for studio use), with extra back for 10 × 8, two cabinets on a plate, and three dark slides, a good half-plate lens (portrait) by Lerebours, and a lens for 18 × 15 landscapes, by Grubb, for a good English lever or Albert chain; a lot of photographic things also.—Address, Mrs. KUFFAM, 11, Victoria-grove, Kensington, W.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPHS REGISTERED.—

E. Debenham, 79, Princes-street, Edinburgh.—*Four Photographs of Sir Stafford Northcote.*

ALF. WERNU.—Any camera-maker would, doubtless, supply what you require.

E. WATSON.—Yes; by doing what you propose you should obtain a studio with sufficient light for all practical purposes.

G. T. MUIR.—The subject of your letter is in no way connected with photography, but applies to a topic with which we cannot deal.

W. COX.—The way the so-called "magic photographs" are prepared is this:—After the print is taken from the frame it is washed to free it from silver; it is now immersed in a solution of bichloride of mercury until the image entirely disappears, and then well washed and dried. Now, if the paper be immersed in a solution of hyposulphite of soda the image will again make its appearance in a brown colour.

S. A. J.—Your pictures certainly bear out all that has been said on the subject. We are not aware that it has been denied that good portraits can be taken in an ordinary room.

SHEFFIELD PHOTOGRAPHIC SOCIETY.—We regret that, owing to the lateness of the hour at which we received the report of the last meeting, we are obliged to postpone its publication till next week.

G. E. M.—Blood albumen can be procured from most drysalters. It is a regular article of commerce. As you only require it in small quantities, it will answer your purpose much better, we imagine, to purchase it than to make it for yourself.

F. J. DEAKIN.—Either of the lenses named will take a good portrait, but one will work in much less time than the other by reason of its larger aperture. With regard to the quality of the work produced by each there is little to choose.

G. J. LOOSMORE.—Any work on photography published twenty-five years or so ago will give you practical working details of the daguerreotype process. Possibly if you were to advertise you would be able to procure all the necessary apparatus.

LEEDS.—Some samples of bitumen answer much better than others. That which you have, and of which you enclose a sample, is certainly not suitable for photographic purposes. It appears to be a compounded article. You must procure a sample of the natural product.

SYNTAX.—Your fixing bath appears to have contained little or no hyposulphite of soda, as the prints darken immediately they are exposed to the light. If you prepare the solution, as you say, "five ounces to the pint," it is clear that you did not use hyposulphite of soda at all, but some other salt; hence the cause of your difficulties.

INITIATED.—All the portraits show a decided preponderance of top light. With the circumscribed space at your command we fear that you can scarcely make your back yard available for good portraiture. If you can erect a studio at such a height upon the wall as will enable you to obtain your light from the north it would be your best method of procedure.

A. J. SYMONDS.—The sample of pyroxyline is quite unsuitable for collodion emulsion, and, indeed, for any photographic purpose whatever. It has evidently been prepared for blasting purposes. The best way for you to dispose of the large quantity you have is to pull it into small tufts, place them in the open air, and fire them separately with a taper.

C. H. B.—We think it very probable that you are over-toning your prints. Try the effect of less toning, and the addition of a drop or two of nitric acid to the sensitising bath—just sufficient to give it an acid reaction to test paper. We believe that those who teach that kind of colouring supply their pupils with a pamphlet on the subject, but we are not positive on the point.

W. D. W.—The unpleasant appearance in the picture is caused by its being taken with a lens of much too short a focus; hence the angle included is abnormally large. If you take the view again from the same standpoint, using this time a lens of longer focus, you will have a much more pleasing result, as the angle included will be less; also, those unsightly buildings at the side will not then be in the picture—a still further improvement.

H. HILL.—If you re-read the reply given you will find that it was in reference to *enlarging direct* on canvas—quite a different thing to printing upon it from a negative. You are in error in saying that the permanence of the basis is of no consequence because the picture has to be painted over. As a matter of fact, if your silver basis fades the fading will make itself manifest through the paint. It is not a fact, as you assume, that oil-painted portraits of necessity crack and peel off. They do not, except the photograph be very carelessly produced.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—The next monthly technical meeting of this Society will be held on Tuesday next, the 24th instant, at eight o'clock p.m., in the Gallery, 5A, Pall Mall East.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.—We are requested by Mr. F. A. Bridge, the Hon. Secretary and Treasurer of the above Society, to announce that, in future, all communications should be sent to his *new* address—East Lodge, Dalston-lane, London, E.

PHOTOGRAPHIC CLUB.—At the forthcoming meeting of this Club, at Anderton's Hotel, Fleet-street, on Wednesday next, the 25th inst., the subject for discussion will be the adjourned discussion—*On Printing-in Skies.* The Saturday afternoon outing will be held at North End and West Heath, Hampstead. Meeting afterwards at 6.30 at the "Bull and Bush."

POITEVIN MEMORIAL FUND.—We have received a cheque for two guineas from James C. Cox, Esq., Lochee, Dundee, towards this fund, and we commend to our readers the excellent remarks which accompanies Mr. Cox's contribution:—"To few men does photography owe more than to Poitevin, although a mere amateur. I cannot but add my mite in gratitude to one who has taught us so much."

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THE BRITISH
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DRYING GELATINE PLATES IN HOT WEATHER.

In speaking of the drying of gelatine plates we refer principally to the performance of that operation during the process of preparation, as the after-drying of the negatives under no circumstances presents any difficulties.

Hot weather, it might be supposed, would be the most favourable for (at least) drying the plates, even though it does introduce difficulties in the matter of the setting of the gelatine. Once set, the process of desiccation might be expected to go on rapidly and regularly without giving any further trouble or anxiety How far this is from being the case most of those who have experienced the pleasures of plate-coating in summer weather will be aware; but, perhaps, some few may not suspect that the very means adopted to guard against the evil, and the precautions taken to promote rapid and equal drying, may frequently be the actual causes of the trouble.

On two or three occasions lately, during the fitful visits of sultry summer weather with which we are so familiar, our attention has been called to examples of the results of sudden attacks of irregular and abnormal drying. In each case the drying appliances have been of the most perfect description in use amongst amateurs. (We may here interpolate the remark that it is the amateur who suffers most in this way, for reasons which will be pointed out.) In two instances drying-boxes fitted with a gas arrangement for setting up an induced current of unwarmed air in an ascending direction were used, a third being on Mr. W. K. Burton's principle, in which the current of air moves in the contrary direction. All these have been in use for some time under precisely the same local conditions without giving the slightest trouble until the recent hot weather. Indeed, in one case the apparatus is provided with an arrangement by which the current of entering air can be heated to any desired temperature; and during the winter months it has been the practice to employ a temperature some degrees higher than that which has caused the recent troubles. But of this more anon.

A few words may be said of the effects produced in the instances which have come under our notice. These consist mainly of uneven drying marks following two—sometimes three—edges of the plate. At times the mark takes the form of a broad, irregular band along one edge only of the glass; but in all cases one portion of the plate presents a matt surface, and the other more or less glass. In two instances, however, the defect took a different form—the film refusing altogether to dry, reaching a sort of gummy stage beyond which it would not go without the application of a considerable degree of heat.

Obviously, in all cases the result was due to decomposition, more or less pronounced, of the gelatine during drying. If there could be any doubt as to whether the decomposition had commenced before coating the plates it is set at rest by the fact, noticed by one of our informants, that a number of plates coated from the same bottle of emulsion gave perfect films a week or more after it had been used in the production of defective ones. In the case of the plates which refused to dry most probably the emulsion itself was also in fault, as in a similar experience of our own a few years ago we found the emulsion had not been properly washed, the films containing a considerable quantity of hygroscopic nitrates which, by delaying the drying, helped on the decomposition.

As to the cause of the decomposition, it is not far to seek. It lies in the drying-box itself. The practice of cramming a large number of plates into a small space to dry—a practice too common with amateurs—is one that results in more failures and troubles than perhaps any other. The idea that, so long as air space exists between the films, the box or cupboard may be crammed full, and that the same current of air which will dry a dozen will prove equally effective for a gross of plates, is one that cannot too quickly and completely be dismissed from the mind.

Putting the matter in its simplest form, the plates in drying give off their moisture gradually and regularly to the surrounding atmosphere. If this be stagnant—that is to say, if the space be confined and there is no ventilation—the atmosphere soon becomes saturated with moisture and drying ceases: hence the necessity for a constant change or current of air. Now, as air will only take up a given quantity of moisture (varying with circumstances) in a given time, it is plain that a current of air passing through a drying-box may suffice to carry off the moisture from (say) a dozen plates, while it will prove wholly inadequate for a gross, which number would require twelve times the volume of air or a current twelve times as rapid to effect their drying. With the larger number of plates and the insufficient current the atmosphere of the drying-box is constantly charged with moisture, the plates are unable to give off any more, or that but slowly, and the drying is checked.

We all know that gelatine in the presence of moisture (especially when the latter is accompanied by heat) rapidly decomposes; hence we need not be at all surprised if, under the circumstances noted above, plates dry unevenly. Of course a *hot* day in summer may vary very much in its character; it may be dry heat or it may be moisture-laden. It is the hot, close, heavy days, when the air is highly charged with aqueous vapour, which bring out the weaknesses of the drying-box. A hotter day if dry will probably cause little or no trouble; hence the reason of the result obtained with the weak, old emulsion quoted above.

The moral, then, is, if a drying-box *must* be used, not to overstock it; but it is far better, when possible, to dry in an open room well ventilated, as most of the commercial makers do. The ordinary coating-room will do if the window be covered with an opaque blind. The plates should never be left exposed to *any* light of whatever colour; and if the interval of night be selected for drying, no time will be lost. In any case the room should be left to itself, as any moving about would raise dust and spoil the films. At this season six or eight hours in an ordinarily-ventilated room will be found amply sufficient.

PRACTICAL DETAILS OF ALBUMENISING PAPER.

Resuming the above subject where we left it last week it will now be necessary to digress for a moment from the actual manipulations to say something about the drying-room and its fittings.

When the preparation of the paper is on a commercial scale the albumenising- and drying-rooms must be specially fitted up for the purpose. This is usually done by having light frames or racks constructed to hold the wooden rods over which the paper is laid when it is removed from the albumen. These rods are of deal and usually about the thickness of an ordinary broom handle. Rods suitable for the purpose may be purchased in lengths of from ten to fifteen feet at any of the steam moulding works, where they are rapidly produced by machinery, and are, therefore, very low in price. The wood should receive a coating of shellac varnish, and then be slightly polished with bees'-wax dissolved in turpentine—or, better still, rubbed over with a little cocoa butter. The object of this treatment is to prevent the edges of the paper adhering to the wood if, by accident, a trace of albumen should get on the back.

In close proximity to the dishes containing the albumen (which, by the way, must be placed in the coolest portion of the room) a frame should be fitted with holes, into which the ends of the rods will slip, the object being that when the paper is taken off the albumen it can conveniently be placed across a rod, fitted into one of them, where it is allowed to drain into a receptacle while the next two or three sheets are being floated, or until it ceases to drip. Then it, rod and all, can be transferred to the drying-racks. If the paper be laid across the rods diagonally—that is, with the two opposite corners lowermost—the albumen drains off more completely than if it were laid lengthwise or widthwise, as then we get an accumulation of albumen, forming a ridge, along the entire length of the two lowest edges; whereas, if the other plan be adopted, the albumen drains off from the corners of the sheet. It is true that this plan takes up a little more space; but that is more than compensated for by the advantage gained by being able to utilise the extreme edges of the paper without waste.

However, it is not our present purpose to discuss the preparation of paper on a commercial scale, as every manufacturer has his own particular method of procedure, our object being rather—as we said at the commencement—to show how the amateur, or professional with limited business, may prepare a paper to suit his requirements, assuming that such (as has been asserted) cannot be obtained in commerce. Therefore we shall now say a word or two on extemporising a room for the purpose. This is easily done by fixing a number of strings across the room, which, it is scarcely necessary to say, must be as free as possible from dust.

The room should be a dry one, and one that can be made tolerably warm, because it is essential that the paper should be dried off quickly after it is coated; otherwise a high gloss will not be secured. The requisite number of lines being fixed to contain the quantity of paper to be prepared, and a fire having been kept burning in the grate for a few hours previously, to warm and dry the atmosphere, we again turn our attention to the manipulation at the point we left off last week, namely, the removal of the paper from the albumen.

If the paper be lifted off quickly it will bring with it a large excess of albumen, which will have to drain away when the paper is hung up. If, on the contrary, it be gently and slowly raised it will take away but little excess—indeed, it is possible to remove the paper in such a manner that not more than two or three drops will drain off when it is suspended. This, however, is scarcely to be advised, as there may be a risk of not retaining sufficient on the paper. In practice the best plan is to take the paper by the two nearest corners, and gently "strip" it off with an even motion. On no account should a pause be made in removing the sheet, otherwise an uneven wave will be formed which will eventually dry in a ridge, and show in the finished print. The paper having been removed, it is then pinned by one corner to a line close to the coating dish—a vessel being placed below to catch the drippings—while other sheets are being floated. After the albumen has ceased to drip the paper is removed to another line in a warmer part of the room, where it is allowed to remain till dry. Instead of pinning the paper on to the line it might be laid across it, after the method employed with the wooden rods; but this is liable to produce a mark in the albumen by reason of the small diameter of the string causing a sharp fold in the paper.

We have assumed that the paper is being prepared in quarter sheets only; but if the whole sheet be dealt with it will have to be pinned up by two corners, as one will not be sufficiently strong to sustain its weight. Theoretically, paper suspended by one end, or by one corner, to drain and dry will not prove so evenly coated as if were hung from the middle; but in practice there is little difference and this little may be totally disregarded—certainly, in quarter sheets We may, in passing, mention that we know one very successful commercial albumeniser who for years used to, if he do not still suspend his paper from the end of the sheets. Whichever way the paper is suspended when it is taken from the albumen its direction must not be altered afterwards; otherwise the draining will be partially arrested, and an irregularity in the coating will result. When all the paper is coated the fire must be made up and kept burning, so as to ensure as rapid drying as possible. This is essential, or a highly-glazed surface will not be secured.

It sometimes happens—more particularly in hot weather—that innumerable minute bubbles will suddenly make their appearance on the surface of the albumen, and if they be skimmed off others immediately form. When this occurs it is useless to continue the work, as a decomposition or fermentation has set in. The inconvenience, however, is only temporary, and, if the albumen be put away in a cool place until the next day, it will be found to have recovered itself and be, apparently, in no way deteriorated Sometimes a few hours are all that is necessary for its recovery.

When the paper is dry professional albumenisers, as a rule, roll it with heavy pressure between metal plates, but there is really no advantage in this beyond giving it a smoother and more sightly appearance for the market. No difference whatever can be detected in the finished prints between those made on paper which has been rolled after albumenising and that which has not.

After the albumen has been used up so closely that no more paper can be floated, it is a good plan to collect what remains, together with that which has drained from the sheets, and to dilute it with an equal bulk of water containing seven and a-half grains of chloride of ammonium to the ounce—that is, supposing the albumen be salted in this proportion. Then a small quantity of paper should be floated on this, as a little lightly-albumenised paper is often very useful, particularly when extra deep purple or black tones are desired.

LANTERN ILLUMINATION.

The first thought that arises upon reading the report (in our last number) of the inquest upon the body of the man who was killed by the oxyhydrogen explosion in Drury-lane Theatre is surprise that, in a place of public entertainment like this, there could be such loose management in a highly-important department as to render such an explosion possible. We do not so much blame the individuals themselves—mostly uneducated for the purpose though they be—to whom is entrusted the working of gases in which lurk a large power for mischief, as the system under which such work is carried on. Perhaps it will be after the manager of some important theatre has fallen a victim to the inefficiency of the system and the incapacity of the *employés* to whose control are entrusted the preparations for, and exhibition of, the lime light that the managers of other places of public entertainment will bestir themselves in this matter, and adopt the necessary precautions for safety—precautions so simple and almost self-evident as to make "accidents" synonymous with results of carelessness.

That the employment of gas bags instead of gas bottles has much to do with such "accidents"—of which we read more frequently than we desire—there cannot be a doubt; nor is there any doubt that in the mixture, through carelessness or inadvertence, of the two gases (hydrogen and oxygen) in one bag lies the immediate origin of the explosion. Some exhibitors adopt the system of having one bag red and the other black, in addition to large initial letters, so as to prevent the possibility of a mistake; but we can readily enough understand that there are mental conditions which might for the time being so govern the manipulator as, aided by other circumstances, would even then cause him to mistake one bag for another. For this evil we see an effective remedy in the employment of compressed gas—the oxygen, in particular, to be employed in this condition.

The gas bottle or cylinder system, although recognised and in a small measure employed in England, exists in such a crude form as to be objectionable in no small degree. One objection occurred to us when examining such a bottle a few days ago. It was too small to contain an adequate supply of gas for an evening's entertainment of two hours' duration unless placed under a high degree of pressure; while to withstand such pressure the cylinder had to be formed of metal so thick as to make its portability one of some difficulty. In New York (as we learn from a communication received three years ago from our then American correspondent) the gas cylinders are sufficiently light to be easily handled, while at the same time they are not inconveniently large. A cylinder for containing fifteen feet of oxygen measures eight inches by thirty-two inches, and weighs thirty pounds. When fully charged the pressure is 225 lbs., but each cylinder is tested to 600 lbs. before leaving the factory where these receptacles are constructed.

An objection to the employment of an oxygen cylinder of the description referred to consists in the ever-varying pressure which, as it diminishes, necessitates more or less constant attention at the tap that regulates the exit. Again: there is such a lack of delicacy in the construction of the supply tap of the American cylinder as to necessitate the utmost care in regulating the flow of the gas. The lever must be moved with a very steady hand; for, if allowed to be carried only slightly too far, the oxygen rushes out with such velocity as to cause the reservoir to become quickly emptied.

Several years since, and in an editorial article in The British Journal of Photography (for December 7th, 1866), a tap was described which possesses every good quality that can be desired. Unlike at least one of more recent times with which we have had ample opportunity of becoming acquainted, the regulating milled-head moved quite easily without stiffness; and, similar to the fine adjustment of a microscope, it could be rotated to a considerable extent without *greatly* influencing the outflow of the gas. But, even with this, there still existed the objection consequent upon a constantly-diminishing pressure of the gas in the bottle.

To obviate this, various devices were at the time resorted to, the most feasible consisting of a small reservoir constructed like a bellows, under pressure, through which the oxygen passed from the reservoir, and by which it was supplied under a uniform pressure to the burner. When the supply in the bellows became nearly exhausted a lever attached to its wooden top operated upon the output tap of the reservoir by which the bellows received a fresh supply, the lever then cutting off any further output of the compressed oxygen. The smoothness of the outflow to the burner reminded one of the equable supply of air to the pipes from the wind chest of an organ.

We are pleased to learn that an easily-worked and practical automatic regulator of the outflow of gas from a compressed supply has been recently invented, and which, it is hoped, will soon be rendered available to everyone. Patents have been obtained for this automatic equaliser both in this country and in America, and in due course we shall publish full details, from which it will be seen that all objections at present existing against the employment of compressed gases have been anticipated. Let us hope that gas bags will soon become things of the past, and that convenient metallic receivers, and equally convenient force pumps capable of being employed by hand in the compression of the gas, will be available to all.

There is a class of lantern exhibitors for whose special requirements we would make a strong appeal. It is that class who, through being situated at a distance from towns or villages in which gas is laid on for illuminating purposes, must either make their own hydrogen or adopt some substitute for it. The ethoxo lime light, as we all well know, forms beyond doubt the most brilliant substitute for the mixed gases. Mr. W. Broughton, its practical introducer for this purpose, will be gratified to learn that within a brief period of his bringing the light before the notice of the Manchester Photographic Society it was so much appreciated in Philadelphia that a "cute" citizen of the United States had made application for a patent in connection therewith. Owing, however, to a recent explosion, an atmosphere of suspicion surrounds this convenient light just at present.

Too much praise cannot be accorded to the Rev. T. Frederick Hardwich for the strenuous efforts he has been, and still is, making to eliminate from the ethoxo light every element of danger. From such experimental researches of this honoured *savant* as we have published our readers will, with us, have arrived at the conclusion that there is a safe as well as brilliant future in store for the ethoxo light.

But there is a blow-through method which may be applied to ether as well as to carburetted hydrogen. We are unable at this moment to fix the date of its introduction, but in Griffin's *Chemical Recreations*—a work which, when published in 1846, became immensely popular with the rising generation of the period—there is a description, accompanied by a drawing, of an ether lamp, in the flame of which, if a piece of lime were held, it quite dazzled the eye. We append a brief description in order to show that so long ago as the date mentioned the heating powers of ether and oxygen were amply recognised, the lamp being of such a construction as to render any explosion quite out of the question.

A spirit lamp, containing ether, has a small wick formed of asbestos which, dipping into the ether, becomes saturated by capillary attraction in the usual way. It is encased in a burner-tube of metal or stoneware. Passing up through the centre of the wick is a small pipe, the upper end of which terminates in a blow-pipe orifice that is close to the surface of the asbestos wick, the lower end being connected with a bag of oxygen. "When the lamp is lighted and the pressure of oxygen set on, the flame becomes very small and gives little light; but it has such intense power as to be able to melt platinum instantaneously." This quotation is given from the original edition of the *Recreations*, and it demonstrates the impossibility of originating any of the conditions required for an explosion, while there is heat of sufficient intensity to provide a light that may be considered powerful enough for lantern exhibitions of the ordinary class.

Apropos of this subject, we would here (and still in the interests of those who have no gas near them) desire to put in a claim on behalf of a system of lime-lighting which, when managed at its best, is but little inferior to that obtained by the safety or blow-through jets—we mean the oxycalcium light. Its improvement has not kept pace with the times; yet we know that it is capable of giving a bright light on a sixteen-feet disc when all the conditions are favourable. But what these conditions are we had no opportunity of ascertaining from the exhibitor, who for one and a-half hour kept a screen of the above dimensions beautifully illuminated. The relation of the orifice of the blow-pipe to the alcohol wick, together with the hardness or softness of the limes, are the leading factors in determining the illumination. In our own experiments with this lamp we have obtained the best results when employing a low pressure, a large orifice in the jet, and a soft lime.

PERMANENCY, AND TONING AND FIXING.

A fortnight ago we dealt with the question of the connection between the permanency of prints and the chief material employed in their production—the albumenised paper. We now go a step further and discuss the materials employed, and the operations involved at a later stage of the process of printing, with a view of ascertaining to what extent they involve considerations of permanency. A consideration of the sensitising of the paper need occupy but little of our space in doing this, though of the fact of the salting of the paper and the strength of the bath affecting the degree of permanency of any print few will be inclined to entertain any doubt.

It is well agreed that makers at present put far less salt in the albumen with which they coat their paper than was the custom many years ago, and, in consequence, less strength is needed in the silver bath. It will, nevertheless, be conceded that as such weak solutions must lead to the production of a smaller quantity of precipitate within the coating of albumen upon the paper, and, as a consequence, an image composed of a smaller quantity of material than that produced upon a more highly-salted paper. It is evident that the greater the amount present of this image-forming silver salt the longer must be the time needed for the usual influences to set to work and give visible evidence of their action. A large portion of the image might be rendered colourless and yet leave sufficient behind to show up a vigorous image. With a thin deposit within the film, contrariwise, a very small amount of fading would show at once.

The first stage after printing is the preliminary washing before toning. Here there is nothing likely to occur that would tend to induce fading, for, except where the operations are performed in an unusually careless manner, any silver not extracted at this stage would be most probably got rid of during the toning and washing after toning. As, however, we know that a regard for ultimate permanence is not an active force with some workers, we may here point out that an ill-washed print quickly toned and immediately fixed would most probably contain a small quantity of silver—some of it possibly as nitrate; and, if it did, would as likely lead to a decomposition with the hypo.—a decomposition that might show at once or after a time.

Similar remarks may be made in regard to the toning, confining ourselves, of course, to "alkaline toning." It is next to impossible to perform this operation in any way that might induce a tendency to fugitiveness. One particular form of toning which has excited attention in its time has been supposed to tend to imperfect security; but it requires very little consideration to show that no foundation existed for impugning its integrity. We allude to the bath made of gold, neutralised with chalk, and chloride of calcium (not bleaching powder) then added.

This bath actually requires the silver to be imperfectly removed, the toning then being many times quicker than when the nitrate is entirely washed out; but it carries its own antidote in the action of the chloride, which would throw down the silver in a form very easily dissolved in the hypo. At the same time, if the print reached the hypo. too quickly, it would be possible for some trace of nitrate of silver to remain in the paper, and so lead to fading; for it will be understood that when nitrate of silver and hypo. are brought together a decomposition ensues which ends in the production of dark sulphide of silver, an infinitesimal proportion of which would suffice to injure the whites, so that, though the picture might not be said to "fade," it could not at anyrate be termed permanent.

It is at the next stage, however—the washing after toning—that danger is most likely to arise, and here, unfortunately, is disputed ground. Some first-rate printers hold that no washing here is needed, and that prints placed in the fixing, either direct from the toning or after the slightest of washings have been given to them, are quite as permanent as those which have received a plenteous washing, while being more beautiful to look at. This, it will be seen, is neither more nor less than a modification of the old combined toning and fixing bath freshly made, and it is difficult to see why if one is good the other should not be, and *vice versâ*. Our own opinion is strongly against this mixing of the two agents—the gold and the hypo.—even in a diluted form.

Actual experience may be able to throw some light upon this matter; but it must ever be remembered that an old unfaded print is not of great value as evidence unless a very completely-detailed record of all the processes and materials employed have been kept. The number of obscure and complicated reactions which occur in the use of so easily decomposable a substance as hypo. may lead to many errors being made if too much be assumed as to what existed, or did not exist, a number of years ago in the materials used in producing a given picture or set of pictures which have not faded. An extended series of pictures continuing over a considerable period of time would be very strong evidence of the best kind; but, failing any such data, theory must form a most important element in drawing conclusions as to the safety or otherwise of a given process.

With regard to the introduction of gold into the fixing: it has to be looked at from many points of view. The gold, or the hypo., may be acid or alkaline; a possible chemical change from the admixture may occur at once or require time for its development; reaction may set in between the two salts themselves or only when the hypo. has begun to dissolve the chloride out of the paper. These are a few of the many considerations that have to be dealt with in forming a judgment.

If anyone wish by experiment to see what will occur upon the admixture of gold and hypo. solutions he can very readily do so. He will find that neutral or alkaline solutions of gold cause upon the first admixture a decided change of colour, while acid solutions cause no such change, but yet cause the evolution of sulphurous acid, as indicated by a faint smell. Are such changes injurious or not? They have not been followed up theoretically, so far as we are aware; but it has long been shown that acid in the hypo. is injurious. Whether the change indicated by alteration of colour be so or not is open to investigation.

As a broad rule it may be stated that anything that causes a change in the hypo. solution should be looked upon with suspicion, and it would be safest to leave on one side any such chemical. How hypo. acts upon the print, and what its dangers are, form the most important part of our present survey. It is an old story, but may well be retold, if only for the benefit of those who have taken up photography since the days when this vital question was so well investigated. It is too wide and important a branch of this subject to deal with at the end of an article, and it is our purpose to conclude our *résumé* of matters germane to this part of the subject in a future number.

THE veteran Herbert Watkins is "on the war path" again, having been aroused by the capabilities of gelatine plates to a renewed enthusiasm for the profession from which he had some years ago retired. His attention will be chiefly engaged with instantaneous work, in which department he hopes to effect some great things.

IN portraiture it was, in former days, that Mr. Watkins made his reputation, and few photographers of the present time, even with all the increased rage for "celebrities," can, we imagine, show so valuable—so priceless—a collection of "portraits from the life" as one we looked over with our friend, Mr. Watkins, the other day, each picture being accompanied by a little story of the circumstances under which it was taken. Out of a collection of thirty or forty notabilities of the past generation we may mention, from memory, Macready, Lord Brougham, Lord Palmerston, Thackeray, Dickens, Harrison Ainsworth, Dumas Sen., Garibaldi, and Michael Balfe, with "Johnny" Toole, Sims Reeves, and Edmund Yates, in their "salad days," to keep up the connection with the present generation. Each of these pictures dates back at least twenty years, many of them far more, so that we may soon begin to believe that photography is growing out of its infancy.

THE portrait of Henry, Lord Brougham mentioned above is the only photograph of the deceased statesman we have ever seen. We wonder if it be the only one in existence. If so, the personality of a character whose name will figure so prominently in future history should be preserved for posterity, possessing as it does that impress of truth which only photography can give. The early pages of *Punch* supply innumerable representations of the remarkable features of one of the leading politicians of that day; but, however good as caricatures, these will never pass to a future age as portraits.

THE question of colour value, colour sensation, &c., is surrounded with difficulties of which those that may be termed the "mechanical" are not less than others connected with the personal equation of the observer, some interesting examples of which latter quality were exemplified at a recent meeting of the Photographic Society of Great Britain. When an observer is colour blind to a considerable extent—in all probability without knowing it—his verdict as to the power of a certain light in a dark-room window is not likely to coincide with that of another possessing a natural power of distinguishing colour. And when it is desired to note and compare the effect of the admixture of colours most instrumental means are really inadequate, and the better class are cumbrous or costly. Thus many of Helmholtz's recorded experiments were founded upon the admixture of lights from coloured discs, which evidently left unexplored a very wide field. A communication, however, was recently read before the Physical Society, describing a new form of instrument, which would seem to offer considerable facilities for investigating these phenemona so interesting to the photographer. The colours are obtained by sending the light from a series of incandescent wires through prisms, and the instrument enables those different rays to be superposed at one time. If this should prove to be a serviceable piece of apparatus it may be expected to shed considerable light upon the subject.

We mentioned a few weeks ago a sample of sheet gelatine which exhibited a remarkable form of dichroism, the colours shown being green and red respectively, according to the number of thicknesses of material. We have since been shown a piece of coloured gelatine which exhibited in a very remarkable manner the transparency of coloured media to other than the prevailing tint. This particular piece of gelatine appeared of a bright, bluish-purple hue, and when held in the hand seemed to impart that tint to all objects; but when brought close to the eye, and a face viewed through it, the predominant colour given to it was not purple but crimson—a result so unexpected as to be almost startling. A more instructive experiment could not be given to show, in a popular manner, how incapable the eye is of forming a true opinion of the transparency of a medium to any particular coloured light.

Still on the subject of colour: a correspondent writes to us, *apropos* of Mr. Sawyer's letter, that last year he used a window coated with aurine dissolved in ordinary spirit varnish for the purpose of screening his silvered paper, and so is in a position to give an account of its value. The window faced due east, and for a while appeared to hold its own against the light; but after a month or two it rapidly changed and became quite useless.

A dark room for scientific purposes eight feet wide may be ample, but is certainly not remarkable. When, however, we read of the walls of such a room being six feet thick there is occasion for some surprise. These are the dimensions of the photographic dark room which is to be added to the Ben Nevis Observatory, an account of the opening of which we gave to our readers last October. The station has been so successful that great results are expected from it in the future, and it has been determined to double its present size, with the result of the accommodation just named for photographic purposes being designed.

The pursuit of astronomical photography presents many difficulties of no light nature in the path of its votaries. No one, for example, would consider the necessary watching in the small hours for favourable opportunities to secure stellar or lunar photographs as a light pastime for leisure hours; still less would he look upon an observer lying on his back on a cold winter night for an hour and a-half steadily turning a handle as engaged in frivolous amusement, even though the observer were a clergyman. These troubles, however, are trivial in connection with one that recently the Rev. T. E. Espin had a narrow escape from. Engaged in near proximity to the rear of his church, with his scientific paraphernalia about him, ready to seize a suitable moment for his favourite work, he was alarmed by a sudden flash of light, which he knew came from neither comet nor meteor, and to his horror he was seized from behind by two stalwart men. Their bull's-eye lantern revealed them to be policemen, and they arrested him as a dynamitard! Fortunately a catastrophe was averted, for the men discovered they had arrested their pastor, and their dismay may be more readily imagined than described.

At a meeting of the Royal Astronomical Society, on the 13th inst., Mr. Ranyard read an original paper on *The Cause of the Blurred Patches in Instantaneous Photographs of the Sun*, in which he gave a most ingenious explanation of the possible mode by which the phenomenon might be produced. M. Janssen explains these appearances in his own photographs as being due to solar clouds or gaseous masses above the photosphere, which he supposes to change rapidly; but Mr. Ranyard attributes them to currents of heated air within the body of the telescope. He placed a heated iron chisel in various positions in his telescope tube, and by the effects produced upon the image of a star out of focus he was able distinctly to localise the spot where the hot body lay. Following these indications he took an instantaneous photograph of the sun with the hot iron near the mouth of the telescope, and also one when the sun was just seen above a heated roof. In both cases the limb of the sun was much distorted, and brighter areas were seen extending into the disc of the sun.

There seemed a tendency to banter the reader of the paper, Mr. Common's remark that "with perseverance no doubt very bad photographs can be got, but the important question is how to get good ones," being received with laughter. It was, however, scarcely a fair remark to make, and the explanation offered by Mr. Ranyard appears a very natural one. Plenty of food for thought, and work for committeemen, may be got out of the sun's legitimate appearances without inventing solar facts to account for mechanical or instrumental vagaries.

LIME-LIGHT EXPLOSIONS AND THEIR PREVENTION.

There seems no doubt whatever that the safety tubes on which I have been lately experimenting are quite effective in preventing lime-light explosions, and it is to be hoped that they will be much used during the coming winter. I foresee, however, that the result will not be entirely satisfactory unless certain little points are attended to. The opticians who manufacture these tubes must supply with them an extra quantity of the granulated pumice or tin filings, as the case may be, to be kept in stock; and also little circular discs of wire gauze, cut out with a steel punch and slightly larger than the tube, so that they will not move when pushed in on the top of the filings to keep them in position.

Those who wish to make their own safety chambers can easily do so by cutting a piece of tin or brass tubing about three-quarters of an inch long by half-an-inch wide, and filling it with slate siftings. A disc of wire gauze, sixty meshes to the inch, must be placed at each end as before described, and the tube may then be attached to the jet by a connector of vulcanised rubber. To prepare the siftings crush two or three slate pencils in a Wedgwood mortar, and throw the coarse powder on a sieve of thirty-six meshes to the inch. All that passes through must be screened from dust by a second sieve of sixty meshes to the inch, and the rough pieces left on the first sieve returned to the mortar for further pulverisation. In this simple way a material is produced equal to the pumice as far as I have tried it, and sufficiently free from dust if well screened.

I find that after the tubes have been long used the wire gauze is apt to become rusted and choked up, so that from ten to fifteen per cent. is taken off the pressure of the gas, independently of the granules. The lecturer should accustom himself to examine the tubes beforehand by drawing air through them with the breath, and should put in fresh gauze whenever it is required. This can be done in a few minutes if the tubes be made to open at both ends; and they can be rendered gas-tight by a small washer of lead, or, better still, by springing a piece of vulcanised rubber over the whole length of the tube flush with the milled heads of the caps at the ends. If the red rubber be used it will present a very neat appearance, and when once the rubber is on it will not be necessary to remove it in unscrewing the caps. Tested by suction the tube will be found to be quite air-tight if the screw has been greased with a little tallow.

The credit of this invention belongs to Mr. Broughton, of Manchester; but I presume he will place no restriction upon the manufacture of the tubes, since we are all interested in restoring the confidence of the public, and in enabling them to listen to the instruction we have to impart, without any nervous fear of an explosion.

T. Frederick Hardwich.

AN ELECTRIC TIME ALARM WITH AUTOMATIC SHUTTER.

Those who have much to do with copying and enlarging cameras, in which the exposures are usually not timed in seconds, feel the desirability of some kind of alarm to warn them of the termination of those periods, and a shutter to cover up the lens at the same moment the aural notice is given. It is not always convenient, when two or more cameras are employed, to attend to any one of them at the proper time, either in consequence of being engaged in the dark room or lest others should be shaken by moving about the floor; besides, one's memory does not always serve. Time appears to pass so rapidly the more busily an operator makes use of it that the interval is found to have been exceeded on referring to the clock, the result being a spoiled plate; whereas, if each of the instruments were fitted with a shutter and bell in electrical communication, and controlled by the timepiece, failures from such a cause would cease to be. To this end I intend to describe a moderately simple and cheap arrangement for the purpose, and, by way of preliminary, to indicate the requirements and give some idea of the conditions whereby electrical energy may be applied to enable photographers, who are not even amateur electricians, to fit up the thing for themselves.

The mechanical and other appliances consist of a cheap American clock (preferably one of the older forms in wooden case), a charged No. 2 Leclanché battery, a small electric bell, and an electro-magnet for each camera fitted. A few yards of silk or cotton-covered copper wire, and some small terminals for convenience in connecting up, completes the list. These may all be purchased at a cheap rate, and are permanent, with the exception of the battery, and this might also be considered so, in that the slight amount of work it has to perform will not necessitate its being re-charged more than once a year, and only costs a few pence if sent to an electrician to be done. This form of battery is so common an article of commerce that it scarcely needs description here; as it is, however, the source of power, a little must be said respecting its action.

Upon the top of the jar are two terminals, soldered respectively to a plate of carbon and a rod of zinc. These are called the poles, and, while unconnected by a conductor of electricity—which, to speak roughly, consist of metals and non-conductors of wax, dried wood, glass, ebonite, gutta-percha, resinous substances, and so forth—no action takes place among the chemicals and metals in the receptacle; but when connected a re-arrangement of the elements of these substances takes place, and developes the subtle and peculiar energy known as electricity which flows through the conductor. This course of the current is called the "circuit," and will in our case be of copper wire, in which the apparatus for utilising the energy will be placed and form part of it. A covering of cotton or silk is advisable to prevent leakage or short-circuiting through some material affording a path of less resistance between the poles of the battery than that of bells and wire.

As it is not intended to allow the energy to waste by continuous action of the battery, but to make it available at the right moment to perform the service required, the line is severed and connected up to the clock in such a manner that the making and breaking of the circuit is controlled by its agency alone. More on this point further on. To convert the current into the servant: the quality it possesses of magnetising a piece of soft iron placed in a helix of covered copper wire through which it is passing, and therefore conferring on the soft iron core, while under its influence, the property of attracting that metal, is the only one to be here noticed. The electric bell and shutter being both actuated by one of these electro-magnets, and the whole being purchasable ready to connect up in the wire, nothing further need be said respecting their construction.

To prepare the clock for its office: provide it with a base piece if to stand, or a backing if to hang, of thoroughly dry wood, and secure upon the dial in the track of the end of the minute hand a little flat staple of wire partially embedded in ebonite or gutta-percha, to insulate it from the metal of the dial and other portions of the clock—one of the ends of the wire to run through the substance of the insulator to a terminal also set in it. The timepiece thus becomes a contact-breaker when placed in circuit—by connecting the wire from one pole of the battery to the terminal of the contact on the dial, and that from the other pole to the metal framing of the clock work—and only permits a passage of current insulated upon the dial whilst its minute hand is travelling over and touching the wire staple.

The electric bell and electro-magnet for the shutter we will pass over, in supposing them to have been bought and all right for fitting up.

The shutter for the lens is of the simplest character. It is composed of a piece of three-quarter inch deal, in length about three times the diameter of the hood of the lens, and in width about twice the same. At the lower end a hole is cut to fit on the hood, and on its face, a little more than the width of the aperture, are glued some strips of wood for the shutter to slide in. This need be but a little longer than the aperture in the board, and when raised for exposure is held in position by a small iron bolt which is drawn to release it by a small electro-magnet fastened on one side of the board.

Having provided the mechanism — battery, clock, bell, and shutter—the fitting up is the next consideration. In the first place, connect up one pole of the battery, by means of covered wire, with the works of the clock. The union thus effected may be looked upon as permanent, because, whether the clock be used to regulate one or many cameras, it serves for all. From the contact on the dial a piece of wire is taken to one terminal of the bell, another length connects the other terminal with one of the electro-magnets on the shutter, and, finally, another length unites the second terminal of this last with the other and vacant pole of the battery. It will be then found, as stated above, that the circuit is only complete when the hand of the clock touches the metallic contact on its dial, the action of the contrivance being as follows:—When an exposure is to be timed—say, for five minutes—the hand is set back that interval from this contact, and the shutter drawn and bolted. At its expiration the hand makes contact, and, completing the circuit, the electric energy magnetises the soft iron cores in the electro-magnets of the bell and shutter, enabling them to attract iron in their vicinity and perform the duty required—to give an alarm and release the shutter, which falls by its own weight and terminates the exposure.

Should the clock be required to regulate the exposing contrivances of several cameras, or do other work of timing either separately or simultaneously, there is no difficulty in fitting it for the duty. For one instrument at a time only the one contact on the dial is needed. This on being connected up by wire to a board to which the wires from the various apparatus are brought, the current is carried through any one of the series by uniting it with the clock wire by means of a switch—a strip of spring brass screwed on the one wire and capable of being turned to touch any of the others.

For simultaneous regulation a slight modification of the clock will be necessary. As each set will require a hand and contact on the face, there must be an extension of the hand arbor of the clock to admit of several being placed upon it. The hands, instead of being put on a square, must be slid upon the round spindle and fit sufficiently tight to move with it; but not enough to prevent the setting back of any one of them upon it. A key or cross-piece on the end of the arbor will be very desirable for checking any tendency to its turning with the hands. The contacts must be in steps, as it were, rising outwards, and the hands respectively of suitable length for each one. If half-a-dozen or fewer be used they must be placed on the spindle in the order of their size, the shortest one first—each one, in setting, to be put back from the contact to which it has been paired. In employing several bells they should be chosen differing in tone as much as possible, to avoid confusion.

An electrical servant of the above description can be usefully employed in many other ways besides timing exposure — in fact for any purpose where the period is definite and known beforehand.

JOHN HARMER.

PHOTOGRAPHIC INDUSTRIES.

THE SCIOPTICON COMPANY.

DESIROUS of becoming acquainted with the state of the sciopticon as regards the probable demand for it during the forthcoming season (for the lantern trade of the winter makes itself felt among manufacturers several months in advance), we took occasion to pay a visit to the head-quarters of the Sciopticon Company at 26, Colebrooke-row, Islington, London, in which place it is established under the management of Mr. George Smith—a gentleman well known to our readers as an able writer on many topics, especially those cognate to applied optics and projection.

But Mr. Smith does not confine himself to "scioptics" alone, for he has also entered the domain of photographic apparatus construction, confining himself in this respect to what are mainly his own inventions. At the time of our visit Mr. Smith was contemplating, with the fond eyes of a parent, his latest achievement in the way of camera stands—the "Manx stand"—so called, as he explained, as being an embodiment of the sentiment conveyed in the Manx motto, *Quocunque jeceris stabit.* This, the latest-born among portable stands, partakes in some of its features of the Kennett stand, only being much lighter, while the lightness is not secured at the expense of rigidity. Without a drawing it is very difficult to convey a precise idea of its various details; but we may say that in the sliding central portion of the leg, by which the height is adjusted to suit the requirements of uneven ground or elevation of point of sight, rigidity is conferred upon it by a clever adaptation of the T system. There are many neatly-contrived adjustments connected with the Manx stand, indicating thoughtful care throughout in its construction.

Conversing on the subject of the size of camera possessing the balance of advantages for the amateur tourist photographer, Mr. Smith gave it as his opinion that the quarter-plate camera fulfilled this requirement in a manner more perfectly, perhaps, than any other. In proof of this he showed us his own working outfit neatly packed in a leather case. It comprised a camera of the dimensions just mentioned, having a focussing-range extending from two to twelve inches; a small battery of lenses, also part of the outfit, providing the means of obtaining photographs at either extremity of this great focal range, or anywhere throughout its scope. A supply of eight plates for the single journey is contained in four double dark slides. The quarter-plate size, Mr. Smith states, is all that is necessary when one desires to print from the negative direct on to lantern-size plates for transparencies of $3\frac{1}{4} \times 3\frac{1}{4}$—the recognised standard dimensions of pictures of this class; while, if larger prints are desired, the negative is sufficiently sharp to produce them, by a simple system of enlarging, up to 15×12 inches.

Respecting the capabilities of single achromatic lenses for portraiture, we were shown by Mr. Smith some portraits obtained with single lenses the working aperture of which had been enlarged to $\frac{f}{6}$. While amply sharp enough in the face the definition of the parts of the figure remote from the face was of a pleasing degree of softness, contrasting favourably in this respect with the definition obtained with a portrait lens having a large angular aperture, by which some portions were extremely crisp and sharp, while others contiguous, but situated on another plane, were quite hazy and indistinct. The property inherent in single lenses by which this great contrast can be obviated has frequently been brought before our readers.

There is a material known as "vulcanised fibre" that has recently been introduced, and likely to prove of great value in various departments of photography, which we saw commercially utilised for the first time during our visit. This material is up to the present time supplied only in sheets, these being of various degrees of thickness. It is said to be prepared with parchmentised paper; at anyrate, it is light, impermeable to the action of acids or alkalies, quite flexible, and exceedingly tough. Mr. Smith has been trying the effect of employing this substance instead of brass for making lens diaphragms, and there can be no doubt of its value for this purpose.

He still adheres to the system, introduced by himself, of providing for a long focal range in the camera by a duplex system of tailboards—one made in three pieces, and wrapping round the camera when closed, like the cover of a book. When these are opened out and kept in a distended and rigid position by suitable fasteners, the body of the camera can travel from end to end of this double or triple tailboard.

The basement of the sciopticon premises is devoted to the production of moulds and the printing of lantern slides by the Woodbury process. Here stands a powerful hydraulic press, by which the gelatine reliefs are pressed into the surface of the lead printing moulds. Of these latter we saw several hundreds stacked away on shelves, all being classified according to the subjects. A distinguishing feature of lantern slides made in this manner is the transparency of even the darkest shadows, while the tone is entirely at the option of the printer, who can employ ink of any colour according to the inclination of his mind. That which Mr. Smith has adopted as a standard colour is a peculiar sort of dark brown, which he finds meets with more general acceptance than any other. It is of a tone much like that which characterised the transparencies of the now extinct firm of Ferrier and Soulier, of Paris.

There are also several printing-presses here of simple form, but which have been found well adapted for transparency printing. In this class of work it is absolutely indispensable that thin plate-glass be employed. This department of photography, we may here observe, is one with which Mr. Smith is exceedingly familiar, having been at the outset a pupil and an assistant of Mr. W. B. Woodbury's, and having for several years subsequently occupied an important technical position in the Woodburytype department of Goupil and Co., Paris. The supply of lantern slides kept ready in stock is both great and varied. Mr. Smith is a strong believer in the efficacy of the double-wick sciopticon in contrast with those in which the light is obtained from three, four, and even five wicks, and considers that the slight increase of illumination is dearly purchased by the greatly-increased heat.

We were shown a new adapting slide-holder for the lantern by which the effects of dissolving views could be obtained when employing a single lantern only. As this slide-holder possesses some features which we think exceptionally valuable, we shall defer the details connected with it till a future number, more especially as it could scarcely be said to be in quite a completed form at the period of our visit. Still we may here state what effect is produced. The picture is seen fully illuminated upon the screen, the source of illumination being either lime or petroleum; a diminution of the light then takes place, more or less rapidly at the option of the exhibitor, until it culminates in an instant of darkness, after which the light again increases to full intensity, but with a *different* picture now on the screen. The rapidity with which one plate may thus be merged into another is entirely under the control of the exhibitor, who can either prolong the transformation during a quarter of a minute or flash it off in half-a-second. The means by which this is effected will form the subject of another article in an early number.

The upper portion of the premises is devoted to the brass work connected with a growing manufacturing business, in which metallic fittings play no insignificant part. Mr. Smith, we may observe, is quite at home at the work-bench and turning-lathe; and in this respect, and unlike many other inventors, he possesses the advantage of being enabled to carry his special ideas into practical effect with his own hands.

EXPERIMENTS WITH PHOSPHITES AND VARIOUS ACIDS IN DEVELOPERS.

The objection to sulphite of soda in the developer, raised in these pages some time ago—that it acts as a restrainer—was experimentally refuted by the Editors, who proved that it, by itself, acts as a slow developer, which was to be expected, because all developers, including pure sulphite of soda, are absorbents of oxygen. Another reason is that it has a feebly-alkaline reaction, and the presence of alkalies increases the absorption of oxygen by silver reducers. Then, again: sulphurous acid is one of the weakest of the inorganic acids. It is not much more powerful in its combinations than carbonic acid; so that there are certain resemblances between carbonate of soda and sulphite of soda—the former, however, having the stronger alkaline reaction. As sulphite of soda is a developer, how is it that a solution of it rendered slightly acid preserves pyrogallic acid? This may be because there is so very much matter in the concentrated solution to oxidise, and because the specific gravity of the liquid is such that when its upper surface is oxidised the thin film acts partially as a protecting layer upon the bulk of the liquid below. Without the sulphite the oxidised layer sinks in streams to the bottom of the solution, fresh liquid takes its place, to be in turn oxidised, and so the whole mass discolours rapidly. The oxidised solution is a brownish-yellow vegetable dye.

Undoubtedly sulphite of soda slows development, which is a different thing from slowing the plate. To operators not in a hurry from commercial stress or other reasons, the lengthening of the time of development by a minute or two is an advantage rather than otherwise. The whole operation is then more under control, and it is easier to hit the proper intensity, thereby avoiding subsequent strengthening or reducing of the negative.

Wishing to know the function of acids in the sulphite of soda developer, and to what extent different acids affect the colour of the image, I tried several new developers, all of which worked well. The first picture was, however, developed with the usual sulpho-pyrogallol developer, slightly acidified with citric acid in order to compare it with the others. The acidulated sulpho-pyrogallol and bromide of potassium were applied first to the film that it might obtain the benefit of the action of the free acid before the latter was neutralised by ammonia. By soaking the plate in this way for more than a minute, and brushing its surface under the liquid before the addition of the ammonia, it is easier to obtain clean, unspotted, and dense negatives. Soaking the plate with water alone before development has always had a bad effect in my experience.

The following are the new developers tried. The sulphite of soda used was the recrystallised variety; all the chemicals employed were those of Messrs. Hopkin and Williams, except the pyrogallol, which was Schering's. In all cases, of course, the acid was put in the liquid before the pyrogallol was added.

1. Lactic Acid.

The stock solution consisted of—

Lactic acid	60 minims.
Saturated solution of sulphite of soda	1 ounce.
Pyrogallol	45 grains.

In this and all the succeeding experiments, before developing, one part of the stock solution was added to fifteen of water containing the bromide, and the ammonia was added after the plate had been treated in the manner already stated. The above stock solution at once took a faint, pinkish straw colour.

2. Bisulphite of Soda.

The stock solution consisted of—

Saturated solution of bisulphite of soda	1 ounce.
Pyrogallol	45 grains.

This salt is strongly acid to test paper; in fact, it will dissolve zinc, and undergo decomposition in the process. The solution was of a feebly-tinted, blackish-green colour. Bisulphite of soda is much less soluble in water than the sulphite.

3. Sulphurous Acid and Sulphite of Potash.

Water	1 ounce.
Sulphite of potash	2 drachms.
Sulphurous acid	1 drachm.
Pyrogallol	45 grains.

The sulphite of potash had an alkaline reaction, and the above quantity of sulphurous acid made it but slightly acid. The solution was of a dark, sage-green colour.

4. Carbolic Acid.

Saturated solution of carbolic acid in water	1 drachm.
Water	7 drachms.
Pyrogallol	45 grains.

At the time of mixing, this solution was colourless; but it gradually took on a yellowish-brown tint, and at the end of three weeks became the colour of ordinary negative varnish. Carbolic acid or, more properly speaking, phenol, is not an acid at all; the behaviour of this developer was, therefore, unlike the others, as stated farther on.

5. Phosphorus Acid.

Water	1 ounce.
Phosphite of potash	110 grains.
Pyrogallol	45 ,,

The phosphite of potash had an acid reaction of its own. The solution was a dark, sage-green colour, and slightly opalescent before and after filtering. In three weeks it exhibited symptoms of slight turbidity, but was possibly only ridding itself of that which caused the opalescence.

6. Phosphorus and Citric Acids.

Water	7 drachms.
Phosphite of soda	220 grains.
Solution of one drachm of citric acid in eight drachms of water	120 minims.
Pyrogallol	45 grains.

The phosphite of soda had an acid reaction; but on adding the pyrogallol it went a dark colour, so I added the above citric acid, which at once partially decolourised it. I do not now think that the addition of the citric acid was necessary; for the dark colours struck with the phosphite salts appear to be harmless, and do not show in the developer when first diluted for use. The stock developer now under notice assumed a greenish-brown colour.

The general result of the trial of all these developers was to show that, with ordinary exposures, the particular acid in the developer has very little influence on the colour of the image, though it has much on the colour of the developer. The free acids in these developers all acted as restrainers, with the development conducted in the manner already stated. In fact, with the very acid, bisulphite of soda, No. 2 developer, more than treble the usual exposure of the plate was necessary. On the other hand, as the exposures were lengthened and the developers made more acid the vigour of the images increased, and acquired more the characteristics of those taken on chloride of silver gelatine plates. I am not sure whether by following out these principles it may not be possible to get the same class of transparencies as with chloride plates, and to avoid the long exposures to lamp-light on the one hand, or to burning magnesium on the other, as well as to avoid keeping one set of plates for transparency printing and another description of plates for the camera.

According to Miller, sulphite of potash in solution undergoes slow decomposition in closed bottles; and a recent paragraph in these pages announced that a French chemist had stated that sulphite of soda in solution slowly decomposes. The latter paragraph may have merely meant the ordinary decomposition by oxidation; but if it meant decomposition in closed bottles the subject should receive attention. Watts says that the solutions of the phosphites alter little by exposure to air, so there is a probability of advantage in substituting them for the sulphites in developers.

These experiments proved to me that variations in the amount of free acid in the sulphite class of developers affect the results—whether more so by my method of applying the developer than by other methods I cannot say; but, as the citrates of the alkalies are powerful retarding agents, it is probable there is restraining in every case. A bad sample of sulphite of soda is a mischievous thing, because the decomposition of any free carbonate of soda in it, when citric acid is added, produces the strong restrainer, citrate of soda, in the solution; therefore the sulphite of soda should be pure and recrystallised.

In all cases litmus paper should be called into use when mixing the sulphite developer. When the solution is but just neutralised, or but faintly acid, it has much more tendency to fog the plates than if a little more acid be added. The stock developer may give a fairly-strong reddening of litmus paper before the acid is in sufficient ascendancy to effect retardation of practical importance; but the chances of fog are greatly diminished. Some of the discrepant experiences of various new users of the sulphite of soda developer may have been due to their following one formula, and mixing the same quantity of citric acid with different samples of sulphite of soda. The latter must be pure to be sure of good results, and the mixing should be done with the aid of the information given by test papers.

As an example of the danger of using different samples of sulphite of soda indiscriminately, it may be mentioned that while at Lucerne I received a French sample of the salt, and did not recognise it, its appearance was so "chalky." Seven ounces of saturated solution of it were made and filtered, and having no litmus paper at my hotel I took the solution to Herr Brunck, of Zuricherstrasse, to be rendered very slightly acid before adding the pyrogallol. He informed me of a more delicate test than litmus paper, namely, a very weak solution of cyanine, the beautiful blue colour of which is destroyed by the feeblest trace of acid in any liquid added to it. To hit this neutral point we had to put into the seven ounces of solution at least a quarter of an ounce of strong sulphuric acid, that acid being selected for the purpose of liberating a little free sulphurous acid. The quantity of carbonate of soda in the original sample of "sulphite" may therefore be imagined, and had the neutralisation been performed with citric acid a heavy amount of the powerful restrainer, citrate of soda, would have been in the developer. This abundantly shows the necessity for using test papers or test solutions, and pure chemicals, in making the sulphite of soda developer. This developer works best when not quite neutral; it should have a moderately-strong acid reaction. I did not find that sulphate of soda acted very strongly as a restrainer, much of it as the solution contained. Many salts, containing more oxygen than the sulphites, act as restrainers in chemical actions. An article by Mr. Hood in a back number of the *Philosophical Magazine* states that the oxidation of ferrous sulphate through chlorate of potash is retarded by the presence of the sulphates of potash, soda, ammonia, and other salts, in proportion to the weight of each inactive salt added. In photography any tendency to yield oxygen checks development, and any tendency to absorb oxygen increases the energy of development; even salts chemically inactive seem to exercise some little "strain" in either the one or the other direction.

On my notes are the following items of further information about the six developers already mentioned:—

The lactic acid developer, No. 1, gave a bright image, which came out rapidly. This acid possesses much power in the way of preventing the decolourising to any great extent of the pyrogallol stock solution, which in three weeks has undergone no visible change. The lactic acid used was not very strong, but that known as "medicinal," specific gravity 1040.

Developer No. 2, with bisulphite of soda, was so acid that it required about three times as much ammonia as the other developers to energise it. I find the curious remark on my notes that the plate developed with it took longer than the others to fix in the thiosulphate of soda solution, but this requires verification by more experience.

The sulphite of potash developer, No. 3, presented no unusual features. The carbolic acid developer, No. 4, darkened rapidly over the plate; in short, it behaved just like the ordinary pyrogallol developer without sulphite, and the image came out quickly. No. 5, with phosphite of potash, gave a vigorous image; the diluted developer became slightly opalescent. No. 6, with phosphite of soda and much citric acid, gave one of the best transparencies of the series; but the exposure was necessarily longer than with plates for development in a less acid solution. The developer acquired a deep colour—not irregularly; yet I do not think it was more decomposed than if the ordinary sulphite developer had been used. These colours of the liquids are very deceptive, and, as a rule, are harmless, forming no guide as to the relative amount of decomposition going on in various developers. The phosphite of soda developer took the colour of strong old ale over the plate.

All these stock solutions work well; and, as I use them up, if they should present any peculiarities not yet observed, any such points of interest will be published. W. H. Harrison.

ON THINGS IN GENERAL.

Oxygen explosions still to the fore! I suppose, also, they will be till the arrival of the millenium. The first time a man starts exhibiting lime-light, if he be not thoroughly ignorant, he is generally in a state of nervous tremor; and when he makes oxygen, if he have heard anything about its danger—a problematical occurrence, by-the-bye—he almost buys a suit of plate armour against possible explosions. But after a few trials, when he finds the whole thing so simple, he rapidly proves the truth of the adage, "Too much familiarity breeds contempt," and he has nothing but wonder for the fools who have "blow-ups," till, perhaps, some day he finds himself testing the strength of the ceiling with his head. When, however, the work is delegated to ignorant servants, the occasional occurrence of accident is an actual necessity, and the wonder is that there are not more of them. Even if the danger be well known to them, and steps devised to prevent accident, they will not make use of them. There are manufacturers who will not have their steam-boilers examined by an official examiner as they might be put to expense in repairing them; and there are workmen who load the safety-valve. The same class of treatment is given to gas bags, and would be to nitro-glycerine if it could be turned on by a tap. One has only to observe the usual course of proceeding when there is an escape of gas. Most people know that if it get alight it will explode, so the common plan is to strike a light at once and apply it where the gas smells strongest, with the idea, I presume, of ascertaining whether it is dangerous. Unfortunately, too many of these rash persons carry the knowledge to the grave. I do not for a moment wish it to be supposed that I would deprecate any attempt to introduce safeguards; the more, and the better in quality they are, the fewer the accidents there will be. But it is useless for anyone to expect perfect immunity from accident when the ordinary plan of the workman, who imagines that the gas has got mixed, is to apply a light to the tap to ascertain the fact. The minstrels who were performing at Drury-lane where the accident recently took place deserve a medal for their presence of mind, for it prevented the occurrence of a panic. As soon as the noise showed something to be wrong they interpolated a few comic remarks, and led the audience to believe that it formed part of the entertainment.

Explosive substances seem to connect themselves most closely with photography. With ether, pyroxyline, oxyhydrogen, &c., so constantly in use, no wonder the fire insurance companies make us pay heavily; and now we have still more dangerous chemicals suggested. M. Guyard has proposed iodide of nitrogen as a light measurer—a chemical which will literally explode by a breath of wind, and cannot be kept in quantities of more than a few grains at a time. I note a correspondent of this Journal writes to the Editors to know if iodine dissolved in ammonia would remove very bad silver stains. He is informed that they will, but is cautioned to keep iodine always in excess to avoid the formation of the above-named terrible compound. But why use such a compound at all? A preliminary treatment with strong solution of iodine, followed by cyanide or even hypo., is quicker than any plan known. It is incontestably superior in point of efficacy to any other plan published; but it has not been told more than a thousand times, so I presume it is not generally known.

Mr. W. Coles's paper on *Altering the Density of Gelatine Negatives* was a most useful one, though, as a matter of course, he could not include all good methods. He must be a courageous man, for he positively admitted that it was possible for him to make an error of judgment in the density of a negative. My experience of photographers is that, like doctors and lawyers, they never make a mistake. Mr. Coles no doubt believes with me the philosophical dictum—"Show me a man who never made a mistake and I will show you a fool."

Mr. E. Dunmore, at the last meeting of the Parent Society, made a very pertinent remark *anent* permanency. He said the word "might have a very elastic meaning; it might be used as meaning indestructibility or durability." I can give him an instance showing that the public may put the former construction upon the word. A reception-room attendant was showing to a lady a beautiful picture in water colour upon a carbon print which had just left the artist's hands and was not yet framed. "This is done by the permanent process." "Is it," was the reply, and the lady quickly rubbed the face of the picture with her gloved finger before she could be interfered with. *Tableau!*

I see that Mr. H. B. Berkeley has been complaining about the reports in the journals of the meetings of the Photographic Society of Great Britain. He says:—"Under the present system of publication of a non-official character such errors must remain inevitable." Mr. Berkeley is nothing if not logical. Where is the logic here? By the same argument all the summaries that appear in the daily papers even are necessarily inaccurate!

I was much interested in reading the account of the method of getting rid of obtrusive backgrounds that the editor of the *Photographic Times* (New York) devised. He made bonfires, and the smoke formed a screen that quite obscured the objectionable parts. Our old friend is a lucky man, or deserves to be; but was not the wind a very convenient wind on the occasions he named—never once blowing the smoke the wrong way, on to the foreground instead of off it!

Photography and fine art are again in collision on the continent. This time there is actually on view a photograph and a painting of the same spot—the interior of a studio—with similar surroundings, and the painter is accused of undue use of the photograph. The jury of honour, however, has acquitted him. This artist did not adopt a safe plan; he should have got hold of a beautiful landscape photograph, the result of thought and clever selection by an educated photographer; no one would have blamed him then, as that sort of thing is considered all right.

Photography in colours once more and not a secret process, the whole being given to the world without fee or reward! See report of a meeting of the St. Helens Photographic Section. I did not hear of any picture being shown that had been executed by the process. We shall see what we shall see!

Mr. J. R. Sawyer's remarks about coloured light in dark rooms was quite to the point; in well-arranged works they do not stare at the light. In the first place, the workman has his work to look at; and, in the second, even if his eyes did wander, there should always be an opaque screen between them and the direct glare of the light. It is only our dark-room visitors who stare at the windows and say—"does not the light dazzle your eyes?"

FREE LANCE.

WHERE TO GO WITH THE CAMERA.

[It is hoped that this series of articles will be continued at regular and frequent intervals during the vacation months, and we shall be glad to receive contributions to the series from any friends able to treat of new and interesting ground.]

AMONG THE ALPS IN JUNE.

ALTHOUGH weather in Switzerland was very bad during July, 1883, we were fortunate in having seventeen perfect days among the Alps in June. The passage from Southampton to Havre on the night of the 19th was exceptionally smooth, and the journey was continued *viâ* Rouen, Paris, and Dijon to Lausanne without a break.

About four o'clock on Wednesday morning the train wound above the gorges of the Jura. Heavy mists clung to the pine-clad mountains, and the meadows were carpeted with forget-me-nots and what appeared to be narcissus. There is a solemn beauty about the Jura that is most impressive—"foresplendouring," as Carlyle would say, the greater glories of the high Alps. Lausanne, the last resting-place of Kemble, was reached about nine o'clock, and Ouchy shortly after, where we slept for the first time. The main features of interest at Ouchy are the old Clock Tower, the washerwomen (each standing at her tub), and the water-carriers; these are very picturesque.

Thursday was superb, and we left early by boat for Chillon. The old castle on the lake with its background of hills glowing with colour, between and above which rise the snow-clad mountains, formed a picture never to be forgotten even amongst the grander scenery of the Alps.

Eight o'clock next morning found us on our way through the Rhone valley, *viâ* Brigne, to Bel Alp. Skirting the lake we saw the railway to Glion (a mountain village) in progress. It is now open, and is said to be (excepting Vesuvius) the steepest railway in the world. The gradient is fifty-seven per cent., and the line nearly 700 metres long.

At St. Maurice we changed trains. There is half-an-hour's stay here. We did not see the fine grotto here, thinking half-an-hour insufficient. There had been heavy rain about three in the morning, so that the oppressive air of the Rhone valley was in as good condition as it ever can be with its miles of stagnant swamp. We saw the cascade of Pissevache; it was very full, and makes a beautiful plate. Near here is the Gorge du Trient, which also makes an interesting picture. Further up the valley, on the edge of a snow-clad giant, blushed the exquisite pink of the Alpine rose.

At Martigny the Rhone turns a sharp angle and accompanies the rail up the valley to Brigne, which we reached about half-past two. The porter of the Hôtel d'Angleterre speaks English as well as an Englishman, and, as a rule, the porters of the Swiss hotels all speak English. They accompany the omnibuses to meet the trains; therefore all you have to do, if you speak neither French nor German, is (having decided upon your hotel *before arriving*) to make at once for the right omnibus and address yourself in English to the porter.

After lunching at Brigne we started on foot to climb Bel Alp, some 7,000 feet. Crossing the Rhone at Brigne we soon began to ascend a bridle-path, which is very steep, and more or less a staircase of large stones. Here and there watercourses overflowed the path, rendering it muddy and disagreeable. Valais is a Catholic canton, and around the *châlets* on our way the dirt and mire were indescribable. We had not ascended far when we found the Turk's-cap lily, pink with red spots, growing abundantly. I believe it to be the martagon lily. As we ascended, the grandeur of the view rising behind us defies description. In the front a mountain torrent born of the snows above, Ben Alp, came rushing down, forming here and there beautiful pictures for artist or photographer.

At something over two hours and a-quarter we reached the half-way house. Here we had milk, and the horses fed on black bread. It was past eight in the evening when we reached the Hôtel Bel Alp. The air was quite frosty, and we were glad to take advantage of a large wood fire beside which to dine. It was too late to see anything after dinner, but next morning revealed one of the finest panoramas in Switzerland in a semicircle before us.

Wrapped in garments of eternal snow the mountains stood like saints in robes of righteousness. First came the Weisshorn, next the Matterhorn, the Mischabel, the Fletchhorn, Monte Rosa, and several other peaks. From the Sparrenhorn, three hours up behind the hotel, a more splendid view is obtained. Five minutes off is the "Maison de Tyndall," and certainly the professor has shown his appreciation of air, which we thought unrivalled. There are two hotels, both belonging to Klingele. The new one looks straight on to the great Aletsch Glacier—"the widest, the longest, and the grandest glacier of the Alps"—at once a marvel and a terror. The border line on the Eggischorn side—which seen from this great height appears a short walk—is fifteen miles long, and takes fourteen hours to traverse.

On the path to the glacier we found the yellow violets (*Viola biflora*), and round the hotel masses of *Gentiana verna*, *Gentiana acaulis*, violas of different shades, crocuses, *Toudonella Alpina*, myosotis, blue and white, and many other flowers unknown. I had with me a $7\frac{1}{2} \times 5$ camera, and here I took several plates—notably one of the Great Aletsch Glacier, which I thought good, but which was broken in going home. My bottles were each in boxwood cases, but, nevertheless, one bottle was broken to pieces. I used Kennett's slow plates. The exposure was generally nine seconds, the Alps being covered with a black card kept moving until the last two seconds. I received this hint from a gentleman of great Alpine experience, who advised the card in preference to a flap shutter.

All Saturday, Sunday, and Monday the Alps were cloudless. Finer weather could not be; and the sunrise on Sunday morning at Bel Alp will never be forgotten by those privileged to see it.

On Monday, June 25th, we went down to Brigue. Soon after leaving the Bel Alp Hotel we came to a fir wood gemmed with *Anemone var sulphurea*, and further on found *Authericum (Paradisia) liliastrum*—otherwise called "St. Bruno's lily." The word "*paradisia*" is very applicable to the purity of this flower, and it grew in profusion. We found several more flowers we knew, but the number of the beautiful unknown prevailed. Our horses having preceded us to Brigue, the *mâitre d'hotel* took upon himself to send a carriage to meet us at the bridge, which was fortunate, for we had not been five minutes in the hotel before a violent thunderstorm came on. Rain fell in torrents, and the lightning was magnificent. This storm cleared the air, and, as before, we had a cool journey through the Rhone Valley.

Leaving Brigue about seven next morning we reached Interlaken that evening about nine. Interlaken is charming. Nearly all the houses are built in *châlet* style. The shops are good, and the place is highly picturesque, bright, and clean. But I was disappointed in the Jungfrau as seen from Interlaken. How could it be otherwise after the grand panorama of Bel Alp—the Mischabel alone being fifteen thousand feet high? However, the weather was perfect, and on Wednesday we drove to Grindelwald, where I took several plates. I greatly regretted not having the camera with me at the Gorge of the Lütschine. The time was between nine and ten a.m., and the light was just right. We went to the lower part of the glacier, and there the fantastic shapes of ice made a wonderful picture.

Next day we drove to Sauterbrunnen. The road is very beautiful, the white Lütschine on one side and the pine-clad mountains on the other. At Lauterbrunnen, the "Staubbach," or dustfall, was full. It falls at one leap 980 feet, and it is so airy that a strong wind will blow it considerably out of its perpendicular. I got a good plate of it, and also of the Trümmelbach—a fall about a mile down the valley. There are, I believe, twenty-five falls here, and these two are the finest. The word "Lauterbrunnen" means "nothing but fountains." There are a quantity of trout in the Lütschine, and it seems a pity to serve them, as was done, before they were half grown.

Early on the 29th we started for Mürren. The bridle-path from Lauterbrunnen is steep, but not nearly so evil as the Bel Alp staircase. The view going up is magnificent. The Jungfrau, Mönch, Breithorn, and Eiger seem very near, and splendid pictures can be taken *en route*. Halfway up is a small inn, and close by the Staubbach takes her leap into the valley below. After two hours and a-quarter we arrived at the Hôtel des Alpes. It is a first-rate hotel, with a fine billiard-room and every luxury, even to a hairdresser. This hairdresser is an intelligent little man. He showed us over their museum, which is very interesting, and told us he often saw chamois on the black Mönch. He said the license had been raised to over four pounds, owing to the chamois having been killed down. They had two owls alive and several fine rough-coated St. Bernards. When one considers that all the velvet couches, chairs, pianos, &c., &c., have to be carried up these mountains there is room for astonishment. After a good second breakfast we left Mürren, and the following morning left Lauterbrunnen for Giessbach and on to Thun, which we reached on Saturday evening.

The Castle of Zähringen-Kyburg, with its four turrets, is most picturesque, and so is the principal street, which recals Chester. The Castle of Spiez, on the lake, makes a beautiful plate, with the Stockhorn and Niesen in the background. There are several other good pictures to be had at Thun, but the air is oppressive, which is a drawback. Being Sunday I did nothing, and next morning we left early for Berne. There is a beautiful view of the Alps to be taken at Berne. The mountains were clouded the day of our visit, which was a loss. The cathedral belongs to the old Ulm school of architecture, and dates from 1421. The stained windows of the choir are very fine, otherwise the interior is disappointing. The sculpture over the chief portal is the masterpiece of Erhard Kung, of Westphalia, towards the end of the eighteenth century. The face and figure of the Goddess of Justice are beautiful.

The clock tower makes a nice plate; but the bears which perform when the hour strikes are so small and dark that they do not come out well. The fountain of the ogre is another capital subject. We went to the museum to see the celebrated St. Bernard dog "Barry." He was a smooth-coated dog, and was considered A1 at the monastery. Rough-coated dogs cannot stand the exposure and are drafted away. This noble dog had saved fifteen lives. We obtained two photographs of him at the museum. "Barry's" interesting history and that of his successor is given in Vero Shaw's *Book of the Dog*.

We left Berne for Friburg in order to see the suspension bridge, which hangs on chains between two arches and vibrates with the tread, and to hear the great organ. M. Vogt (son of the late performer) played the celebrated thunderstorm, the *vox humana* interpreting the chorus of peasants. The organ has immense power, but lacks sweetness. Near the cathedral stands the lime tree of Morat. This venerable tree, fourteen feet in circumference, makes an interesting plate. The story goes that it was once a twig carried in the hand of a lad who ran into Friburg to announce the victory of Morat, in 1476, utterly exhausted. The boy fell dead with "victory" on his lips, and his twig was planted where he fell.

Our faces were now turned homewards, and we halted for the last time at Rouen. Near the station for Havre stands the modern church of St. Gervais. Here is a crypt of the fourth century. The church stands on the side of the old Priory of St. Gervais, where William the Conqueror died. A marble slab outside the church relates this. We went on to the Cathedral, which the guide-book mentions as "viciously florid," but Time has thrown his gracious mantle over the pile, refining and beautifying the whole. Inside we found the tomb of Rollo, first Duke of Normandy, and in the north aisle that of his son, William Longsword, assassinated in 944. Near the choir is the long-buried effigy of Richard Cœur-de-Lion.

For the first time rain fell on us in torrents and prevented an examination of the carving outside, so we hurried to St. Ouen's, the most ancient abbey in Normandy, founded by Clothaire I. in 533. The abbey was destroyed four times, and the present church was begun and almost completed during the fourteenth century, the west porch being the latest portion. The greater part of St. Ouen's is built of hardened chalk, which abounds in the district. The exterior of the abbey is most beautiful, being so harmonious that an idea of perfect unity is conveyed. The Portail des Marmousets, on the south side, will arrest the photographer.

I was disappointed with the nave, which is extolled as "pure Gothic;" and I afterwards found that Mr. Ruskin, in his *Seven Lamps of Architecture*, page 35, says of St. Ouen's—"Its nave is a base imitation:" whereas Mr. Freeman says—"Nothing is introduced which derogates from its claim to be the noblest of Gothic churches" *(History of Architecture*, page 399). The Norman tower, containing the *chambre aux clercs*, at the corner of the north transept is the only remains of the pre-existing churches. There are three exquisite rose windows—one the work of the master mason, Alexander Borneval, and another by his pupil, called "The Apprentice's Window." Berneval killed the lad out of jealousy, and was tried and executed. Master and pupil lie side by side in a chapel near the choir—date 1440. There are besides these windows 125 others. Near the western entrance is a black marble benitura, which reflects the nave in a striking manner.

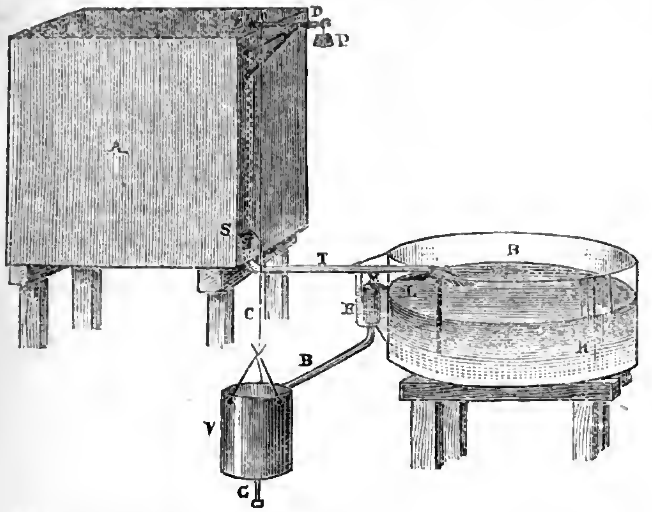
Passing by the wretched statue of *The Maid* in the Place de la Pucelle we came to the Hôtel Bourgtheroulde. The principal *bas-relief* represents the Field of the Cloth of Gold. There are also several salamanders and other sculptures. This hotel was begun in 1485, but not finished until the middle of the sixteenth century. The stone is a green grey.

From hence we walked to the museum of antiquities, where reposes the heart of Richard Cœur-de-Lion, the mark of William the Conqueror, a fine collection of faïence, one of the celebrated blue and white violins in delft, and much else too numerous to mention. Time did not allow us to visit St. Maclou—a most beautiful church, judging from the exterior; neither did we see the famous gradual of the monk Daniel d'Aubonne to be found in the public library. We much regretted not seeing the old houses that still exist—notably those in the Rue Malpalu, the Rue Nouveau Monde, and the Rue des Arpent, so attractively described by Mrs. Macquoid in *Through Normandy;* but time compelled, and we were soon on our way to Havre, from whence a smooth sea carried us back to the shores of old England. BOODE.

FOREIGN NOTES AND NEWS.

M. Berge's Print-Washing Apparatus.

Berge's washing apparatus, in which the water is automatically changed, forms the subject of an article in the *Photographische Correspondenz.* The washing apparati that have been described these last few years have generally been intended for the gelatine negative process, but this is for the removal of hyposulphite of soda from silver prints. Of course, the idea of washing prints automatically is by no means new, and there are already many more or less successful machines in the market; but there is always room for another. Every practical man knows how difficult it is to remove the hyposulphite completely from the prints, which have often, before that has been effected, to lie so long in water that their appearance suffers; and it is generally conceded that the quicker the washing can be done the better are the results. With this apparatus the prints may be thoroughly washed in from one to three hours. Description of the apparatus:—The apparatus can be set up any size suitable to the requirements of the establishment. The accompanying cut shows the arrangement according to the following proportions. In the cistern A, holding fifty-five litres, there is a vertical wire E S to which is affixed a valve S which permits the outflow of the water when the lever D is moved by the counterweight P. The water runs through the india-rubber pipe T into the washing vessel B. A very light bucket V, capable of containing about a litre, is hung to the arm E O of the lever D as near to E as possible, and at its under side an aperture of three or four mm. is made at G. A circular water-holder, B, of 0·4 of a metre in diameter, has a floor at H, and is connected by an aperture in its floor with the annex K. In the centre of this annex, 0·05 of a metre above the floor H, there rises the pipe R—the interior diameter of which is eight mm., and which carries off the washing water into the pail V. Above the pipe R a movable bell glass is inverted, the dimensions of which are so chosen that the washing water finds its way into it. In this way an intermittent outflow is established. The



gutta-percha tube T, which brings the water from the cistern A, is connected with a brass tube, which passes through the wall of the vessel B and empties itself in an oblique direction. The stream of water runs out with great force, and communicates to the water already in the vessel—a rotary motion by which the pictures are always brought in contact with fresh water. Mode of working the apparatus:—The cistern A is filled. The lever D E raises the valve S; the water enters the holder B by the tube T with a rapidity which can be regulated at pleasure. Since the aperture G in the pail is smaller than the opening M in the lever, the pail becomes filled, and when its weight is more than one kilogramme of water it exceeds that of the counter weight P; it thus causes the lever of E O to move backwards, and therefore causes the valve S to close, by which the flow of the water from the cistern A into the vessel B is interrupted, and the latter empties itself completely. Then when no more water flows into the pail V it will also empty itself completely, and thus become lighter than the weight P, which will again come into action and open the valve S, so that water can once more run from A into B. This filling of the holder B at M (the escape), as well as the subsequent emptying of the vessel, goes on repeating itself as long as any water remains in the reservoir A; and, of course, the greater the capacity of the reservoir, as compared with the receiver B, the oftener will the water be changed, and after each change of water the pictures are brought into contact with a perfectly-fresh supply. To convert the intermittent flow of water into a continuous flow all that has to be done is to remove the inverted bell glass at M. There is no fear of the water in B running over, because as soon as the water rises above the tube R the pail V is set in action, and cuts off the inflow of water from A.

THE ROYAL INSTITUTION.

The Freezing of Ether and Alcohol.

On Friday evening, the 13th instant, Professor Dewar gave an experimental lecture at the Royal Institution on *The Liquefaction of Gases.* Mr. Warren De la Rue presided. Among those present were Professor and Mrs. Edward Frankland, Sir William Bowman, Professor Tyndall, Lord Ranelagh, Professor Hughes, Miss Ottley, Colonel Pinney, Dr. Topham, Dr. Maudslay, Miss Emmett, Dr. Macpherson, Earl Percy, Captain Baillie, Dr. Tidy, Mrs. Ralli, Rear-Admiral De Kanzow, Mr. Dent, Mr. and Mrs. William Crookes, and Dr., Mrs., and Miss Edmunds.

Professor Dewar had arranged in the theatre a variety of pieces of apparatus for the production of extreme cold far below that obtainable by means of a solution of solid carbonic acid in ether. He first, however, drew attention to an iron vessel containing carbonic acid liquefied by pressure; when the carbonic acid was permitted to escape by turning a stopcock it chilled itself by expansion, and became condensed as carbonic acid snow, which could be handled with impunity despite its intense coldness, because it does not touch the hand, a layer of its vapour being always between the hand and the snow. This snow floated on the top of cold water, but when he compressed it into carbonic acid ice by a force of between one and two tons to the square inch, it sank in water, and gave off bubbles of gas freely. The ice could not be so easily handled as the snow. A solution of solid carbonic acid in ether gives a temperature of −80° Centigrade, which is the boiling point of carbonic acid; at this temperature mercury is frozen rapidly. By placing the mixture under the air-pump, to increase the evaporation, he obtained a temperature of −110° C., and he stated that −115 C. is about the lowest temperature obtainable by means of solid carbonic acid, which was the lowest temperature Faraday could obtain in the state of knowledge in his day.

In the lower temperatures now obtainable, he said, an air thermometer is useless for measurement, for air itself can now be liquefied by cold and pressure. The thermometer he used was, he stated, both simple and effective. It consisted of long, thin bands of copper and iron soldered together at the ends so as to form a thermo-pile. The soldered junctions of one end of the pile were kept at a constant temperature by being placed in water containing melting ice; the other end of the pile was put in the liquid the temperature of which had to be ascertained. The current from the pile passed through the coils of a reflecting galvanometer, which threw a vertical line of light upon a long white paper scale stretching all across the back of the theatre of the Royal Institution. The movements of this line of light along the scale indicated the temperature obtained in each experiment.

Liquid ethylene was the substance employed to produce the intense cold afterwards employed by the lecturer. About five pounds weight of it, under a pressure of 100 atmospheres, was stored in an iron bottle. His assistants had been about a fortnight making this quantity. They made it a little at a time and then put it in the large bottle, which stood in a vessel surrounded with ice and salt to keep it cold; for ethylene cannot exist in the liquid form above the temperature 10° C. Ethylene is the chief illuminating constituent of common coal gas, and burns in air with a smoky flame. The boiling-point of ethylene is −103° C., and by placing it under the air-pump a cold of −145° C., or −150° C., can be obtained. The following are the temperatures at which the gases named become liquid:—

Boiling Points Below the Freezing Point of Water.

	Boiling Point below F. P. of Water.	Boiling Point in Vacuum.
	Degrees Centigrade.	Degrees Centigrade.
Carbonic acid	−80	−116
Nitrous Oxide	−90	—
Ethylene	−103	−142
Oxygen	−184	−198
Nitrogen	−198·1	—
Air	−192·2	—
Carbonic Oxide	−193	—

The greatest cold yet obtained by man has been reached by two Russian physicists, Wroblewski and Olszewski, who by the use of liquid oxygen produced a temperature of −200° C. Hydrogen has been condensed into a mobile, colourless fluid; and although, chemically, hydrogen possesses the properties of a metal, in its liquid state it presents no appearance of metallic reflection.

The experiment of most interest to photographers was that in which Professor Dewar froze absolute alcohol. This was done by allowing some liquid ethylene to flow through a brass tube surrounded by solid carbonic acid and ether. When thus cooled it was passed into a large test tube, in the middle of which was placed a glass tube with a flattened bulb at the end, the bulb being full of absolute alcohol. The evaporation of the ethylene was then accelerated by the use of the air-pump, and the alcohol was frozen into a mass as clear and transparent as crystal. The tube containing it was turned bottom upwards, and as it melted it assumed exactly the consistence of glycerine, flowing in a sluggish way down the sides of the tube. Ether requires less cold than alcohol to freeze it, and in several of the experiments ether ice formed on the sides of the glass vessels; but Professor Dewar said nothing about its peculiarities, except that it interfered with the view of what was taking place inside the vessels. The warm air of the theatre was constantly condensing as snow or hoar frost on some of the vessels used in the experiments, and the chief difficulties of the lecture were the projecting of the experiments on the screen by the electric light so that all present might see what was taking place.

During the evening Professor Dewar momentarily liquefied oxygen. The lecturer also proved that ozone is a blue gas, which at a very low temperature dissolves in bisulphide of carbon, forming a blue liquid. As the temperature rises, the ozone oxidises the bisulphide of carbon with explosive violence. He said that there was no reason why some of these condensed substances should not be utilised for practical purposes—indeed, that there was no doubt they would be so utilised.

In the course of the lecture Professor Dewar called attention to the following table, the first column of which gives the temperatures at which the various substances are liquefied:—

Ranges of Physical Conditions.

	Point of Fusion.	Range of Liquid.	Range of Solid.
	Deg. C.	Deg. C.	Deg. C.
Water	0	370	273
Cyanogen	−34	158	239
Carbonic acid	−65	97	208
Sulphurous acid	−75	230	98
Ammonia	75	201	95
Hydric sulphide	−85·5	186	157·5
Nitrous oxide	−100	135	173
Chlorine	102	250	171
Carbon sulphide	−110	386	163
Hydrochloric acid	−112·5	163	160
Phosphorous chloride	−114	400	159
Ether	−117·4	413	155
Alcohol	130	365	143
Amyl alcohol	−131	410	139

RECENT PATENTS.

APPLICATION FOR PATENTS.

No. 9,359.—"Portable Stands for Photographic Cameras." Geo. Smith, Colebrooke-row, London.—*Dated June* 24, 1884.

IMPROVED METHOD OF PRODUCING SURFACES FOR PRINTING.
Specification of HARRISON GARSIDE.

This invention consists of an improved method of producing surfaces for mechanical printing by means of photography, and the object of my invention is the production, by mechanical and chemical means, of surfaces for mechanical or ink printing, and it is applicable to typographic, lithographic, and plate printing, and to the printing of fabrics by means of rollers.

Its leading feature is the breaking up of natural tints or photographic reproductions of the same into dots or lines of varying magnitude. This I effect in such a way that the so-called lights of the object to be represented are translated into minute dots or lines, and the shadows into dots or lines of such magnitude, and at such a distance apart, as almost to represent actual blackness.

One of the ways in which my invention can be carried out is as follows:—I produce a grained plate or mould by cutting or punching, in a flat metal or other plate, a series of shallow recesses of conical form and having their edges in close contact. From this mould I produce, by the method known as Woodburytype printing, a transparency on glass or thin paper, using such a mixture of fluid gelatine and pigment as will give absolute opacity at the extreme depth of the mould. I now copy this transparency in the camera on a suitable scale to give the grain desired in the printing block or plate. This grain may be conveniently varied to suit the different classes of work and printing. This copy, which consists of dots of absolute transparency, shading into absolute or nearly absolute opacity, may now be duplicated in any of the usual ways and for convenience in the form of films. If one of these grained films or screens be now applied to the face of an ordinary photographic negative it will be found on examination by transmitted light that the more opaque portions of the negative are now absolutely impervious to light, except in the form of minute spots, while the more transparent portions or shadows are veiled by a tracery of lines, which by suitable printing may be nearly obliterated in the further operations, while between these extremes the varying tints of the negative are seen as spots of varying dimensions. From the negative so adapted a photolithographic transfer may be made and transferred to stone or to a zinc or other plate if an etched surface for block printing be desired. If a surface for plate or intaglio printing be required the operations are the same, using in this case a photographic positive and reverse mask.

For certain subjects such as portraits, and in cases in which it is desirable to make improvements by hand, either mechanical or artistic, after the translation to grain has been made it is convenient to make an enlarged picture from the photographic negative and the grained film combined. From this enlargement, after the needed improvements have been made, a grained negative may be produced on the scale required.

I do not confine myself to the use of shaded dots in working my invention. For some subjects, such as the representations of machinery, statuary, and coins, shaded lines may be conveniently substituted, or a combination of two or more screens composed of shaded lines may be used as a substitute for the shaded dots.

The grained plate or mould may be also produced in various ways. For instance, a less mechanical translation may be made as follows:—

An exposed collographic plate is to be inked up with a tint approaching blackness and a grained resist transferred to a metal plate, or a similar transfer may be made by means of the grained paper which is in use by lithographic artists, or in other ways. The plate may now have a conical grain produced by repeated etchings, as practised in typographic block work.

In some cases it is convenient to produce the grain on the photographic negative in the first instance, by placing in front of the sensitive plate while exposed in the camera a grained screen, or by exposing the sensitive plate before or after exposure in the camera to the action of light under a grained screen, and in this case the exposure in the camera may be somewhat reduced.

My invention may also be carried out in the following way:—I expose a piece of sensitive carbon tissue under a negative, and after development I support it on a surface of soluble gelatine, and while still slightly soft I lay it upon a hard metal plate having the V-shaped grain and subject them to sufficient pressure to force the gelatine into the recesses of the plate; and I so proportion the thickness of the gelatine relief that the grain of the plate is entirely filled by the thickest portion of the relief when dry. I now dissolve the soluble support and produce a printing plate by electro deposition or in any other convenient way; or a piece of ordinary carbon tissue may be exposed and developed in the usual way and transferred to a white surface thickly coated with colourless gelatine or other slightly ductile material. While still in a softened condition it is to be placed in contact with the hard-grained plate, which may be waxed to facilitate removal and subjected to the necessary pressure. After drying the picture is to be removed, and it will be found that the tints are broken up into dots of varying dimensions in proportion to the varying thickness of the relief picture. From this picture a negative in black and white may be made, and a block or other printing surface produced by the usual means.

Instead of using a mask or screen consisting of shaded dots or lines, a mask composed of transparent dots or lines on an opaque ground may be used in the following way:—The mask is to be placed at an appreciable distance from the face of the negative which may be in contact with the surface to be impressed, and such a combination of direct and diffused light is to be thrown upon the mask as will cause the rays to disperse to an extent equal to very nearly the pitch of the dots or lines before reaching the sensitive surface.

Having thus described the nature and object of my said invention, I declare that what I claim and desire to be secured to me is—

1. The method of breaking up the tints of a photograph into positive dots or lines of varying dimensions, by means of masks or screens, consisting of shaded dots or lines substantially as described.
2. The method of filling up the grain of a plate by means of a gelatine relief for use as described.
3. The method of breaking up the tints of a gelatino-carbon or other relief picture by pressure in contact with a plate having a V-shaped grain.
4. The use and application of the above methods to the production of surfaces for ink and colour printing in all their branches substantially as described.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
July 1	Sheffield	Freemasons' Hall, Surrey-street.
,, 1	Halifax	*Courier* Office, Regent-street.
,, 1	Bolton Club	The Studio, Chancery-lane.
,, 1	Glossop Dale	Glossop Coffee Palace, High-street.
,, 2	Benevolent	181, Aldersgate-street.
,, 2	North Staffordshire	Town Hall, Hanley.
,, 2	Photographic Club	Anderton's Hotel, Fleet-street.
,, 3	London and Provincial	Masons' Hall, Basinghall-street.
,, 3	Bolton	The Baths.
,, 3	Leeds	Philosophical Hall.
,, 3	Coventry	Coventry Dispensary.
,, 3	Yorkshire College	College, Cookridge-street, Leeds.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

At the technical meeting of this Society, held on the 24th instant, the chair was occupied by Colonel Stuart Wortley, Vice-President.

Several questions were read from the box. The first was—"During the prevalence of the recent east winds albumen paper prints have been found to become covered after drying with fine cracks upon the surface. What is the cause of this?"

Mr. Peek had noticed that this was the case particularly with those prints that had been treated with encaustic paste.

Mr. W. E. Debenham would have expected that filling up the pores with wax would prevent rather than cause cracking.

Mr. W. Davey attributed the cracking to the paper being allowed to dry up thoroughly after sensitising.

The Chairman, if he found a print cracking, would certainly try to improve it by using encaustic paste. East winds were generally dry, and for that reason would be favourable to the production of cracks.

The next question was—"If the time occupied for the transfer of an image from the eye to the brain were one-eighth of a second, will the photograph of a moving object, such as breaking waves, give so true a record of the impression produced if taken in a shorter time than the eighth of a second as it would if that were the duration of the exposure?"

Mr. E. Addenbrooke said that if each image took the eighth of a second to reach the brain and record itself, it did not follow that it was not succeeded by the next image appearing, although that might only be the thousandth of a second afterwards.

The Chairman inquired whether there was any evidence that one-eighth of a second was the time actually occupied in reaching the brain to produce an impression.

Mr. Leon Warnerke said that the time varied with each individual.

Mr. Peek would not use a very quick shutter to photograph breaking waves, but would prefer a rather slow one.

Mr. Debenham would use the quickest shutter that would give sufficient exposure to the plate. He had employed one for the purpose working in about the fiftieth of a second.

Mr. Peek would consider that a slow shutter.

Mr. W. Harrison agreed with Mr. Warnerke that the time for perception varied with each observer. In establishments, such as that at Greenwich, where astronomical observations were made the time for each individual using the instruments was noted and set down as his personal equation. In case of illness, however, the personal equation of the individual would be different.

Mr. Francis Cobb said that all the evidence was that from eye to brain the sensation was instantaneously transmitted. The eye has been known to shut, when a splash of ammonia was coming, in time to catch it on the outside of the eyelid and save the eye. From the brain to the hand in working a recording instrument some time was taken.

The next question was—"What is the cause of green fog? From the photographic journals it appears that this question is one that had been used in the examination of students at the City Guilds' Institute. If the cause has been definitely ascertained the writer wishes to know what it is."

Mr. T. Bolas said that some years ago Mr. Plener had found that one kind of green fog consisted of metallic silver. The fog mentioned lay between the film and the glass, and by removing the film from the glass with dilute hydrofluoric acid the fog could be got at. On rubbing it with mercury it was dissolved away.

The Chairman said that one form of green fog was upon the outer surface of the film and could be removed by rubbing. Possibly the kind referred to by Mr. Bolas might have been also removable by rubbing only, without mercury. That kind, however, was, he thought, iridescent fog, and liable to be caused by imperfectly-cleaned glass.

Mr. Warnerke handed round a negative which had become covered—except in a part which had been protected by a glass lying against it—with a deposit resembling green fog. This plate had been very carefully washed but not varnished, and he thought the lesson to be taken from it was that plates should be packed closer together for mutual protection.

Mr. Debenham considered that the iridescent stain in this case was due to sulphuration of the silver from an impure atmosphere, especially from one containing gas vapours. That it showed in the shadows of the negative was not contradictory of this view, as the plate was a little veiled, and any want of clearness indicated the presence of a certain amount of silver.

Mr. C. Ray Woods said that green fog was not often heard of before manufacturers had made their plates much more perfect than they had formerly been produced.

The Chairman replied that he had noticed green fog in his earliest experiments, before any plates were commercially made at all.

Mr. Debenham said that in Mr. Bennett's first published formula green fog was mentioned, and certain precautions referred to in order to guard against it.

The Chairman continued that if a certain plate were brought with some details respecting it, and he was asked what was the cause of green fog in that plate, he might suggest an answer, but that the question could not be answered in the general way without regard to the particular case.

Mr. A. Cowan expressed himself similarly.

Mr. Warnerke said that green fog was unknown in Russia. He thought that this was due to the dryness of the atmosphere.

The Chairman had observed that plates newly made might give green fog, but if kept for some months in a dry atmosphere the tendency went off.

Mr. Woods said that green fog could not be obtained with iron development unless some solvent of silver bromide were present, such as hypo. or ammonia.

Mr. T. Sebastian Davis said that at a former meeting he had complained of a want of density in his negatives, and it had been suggested to use a much greater quantity of bromide in development. He had done this with complete success, using the following formula:—

Pyrogallol	2 grains.
Water	½ ounce.
Ammonia, ·880	2 minims.
Potassium bromide	4 grains.
Water	½ ounce.

Mix, and apply to the plate. This was eight times the amount of bromide he had been using previously. The time of development was increased, but not the time of exposure.

Mr. Woods generally used two grains of bromide to one of ammonia.

The Chairman thought that when increasing the dose of ammonia during development it was wise to add a little pyro., otherwise that constituent might become exhausted.

Mr. Cowan said that it was asked some time ago whether it was better to mix the developer all at once, or to add the ammonia little by little. He found that by the latter treatment he could get a good, bright picture on a plate that, when the whole developer was mixed at once, would only give a poor, foggy result. He produced two negatives, one developed in each way. The difference was very strongly marked.

The Chairman said that development was a science. He could teach anyone to make plates, but not to develope.

Mr. Cowan said that a letter had recently appeared in one of the photographic journals asking whether there was any injurious effect upon the brightness of the image from using a very small stop, and that Captain Abney had written on the same subject. He (Mr. Cowan) produced two negatives on the same plate, one of which had been taken with an ordinary stop, and one with a stop measuring only $_{2}f/_{50}$, requiring an exposure of nearly 4,000 on the universal system. There was no loss of sharpness from diffraction, and no difference in brightness in the two results obtained.

Mr. Debenham referred to a negative of a statue taken by Mr. A. L. Henderson, at Southampton, with a pinhole, meaning $\frac{1}{120}$th of an inch, and no lens. There was no lack of brightness in the picture.

Mr. Cowan said that that picture was a trying test, as it was of a white statue against dark trees. There was no effect of diffraction visible, and the inscription on the pedestal, although coming out very small, could be distinctly read.

Mr. Woods said that if such an opening were used in photographing the sun, diffraction would come in.

The Chairman had used very small stops in taking views without any injurious effect.

Mr. Davis showed a printing-frame of large size into the centre of which one of Mr. Warnerke's sensitometers had been fitted, so that a large plate might be tried instead of having to cut it.

Mr. George Smith showed a tripod stand on the general principle known as Kennett's, but it was improved by having on the side of the lower or single part of each leg a piece of wood screwed. This wood was broad but thin, and served to increase the rigidity of the stand, which was very light, weighing less than a pound and a-half.

Mr. Warnerke showed some very fine photographs of the interior of a palace at Moscow, taken by a friend of his. The negatives of these photographs had been much over-exposed, but had been treated before development by immersion in a ten-per-cent. solution of bromide of potassium, which had had the effect of producing perfect negatives. He mentioned also that the plates were of an exceedingly-rapid make, giving 25 on the sensitometer. He thought that this would prove that rapid plates were not necessarily deficient in quality.

Mr. Debenham inquired whether the plates would have given as fine a result if they had had only their normal exposure and been developed in the usual way.

Mr. Warnerke believed that they would.

The meeting was then adjourned.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society, held on Thursday, the 19th instant, the chair was occupied by Mr. W. H. Prestwich.

The discussion upon Mr. W. Coles's lecture—*On Altering the Density of Gelatine Negatives* (which at the preceding meeting had only been carried as far as the reduction of intensity)—was resumed on the question of the various methods of increasing density.

Mr. W. E. Debenham said that the method referred to by the lecturer, of using a solution of Schlippe's salt after treatment with mercury, was the one which he preferred and regularly used. He did not find, when used after the iodide solution of mercury, the colour so red as to be objectionable. After a bichloride solution the colour of the negative certainly was red, but that was not the course of proceeding he adopted.

Mr. W. Coles replied that the negatives were not so red in colour when hypo. was mixed with the mercuric solution—in the formula of Mr. B. J. Edwards, for instance.

Mr. A. Cowan considered Dr. Monckhoven's method with cyanide of silver to be the best.

The Chairman used bichloride of mercury, followed by ammonia.

Mr. A. L. Henderson preferred the use of lime-water, instead of ammonia, after bichloride of mercury. When using silver as an intensifier he always found the negative became eventually stained. These stains did not show in the first instance, but came out as spots afterwards.

Mr. Cowan advised the plan of getting sufficient density or some excess in the first instance. He considered it easier and better to reduce intensity afterwards than to add to it.

Mr. W. M. Ashman formerly intensified with mercury followed by ammonia. All those negatives which had been thus treated were now much stained. He had also used mercury followed by ammonium sulphide, and this had given permanent results. He produced examples of both methods.

Mr. Debenham remarked that the ammonium sulphide very much resembled in its action that of Schlippe's salt, but its horribly-offensive smell was an objection to its use.

Mr. Ashman added that those negatives in his possession which had been intensified by silver were now useless.

With reference to one of the experiments performed by Mr. Coles, and to a question proposed by him at the preceding meeting, a letter was read from Mr. T. H. Norris, as follows:—"I have been trying some experiments with hypo. and ferric chloride, and find that when $Fe_2\,Cl_6$ is added to hypo. in small quantities there is a precipitate which I have analysed, and find is oxide of hydrated oxide of iron (ferric), and no sulphur is thrown down if solutions are neutral. If solutions are made corresponding to—

$$\underset{325}{Fe_2\,Cl_6} + \underset{248}{Na_2\,S_2\,O_3\,5\,(O\,H_2)},$$

these, when mixed in equal quantities, give no precipitate, and there is a certain quality of ferric chloride left; but if three of Fe to four of hypo. the solution gives a precipitate, and the iron is *completely* converted into *ferrous*. There is no sulphate formed, and, no doubt, the reaction is the following:—$Fe_2\,Cl_6 + 2\,Na_2\,S_2\,O_3 = Fe_2\,Cl_4 + 2\,Na\,Cl + Na_2\,S_4\,O_6$; but, considering there are many more sulphur acids than these, perhaps it may be converted into some of the following:—

$$(Na_2\,S_2\,O_3)$$
$$Ns_2\,S_2\,O_6$$
$$Na_2\,S_3\,O_6$$
$$Na_2\,S_4\,O_6$$
$$Na_2\,S_5\,O_6$$

I will try and make some more experiments before the 26th. I think of being at the London and Provincial Photographic Association that evening.—Yours, very truly, T. H. Norris."

The Chairman, in commenting upon Mr. Coles's lecture and the discussion which had ensued upon it, expressed himself as indebted to the lecturer—a sentiment which was supported by a very hearty vote of thanks on the part of the members.

Mr. Norris sent samples of a material called "vulcanised fibre," which had been applied to the use of the photographer as the material of which to form the sliding shutters of dark slides, and which, it was suggested, might be advantageously employed for other photographic purposes.

Mr. Cowan showed two negatives of the same subject, one of which had been developed in the usual way with pyro. and ammonia, and the other by Mr. Munro's formula with carbonate and sulphite of soda and carbonate of potash. The latter gave rather more intensity of the two. He thought, however, it suited slow plates better than quick ones, and was worth further experiment.

Mr. Henderson said that he had brought with him the diffraction-grating lamp of which he had spoken at a previous meeting. His experiments with it, however, since that time yielded the most perplexing results. Sometimes it had given similar results to that which he had mentioned before; at other times the results from the diffracting and from the plain glass appeared about equal. In one instance the light through the plain glass had given the fainter indication of the two on the sensitometer.

Mr. Debenham thought that this pointed to the probability that the differences which had been observed were due to some extraneous unnoticed differences of conditions, and that the diffraction grating itself had had no influence in producing the result. As had been observed by Mr. W. K. Burton and himself a slight pre-exposure to light would cause a plate to register many degrees higher on the sensitometer, and if some of the plates used had been more exposed to the light of the coating-room than others that would be one possible way of explaining the differences in the results referred to by Mr. Henderson.

Experiments were then made in an adjoining darkened room with the lamp, with and without the interposition of the diffraction grating. The differences in the results obtained appeared to be slightly in favour of the use of the grating, but were so small that they were not considered in any way decisive.

Mr. W. K. Burton proposed a question for discussion—"What is the best proportion of bromide to be in excess in making an emulsion?" He said it had formerly been recommended to use the silver and the bromide nearly in their equivalent proportions, but lately the proportion of excess of bromide that was advised had been very largely increased. He thought that this had been carried too far.

Mr. HENDERSON had successfully used equal weights of silver and bromide, and had even gone so far as to use one and a-half part of bromide to one of silver. On the question of obtaining density he (Mr. Henderson) said that great density could be gained by adding meta-gelatine, sugar, or glycerine to a finished emulsion, but the addition caused a tendency to fog.

Mr. BURTON thought that density in the boiling process was favoured by the use of a large quantity of gelatine with which to boil.

Mr. J. B. B. WELLINGTON, in making an emulsion by a cold emulsification process, found that by keeping in the cold state for some hours before adding the gelatine the bromide passed into the blue state, but gave scarcely any quicker plate than if used at once, when the emulsion remained red throughout.

Mr. DEBENHAM's experience was similar to that of Mr. Wellington's.

Mr. HENDERSON contended that rapidity did accrue from keeping before adding the gelatine.

SHEFFIELD PHOTOGRAPHIC SOCIETY.

THE usual monthly meeting of this Society was held on Tuesday, the 10th instant, at the Masonic Hall,—Mr. Councillor Firth in the chair.

A large number of members were present, there being a very attractive programme for the evening, namely, the pictures and talk of the trip to Dovedale, and the pictures in competition for the subject composition of *A Rustic Bridge*, two prizes having been offered by the committee—one for the best in half-plates and under, and one for whole plates and over. Many members took part in the competition, and a very beautiful variety of bridges were portrayed, yielding a pleasant and interesting exhibition for the non-competitors as well as the competitors. The collection embraced most of the picturesque bridges in the surrounding country.

The prize for whole-plate and over was won by Mr. Firth (President) for a very brilliant picture of the rustic bridge at the entrance to Dovedale. Mr. Thomas Hibbert (one of this season's "colts" in the art) managed to "pull off" the prize for half-plate and under, with a very carefully-selected and interesting representation of the wooden foot bridge near Rivulin paper mill.

Many of the pictures were beautiful and highly creditable, and in one or two cases ran very near the winners in the ballot box.—Mr. H. Rawson showed a stereo. picture of fine manipulation and poetic subject.—Mr. B. Wood exhibited an enlargement by the Autotype Company from a negative of a rustic bridge in Padery Wood, which called forth great praise (not for competition).—Mr. T. S. Yeomans showed a very beautiful cabinet vignette of *Rustic Bridge, Foliage, and Rippling Brook*, carefully selected and rich in tone.

Mr. W. DAKIN drew the attention of the members to the high qualities of a developer he had mixed and tried (which was some time ago published in THE BRITISH JOURNAL OF PHOTOGRAPHY and *News)* and worked with great success on both in- and out-door pictures, but which he said was invaluable for outdoor work and amateurs, as a protracted development did not stain the film, there being no ammonia in it. The formula runs thus:—

Carbonate of soda	125 grains.
Carbonate of potash	125 ,,
Sulphite of soda	125 ,,
Water	10 ounces.

Use pyro. as usual to the respective sizes of plates, and enough of the above solution to flood with.

Mr. H. RAWSON brought a few dishes made by the Patent Pulp Company, which were white, and seemed very likely to be of great use in the art, having the requisite chemical-resisting properties, along with durability and cheapness.

The subject of the next trip was then brought on, and Miller's Dale was selected.

Mr. Drummond was elected a member.

The subject of Dovedale, and the pictures got there, then formed the topic of conversation, the trip having taken place on the 22nd ult. on as fine a day as such an assembly could desire. The party numbered twenty-two, starting with their valuable baggage from the Midland Station at 6-30 for Cromford, and landing there about eight, where, as per arrangement, two waggonettes were waiting to convey the party the remainder of their most delightful journey. The route was through Cromford, which is a very interesting as well as picturesque little place, leading up to one of the Edens of the Peak, the "Via Gellia," through which no man having a love for art or for Nature's grandeur could pass without its kindling in his breast more pleasure and gratitude than his language could possibly express. The sun, by the time the *voyageurs* had got fairly between the two grand hills, was high enough to throw its brilliant rays along the varied foliage of the valley, and light with vivid whiteness the peaks of limestone rocks which here and there broke through the wooded clothing of the hills, making pictures which changed every turn as the horses sped along through the winding road. The sweet scent of the lime bloom, mingled with the bursting hawthorn, rendered the air a perfect stimulant to the party of picture hunters. There is, too, a rippling brook which runs through the dale, and which varies the near pictures by first running on one side of the road and then on the other, but all the way being lined abundantly with forget-me-nots and pretty wild flowers of many colours. After running for about five miles through this glorious country we came on a more barren part—the termination of the High Peak Railroad—where a short time was allowed for the refreshment of man and beast. A clear run was then made through the Isaak Walton, which is situated at the entrance to Dovedale. All arrived safe, and delighted with the prospects before the party.

A bright sun, a clear atmosphere, a country around rich in charming pictures caused very little time to be lost before men and apparatus were seen taking different directions for work. There were thirteen cameras, and 112 plates of various sizes were exposed. Many of the members took up the dale, and the most experienced and careful of picture-hunters were delightfully surprised at the wild beauty around them. Nothing can surpass the romantic wildness and luxuriant verdure of the hills, the view embracing the river Dove, so clear and sparkling, and so richly reflecting the dark green and pointed tops of the majestic firs and larch, mingled with the feathery foliage and graceful drooping of the silver birch, with here and there standing out in bold relief gigantic pillars and cones of limestone rock, dotted with patches of dark-green moss, and bearing from their giddy height festoons of ivy and other creeping plants, which cause this spot to look as if some tasteful mortal had displayed his tact to make the place sublimity itself, rather than the result of ordinary law surrounding common things. Plate after plate in quick succession received its charming imprint, and many were the sighs and exclamations of—"Oh! I hope that will come out all right! It is a beauty!" It must be admitted that many have justified the expectations formed.

Mr. Thos. Firth, who worked the whole length of the dale with whole-plate camera, is well repaid for his trouble with some excellent pictures.—Mr. Taylor also succeeded in getting some choice views.—Mr. H. Rawson, armed with a new stereo. fit-out, secured some charming "bits" of river, rocks, and trees.—Mr. W. B. Hatfield worked a long-range lens on whole plates, and was very successful.

Mr. Dakin and Mr. Milward left the party with the object of varying the collection of pictures, and went to work at Ham Hall and grounds, which stood a short distance from the dale, nicely surrounded with majestic timber and sufficiently high up the hill to impart to it a picturesque prominence over the surrounding country. After obtaining permission from the owner—who gave it in a good-humoured and welcome fashion—they commenced work. Mr. Dakin got five 10 × 8 negatives from choice positions, and with a success that has left nothing to be desired. They are among the finest the writer has ever seen as regards detail, contrast, and selection. Through some accident with Mr. Milward, when changing his box, his work was spoilt.

Messrs. Turner, Wood, Pilley, Mottersham, and Pearse all brought home some lovely things; and, taking one thing with another, the day was one of the best the Society has ever had.

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION.

THE unsettled weather of Monday and Tuesday had been regarded with some little anxiety by those members of this Society who were intending to join the annual excursion to Edzell, on Wednesday, the 18th instant; but the more promising state of the weather on the morning of that day, along with the fact that the weather forecast of the district promised "some rain," entirely relieved the minds of those interested. A party numbering over sixty, composed of the members of the Association and their friends, left Dundee East Station at 9.15 a.m. Through the kindness of Mr. Hunter, station-master, a couple of special carriages had been ordered through from Glasgow for the occasion, and this materially added to the comfort of the excursionists.

Arriving in Brechin at 10.45 the party found five brakes in readiness to convey them to Edzell, which was reached after an exceedingly-pleasant hour's drive, without more than a few minutes' delay for slight refreshment. Most of the party arrived with cameras of all dimensions—from quarter-plate up to the size playfully alluded to as "dog-kennel"—and walked along to Gannochy bridge, the picturesque glimpse from which was the signal for commencing the attack. Proceeding up a path which ran beside the river there were also presented to the view numerous subjects for the camera.

Returning to Edzell at 2.30 p.m. every one did ample justice to a first-rate dinner purveyed by Mr. Keith Knowles, of the "Tanmure Arms," after which a start was made for Edzell Castle, a short distance from the village, where an hour was pleasantly spent and several more pictures taken. The total number of plates exposed during the day was about 120. After tea a couple of photographs of the party grouped round the front of the hotel were taken by Messrs. Johnston and Geddes; and at twenty minutes to six the return journey was commenced and Dundee reached at 8.45 o'clock, after a most agreeable day's outing, which was thoroughly enjoyed by all present.

DERBY PHOTOGRAPHIC SOCIETY.

A MEETING of this Society was held at the London Restaurant, Derby, on Wednesday, the 18th instant,—Mr. R. Keene, Vice-President, in the chair.

The minutes of the previous meeting having been read, the following gentlemen were declared duly elected:—As honorary members: Messrs. R. J. Billinton, Henry Bolden, George Rice, and W. W. Winter. As members: Messrs. F. Campion, J. Crossland, E. A. G. Jewitt, J. Merry, and R. L. Warham.

The CHAIRMAN then read a proof of the proposed rules. After a discussion, during which several alterations were made, the amended copy of the rules was unanimously adopted, on the motion of Mr. A. J. Cox, seconded by Mr. H. A. Bemrose.

The first technical meeting of the Society was fixed for Wednesday, July 2nd, when a paper will be read by Mr. R. Keene.

After the usual vote of thanks to the Chairman the proceedings terminated.

The following are the officers of the Society:—*President:* Captain W. de W. Abney, R.E., F.R.S.—*Vice-Presidents:* Charles Edward Abney, B.A., H. Arnold Bemrose, M.A., and Richard Keene.—*Committee:* Arthur J. Cox, James E. Kaye, and Thomas Scotton.—*Hon. Secretary and Treasurer:* Fred. W. Simpson.

BERLIN ASSOCIATION FOR THE CULTIVATION OF PHOTOGRAPHY.

An ordinary meeting of the above Association was held on the 18th April,—Professor Vogel in the chair.

A letter was read from a correspondent in Holland complaining that of a number of photographs mounted at one time—some on black and some on white mounts—those on black mounts had become spoilt, while those on the white mounts remained in good condition.

The Chairman gave suitable advice.

A letter from Dr. Browski, dated Mossul, Mesopotamia, was then read, after which a landscape said to be taken by moonlight, by Herr Zang, of Sonnenburg, with an exposure of thirty-five seconds with the full aperture of a Voigtländer thirty lines rapid lens, was exhibited. The landscape was somewhat under-exposed, but the moon itself was over-exposed.

Herr Schultz-Hencke remarked that he had taken photographs by moonlight with the moon behind him and shining on the objects taken, but that he had required an exposure of eight hours.

Herr Anschütz showed a number of instantaneous pictures of landscapes, men, and animals.

Herr Godeljce, of Leyden, exhibited a number of instantaneous landscapes and sea views.

The Chairman communicated a very simple means of purifying gelatine with which to make emulsion. He is convinced that by employing this process almost any gelatine can be used for the preparation of emulsion.

Herr Joop expressed his opinion of what photography in general and heir Association in particular owed to Professor Vogel, and mentioned hat they had just founded a prize of 1,000 marks (say £50) which they would award to him as a token of their appreciation of his services.

After the applause which followed had subsided,

The Chairman returned thanks in a suitable speech, in the course of which he said he had been called, in no complimentary sense, a theorist as opposed to a practical man; but he thought the best practice was founded upon true theory—at least his practical process was based upon his theories. He (the Chairman) then described his new process. [This description has already appeared in The British Journal of Photography.]

Herr Joop recommended a method of purifying the silver bath to be used nstead of the usual process with permanganate of potassium.

The contents of the box were then dealt with, after which the meeting was adjourned.

Correspondence.

THE EFFECTS OF RED AND YELLOW LIGHT ON THE EYES.

To the Editors.

Gentlemen,—I see that the subject of light for the operating-room is still occupying public attention, and that the champions of the greenish-yellow medium—notably Mr. W. E. Debenham—are still busy lauding and recommending their special fancy. To Mr. Debenham, as I believe, is due the credit of having started the investigations into the matter; but I also believe that Mr. Debenham took for his original text the assertion that red light is more hurtful to the eyes than yellow. I held a different opinion, and stated, in your issue of May 9th of this year, that yellow light was more hurtful than red light. Had this statement rested on my word alone I should have expected that some sort of denial or contradiction would have been forthcoming even in ordinary courtesy; but, when my statements are supported in the most plain and direct language by two medical men—one an ophthalmic specialist of repute—it appears to me to be incumbent on my opponents to notice at least my objections to their arguments, and, before proceeding further, to prove that my medical authorities and I are wrong.

My assertion is—Yellow light is more hurtful to the average human eye than red light. I am backed by the only medical men I have consulted, and I appeal to your readers to say whether or not I deserve any attention. If I am right, or remain uncontradicted, what is the use of hunting the "greenery-yallery" colour to death? Much good has been done by Mr. Debenham and his associates; new light has been thrown on several subjects; but if our eyes are to be losers instead of gainers by the innovation it would be better if we had "let well alone." To me the matter seems of sufficient importance to warrant an appeal to a jury of ophthalmists. At present the question stands thus: Dr. Herschel and Mr. Ackland *versus* Mr. Marcus Gunn and Dr. Pringle.—I am, yours, &c.,

Craigcleugh, June 23, 1884. Andrew Pringle.

P.S.—In my letter addressed to you last week I see I have overstated the membership of the Photographic Society of Great Britain, and also the expense incurred in the publication of that Society's *Journal*. The membership in February this year was under 400, and the *Journal* expenses do not amount to £100, as from the £115 of outlay £76 have to be deducted for income. When I wrote I had not at hand the balance sheet of the Society, and I am to blame for not being more accurate.—A. P.

PHILADELPHIA AMATEUR PHOTOGRAPHIC CLUB.

To the Editors.

Gentlemen,—In your issue of May 16th I notice a letter from Mr. Beach, in which he states that the "Society of Amateur Photographers of New York" is the first to give its members dark-room and experimental facilities. From the expresssion used one would suppose he was referring to the entire country.

Our Club, as above, was formed December 21st, 1883, and a *suite* of rooms procured early in February, where we give our members all facilities necessary. We now have a reading-room furnished with all photographic journals, as well as a library of about one hundred volumes, a dark room with twenty-five closets for individual members, and also an ample sink-room with four taps, allowing eight members to work at one time. There is a printing-room, with an unobstructed southern exposure, containing burnisher and sensitising apparatus, and windows arranged with exterior platforms for frames. A small room, not yet furnished, is to be used for emulsion-making or other experiments.

We now have about forty active members, and are receiving applications so rapidly that we fear in a short time we shall be compelled to limit our membership, owing to the encouragement given us. The want of such a club was felt, and we do not wish to be classed as having followed the ideas of others.

Trusting you will correct Mr. Beach's claim,—I am, yours, &c.,

907, *Filbert Street, Philadelphia, June* 12, 1884. Geo. W. Pearson, *Secretary.*

"ON ALBUMENISING PAPERS."

To the Editors.

Gentlemen,—We have read with great interest the correspondence and leading articles which have appeared lately on albumenised papers and albumenising, &c. We beg to say that, so far as our long experience goes, we have always advocated the high salting of the pure fresh-egg albumen and strong silver solution for sensitising the same, so as to secure, as far as the quality of the negative will allow, a good body of silver in the pictures to tone, fix, &c. Assuming the prints were thoroughly washed there would be a fair chance of permanency. This cannot be obtained with weak salting or sensitising solutions.

In last week's issue you mentioned seven and a-half grains of chloride per ounce, and silver bath sixty grains. For years past we have prepared our papers with that amount of chloride, and have recommended a sixty to sixty five grains' silver bath. We beg to enclose you samples of papers so prepared for your inspection or trial.—We are, yours, &c.,

Willesden Green, N.W., June 24, 1884. A. Rivot and Co.

Notes and Queries.

George Darnsley wishes to be informed what is the difference between the "ivorine" of 1884 and the translucent medium formed of gelatine and a white pigment which was employed eight or ten years ago, by the late Oliver Sarony, as a basis on which to mount his carbon prints.——We reply to this by saying that we do not know.

"Can I copy a lithographic portrait published by a Boston (America) firm? It is not stated on the print that it is copyright.—Querist."——In reply: As it is imperative in the United States to imprint upon all copyright works the fact of their being copyright, we do not imagine that, in the absence of such announcement, there is any legal difficulty in the way of copying the portrait specified.

W. H. Harrison says:—"Your paragraph, in the last number of the Journal, speaks of care in mixing chlorate of potash and sulphide of antimony by means of a bone knife; but please allow me to point out the deadly danger of an incautious person triturating the two together in a *mortar*, should he do so in ignorance. The mixture is far more energetic than gunpowder, and is explosively ignited by friction. Once I burst about half-a-dozen toy cannons with it, which were quite safe when charged with gunpowder to the muzzles."

Rev. J. Brown wishes to know what is a suitable solvent for bitumen when it is to be employed for photographic purposes, such as coating a metallic plate for photo-engraving.——We reply: Benzole and oil of turpentine, both singly and mixed, have been successfully employed. In order to obtain greater clearness of the image it has been recommended to add certain essential oils, such as oil of lemons. If our correspondent have access to the work on this subject by Niepce de St. Victor, which was translated into English many years ago, he will find much useful information given in detail.

R. T. Watson has found, when photographing an interior on a 12 × 10 plate, that instead of there being only one window in the negative, as is the case in the natural subject, there are two—the original and proper one, accompanied by another which is fainter and upside down.——This is a special class of ghost picture which not infrequently accompanies the employment of lenses of the "rapid" class. It is caused by reflection from the inner surfaces of the lenses, by which a non-inverted image is formed. The remedy consists in altering the distance between the front and back lens of the combination.

"Can you inform me of any simple method within the powers of a young and inexperienced photographer by which I can ascertain whether my lens has a chemical focus? I invariably get a beautiful and sharp image upon the ground glass, but when I take a negative of any scene, no matter how sharply it is focussed, the negative never possesses the same degree of sharpness displayed upon the ground glass. My camera is made by ———, which may be considered as a guarantee that the fault does not lie there, but with the lens, which a friend informs me must have a chemical focus, whatever that may be.—Cymbria."——In reply: By the term "chemical focus" is meant that the lens is not properly corrected for colour, owing to which the visual image seen on the focussing-screen is brought to a focus nearer to or farther from the lens than the plane upon which the chemical rays find their focus. To ascertain if the lens, in the case mentioned, possess this property, focus very sharply, employing a large stop, upon bold printed matter situated at a distance of a few hundred feet (signboards or showbills answer the purpose quite well), and take a negative. Then push in the ground glass towards the lens about a-quarter of an inch, by which the image will be out of focus visually, and expose a second plate. Lastly: withdraw the ground glass from the lens a-quarter of an inch beyond the point of best visual focus and expose a third plate. If the second picture be sharpest then the lens is under-corrected, over-correction for colour being proved by the third image being best defined.

"KINDLY permit me, through the medium of your useful *Notes and Queries* department, to submit a case to my fellow-photographers. I have access to a window, nearly opposite to which, at no great distance, is a corner of a street which is bifurcated, and at which many actors, artists, and leading men of the day take occasion to stand for a few moments when bidding each other "goodbye" previous to passing each on his own way. I have already succeeded in obtaining several instantaneous groups in the utmost perfection, in which the figures are small; but I am thinking of obtaining a large lens of long focus for the special purpose of taking these figures on a scale of about four or five inches. Previous to incurring this expense, which will be considerable, I desire to know if I should be justified in offering such groups for public sale, or have the persons composing these groups the power of preventing such sale. If they have, then might not such power also be possessed by any recognisable individual whose portrait, as one of the multitude, appears in any ordinary street, boating, racing, foundation-stone laying, or other similar view to which the camera has been directed? Soliciting replies—I am, yours, &c., ALPHA."

Exchange Column.

Wanted, THE BRITISH JOURNAL OF PHOTOGRAPHY for 1879, bound or unbound, in exchange for $4\frac{1}{4} \times 3\frac{1}{4}$ gelatine plates.—Address, EDWIN DODDS, Church-road, Low Fell, Gateshead.

Wanted a good 5 × 4 or half-plate lens, in exchange for either four-lens repeating-back gem camera or Victoria camera, takes four on a quarter-plate.—Address, A. HOPKINS, 21, Bartholomew-street, Exeter.

Wanted, a stereoscopic camera and slides, in exchange for a $3\frac{1}{4} \times 3\frac{1}{4}$ sciopticon camera, rolling-press with glass bed, lantern slides, or scores of photographic things.—Address, W. J. CHADWICK, Eccles, near Manchester.

I will exchange a quarter-plate lens, black stand table, *carte* burnisher, new, small ash chair, nearly new, for a chair with changes and exterior background.—Address, WM. BREWSTER, photographer, 3, Charles-street, Preston.

I will exchange a midget camera, with six lenses, as good as new, two slides, one quite new, by Marion, for taking twenty-four midget pictures on one plate, in four positions, for anything useful.—Address, W. W. WINTER, photographer, Derby.

I will exchange a good five-chambered repeating-revolver, in mahogany case, fitted with powder flask, for an interior background, or a good set of curtains fit for studio, or anything useful in photography.—Address, J. S. WALKER, 48, Wellington-street, Woolwich, S.E.

Wanted, a first-class rectilinear or symmetrical lens and bellows-body camera, about $8\frac{1}{2} \times 6\frac{1}{2}$ or 10 × 8, in exchange for a fifty-two-inch half-plated Timberlake bicycle, used only a few times, quite perfect, cost with extras over £16.—Address, W., 2, Claremont Cottages, White Hart-lane, Barnes, S.W.

I will exchange a nearly-new eight and a-half-inch square bellows-body folding camera, in perfect condition, with two single- and four double-backs, for a modern half-plate square ditto, with double- and single-back, and a good lens; inspection allowed and required.—Address, JNO. STORR, Westgate-on-Sea.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPH REGISTERED.—

Frederic Gorham Tirehurst, the Old House, Battle.—*Photograph entitled "Clubs is Trumps."*

J. W. V.—Any dealer in photographic requisites will get the burnisher repaired for you.

S. J. WEARE.—See article in the present number. This will give the desired information.

AMATEUR (Bradford).—Either Nos. 1 or 2 on your list will answer better than the others. We employ No. 2.

LEROY.—For purely line subjects the bitumen process will be the best. For half-tone the gelatine must be employed.

LAUNCELOT GUBBINS.—The phosphate of soda toning bath, as given on page 230 of our ALMANAC for the current year, will answer your requirements perfectly.

YORK.—With your lens of the "rapid" type you certainly can take full-length *carte-de-visite* pictures, and very good ones too. You will have to place the camera about fifteen feet from the sitter.

BOTANIST.—Without special permission you will not be allowed to take photographs of the different specimens in Kew Gardens. You will have no difficulty in obtaining the necessary permission, we imagine, by applying by letter to the Director.

A. W.—The process of making photographs on "ivorine," described by us a short time back, is not patented, notwithstanding what you may be told to the contrary. You may work the process without let or hindrance. The process *is* open to all.

NEMO.—Between the lenses of six inches focus there is, practically, but little to choose. We should not advise you to select one of shorter focus than this. The height of the camera-stand mentioned is, we believe, about three feet six inches when set up

NOVICE.—The weak, flat appearance of the little enamel appears to be due to the transparency not being made sufficiently intense in the first instance. In future make them denser and tone to a greater extent. Do not subject them to too high a temperature in the firing.

AJAX.—The pictures are moderately good for a beginner, but they are capable of improvement. The chief fault is that they are all under-exposed and over-developed. Try the same pictures again, under similar conditions of lighting, and give at least double the exposure. With more experience you will have no difficulty in producing better work.

SMOKER.—You may safely indulge in your "weed" when developing the plate after the day's work is done. When you experience fog in the plates you may rely upon it that it does not proceed from the fumes of your tobacco. You must, therefore, seek for another cause.

J. E. WILSON.—Had you adhered strictly to the formula given by Mr. W. K. Burton you would have produced a totally different plate. In departing from the formula you have involved yourself in difficulties. The chief ones arise from the use of an unsuitable gelatine, which is very prone to produce "pits." Try again, but this time work to the formula given by the author.

W. R. S.—We do not know the *multum-in-parvo* accessory you name, so cannot pass an opinion on its merits as a "property." As a rule, when one piece of apparatus can be transformed into so many distinct pieces of furniture, the articles they form are very unlike anything found outside a photographic studio. As you state that it was made in "the days of glass positives," we should say its market value is very small indeed.

POITEVIN MEMORIAL FUND.—Our clever "P. D." has been "at it again!" In acknowledging Mr. J. C. Cox's contribution to this fund last week, and quoting from Mr. Cox's letter, the "P. D." makes that gentleman say:—"To few men does photography owe more than to Poitevin, although a mere amateur. I cannot but add my mite," &c., &c. If our "P. D." would have left the full point where Mr. Cox placed it—after Poitevin—the sentence would have read sensibly. Fancy Poitevin "a mere amateur!"

A. WHEELER.—The "puckering up of the film" (as you term it) in your carbon transparencies is what is technically known as "reticulation." It is always more prevalent in hot weather than in cold. It may, however, generally be avoided by drying the tissue more slowly, so that it occupies about the same time that it does in winter. You will find it a good plan to coat the tissue with plain collodion after exposure, and allow it to dry before squeegeeing it down upon the stratum of insoluble gelatine. With these modifications in your working we have little doubt you will master your difficulties.

RECEIVED.—B. Falk; Oscar Schölzig; A. Pringle; Dr. Nicol. In our next.

PHOTOGRAPHIC CLUB.—At the forthcoming meeting of this Club, on Wednesday next, July 2nd, the subject for discussion will be—*On the Best Method of Making Stereo. Transparencies.* The Saturday afternoon outing will be held at Teddington. Meeting afterwards at the Clarence Hotel, near the Railway Station.

ROBBERY OF LENSES FROM THE WOODBURYTYPE COMPANY.—At the Brentford Police Court, on Wednesday, the 18th inst., before General Sir Charles Daubeney, K.C.B., and General Tremenheere, Richard Carter, 1, Baynham-terrace, Ealing Dean, was charged with stealing, between the 3rd and 16th instant, three lenses and two mirrors, value together £70, the property of George Coope Whitfield, one of the principals of the Woodburytype Company, at Kent Gardens, Ealing.—Mr. T. W. Fry stated that he was manager to the Woodburytype Company, and the prisoner had been in their employment as operator's assistant for about nine months. The lenses and reversing mirrors produced were the property of the Company. On the 16th inst. there was occasion to use one of the lenses, and the prisoner was sent for it to the store-room. It was part of his duty to take them back to the store-room after use. He came to the witness and asked him for them, but witness replied that the prisoner was the last person who had handled them. He gave information to the police. The value of one of the articles produced was to the firm 60 guineas; the whole were valued at about £70.—Detective Constable Cluney deposed that at the prisoner's lodgings at Ealing Dean he found three pawn-tickets in the prisoner's coat. They referred to the lenses, and had been pawned for £3 6s. He went to the prisoner and showed him the tickets, when he admitted that he stole the property.—Walter Tattle, assistant to Mr. Harvey, pawnbroker, of Paddington, stated that the prisoner came and offered the large lens in pawn for 16s. Witness questioned him as to the ownership, and the prisoner replied that it was his own. Witness asked him if he wanted more on it, and he replied that he did not, as he only wanted the money for a short time.—Frederick Lear, assistant to Mr. William Ayres, pawnbroker, of King-street, Hammersmith, stated that on the 30th of May the second mirror was pawned at his place for £2, he believed by the prisoner.—Henry Finch, assistant to Mr. Clears, at 27, Goldhawk-road, stated that the prisoner pledged the small lens for 10s.—The prisoner, who asked no questions of the witnesses, pleaded guilty, and wished the case settled at once.—General Daubeney remarked that the persons who took in such valuable articles as the first two lenses should have made further inquiries as to the ownership of the articles, and they would probably lose their money. The prisoner would be sentenced to six months' hard labour.—The witness Lear stepped into the box and said that, so far from believing that the article was very valuable, he refused to lend the prisoner £3 on it as he asked, and he considered that the prosecutors might have taken better care of their property by having their names and addresses engraved on them.—*Middlesex County Times.*

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1261. Vol. XXXI.—JULY 4, 1884.

KEEPING COOL.

The recent sultry weather has, no doubt, proved trying to most people, but to none more than to photographers, and plenty of opportunity has been afforded for the exercise of inventive genius in the direction of keeping cool. With the temperature standing, as it has done, over 80° in the shade out of doors, and probably many degrees higher in the more confined atmosphere of the skylight and dark room, it is readily conceivable that the ordinary photographer's resources must have been strained to the utmost; while, for those whose round of duties includes plate-coating, the time must have been a particularly trying one.

The mere storage of chemicals during such weather as we have lately enjoyed becomes a matter of no little trouble where the natural facilities of the establishment are, perhaps, never at any time of the best. Collodion, ether, alcohol, negative varnish, ammonia, and other liquids have an awkward way of taking matters into their own hands by either bursting their bottles or blowing out corks or stoppers at unexpected times, and thus causing, in addition to the waste of material, much danger and actual discomfort in the already unbearable atmosphere of the laboratory. Where this latter is situate in the basement little trouble will be experienced; but when, as in most cases, it is on the top floor, and exposed to all the sun's heat, some special precautions will be absolutely needful.

We have recently been watching with interest the variations in temperature in a basement apartment temporarily converted to photographic purposes, and have been astonished at the very slight fluctuations. A self-registering thermometer has shown a minimum of 55° and a maximum of 56·5° (with the exception of a sudden rise to 60° on one occasion) as the result of a month's observations, and this during a period when, in the skylight, the temperature has been over 100°. Where, therefore, a basement is available it is to be recommended; and for special purposes it is even worth the trouble to make a temporary change during specially hot weather.

When, however, a cellar is not available the best must be made of existing circumstances. So far as concerns the storage of chemicals, these should be placed as far as possible beyond the reach of the sun's rays, and preferably in a dark cupboard. With specially-volatile liquids, such as those we have already named, extra precautions should be taken to keep them cool. A simple plan we have recently seen in operation struck us as being particularly effective. It consists in wrapping the bottles in blotting-paper and standing them in a flat dish containing water. The blotting-paper envelope is thus kept saturated, and the evaporation which goes on keeps the contents of the bottle in a state of comfortable coolness.

In the same establishment we met with a device for preventing as far as possible evaporation of ammonia in the developing-room. An ordinary flower-pot of porous earthenware is filled with Calais sand thoroughly saturated with water, and into this the ammonia bottle is plunged up to the neck. When a dropping-tube is used no further arrangement is necessary, and it would not be difficult to devise means of adapting the same principle when it is required to use the bottle for pouring purposes.

We will conclude with one more "dodge"—this time for cooling and ventilating a plate-coating room. The lower part of the sash having been thrown up, the space is filled up with a frame in which are stretched, half-an-inch apart, three or four "sponge cloths"—a coarse, wide-meshed cotton material well known in the laboratory for dusting purposes. The sponge cloths are allowed to dip into a trough of water, by which they are kept saturated, and the air in passing through is simultaneously cooled and freed from dust. This plan, of course, involves the existence of means of keeping up a current of air.

PREPARING TRANSPARENCIES FOR COLOURING.

While sitting one day beside one of our ablest transparency painters, watching him at work, he referred to the impossibility of executing creditable work upon such photographs as he very frequently received for that purpose. It seemed impossible, in his estimation, to induce photographers to distinguish between the treatment required for a photograph that has to be coloured and one which is not to be subjected to artistic treatment of this nature. "Who," he inquired, "can do justice to skies so dark and 'grumly' as to render it difficult sometimes to read a piece of printed matter through them?"

We suggested the desirability of his subjecting each picture of this class to chemical treatment so as to be reduced previous to passing it over to the painters, several of whom were at the time pursuing their avocations. To this end we thought that a denuding ink possessing three grades of power might be made use of with great effect. The first, if applied to any particular part by means of a camel's-hair brush, should possess the property of dissolving the image entirely away wherever it touched, leaving the glass quite bare; the second should be able, when applied in like manner, to thin the image in a very material degree, but without removing it altogether; while the third should possess a property similar to the second, but in a much less potent form. "Could such inks be invented," said our friend the painter, "they would prove a great boon; but," added he, "most of the transparencies sent for painting, especially those on collodion, are varnished, and will resist the solvent action of the inks you suggest." To this we made response that the removal of varnish was really a very slight matter, as it would not involve any difficulty.

There are so many solvents of silver that a difficulty in making a selection meets one at the outset. For many years we have made bare our skies and removed objectionable features from transparencies, previous to their being coloured, by the agency of iodine dissolved in an aqueous solution of cyanide of potassium. When a strong solution has been prepared, and sufficient gum arabic added to impart a body similar to writing ink, it forms a denudent of great value.

Let us suppose that a dirty sky has to be removed from a landscape. The transparency is placed on the painting or retouching desk, the foreground to the top, and a brush charged with the destroying ink is run across the sky close to the horizon. There is no danger to be apprehended of its spreading inwards upon the film where it is not required, as the gum prevents this from occurring. By employing a larger brush the whole of the sky is treated in like manner, and it is now seen to be denuded of everything savouring of deposited silver. At this stage we usually prefer to wash off the solvent before proceeding further. When the film has become once more dry it will be found that by having laid the sky bare the horizon, which may be assumed to consist of trees or hills, will be found to be too heavy and lacking in aërial perspective. To lighten this a solution similar to the former, but much weaker and containing a larger proportion of cyanide, is applied to all the parts that are to be made retiring, carrying the solution down to the sky. During this operation a broad, soft brush saturated with water must be placed ready to be grasped and applied to the photograph the instant the reducing action is found to have proceeded far enough. It is scarcely necessary to say that the eye must not for a moment be taken off the part undergoing treatment.

Owing to the volatile nature of the agents in the reducing ink described, and also to their well-known poisonous properties, we have of late discarded them in favour of others more innocuous. Of these, ferridcyanide of potassium appears to be the best and most convenient to use. If a strong solution of this salt be applied to a transparency (or negative) by means of a brush the image instantly disappears. This property is very useful for employment under such circumstances as the entire clearing away of "skies" or "seas" which are to be afterwards painted in. Although every vestige of an image is removed a yellow, although transparent, stain results, to remove which it is only necessary that a solution of hyposulphite of soda be applied. By dissolving the soda salt with the ferridcyanide the action goes on simultaneously. When the soda is in excess the action is slower, and, therefore, more manageable; and when the solution is much diluted it may be rendered exceedingly slow. The ferridcyanide with which our experiments were made is a cheap commercial sample of the ordinary red prussiate of potash, which we find to answer so well as to leave no desire for any purer specimen—certainly it is so for the purpose in question.

What we suggest as the most practicable manner of utilising the solvent action of the ferridcyanide of potassium is to have two solutions—one saturated, or nearly so, which will act quickly and thoroughly; the other having its strength so much reduced by water as to remain on the transparency for nearly half-a-minute before its reducing action becomes apparent. Let the solutions be kept in small, wide-mouthed bottles, a brush to be specially reserved for each, care being taken throughout that each solution be applied by means of its own special brush. Two trays—one containing a solution of hyposulphite of soda, the other containing water only—must be placed beside the operator, who will proceed as follows:—The sky and all the portions to be made "bare glass" are subjected to the action of the strong solution, and the brush returned to that bottle. The weaker solution is then applied, first, to those parts which have to be most illuminated, such as the horizon, the distant hills and trees or other foliage, which are usually much too dark for effective colouring; and subsequently to other portions of the foreground which do not require much reduction. Expedition and judgment must be used, as the reducing action may proceed too far if delay be permitted. The instant everything is seen to be right plunge the plate into the tray of water and rinse off the ferridcyanide; then transfer to the hyposulphite solution, which in a few seconds will remove the yellowness, leaving the portions acted upon free from colour. Washing and re-varnishing follow.

We have referred to the facility with which varnish may be removed from a film protected by its agency. Make a solution of one part of caustic potash in ten parts of water, and add to this ten parts of alcohol. This solution, if applied to a varnished film, will dissolve the varnish, which must be removed by washing the film. This leaves the collodion surface in the state in which it was found previous to the application of the varnish.

SUPPLEMENTARY NOTES ON ALBUMENISED PAPER AND ALBUMENISING.

There are a few other matters in connection with this subject (which it was undesirable to embody in the purely manipulatory details) that it will be well to lay before those of our readers who may be induced to prepare their own paper. For instance: there is the vexed subject of blistering in the prints during the fixing and washing operations. It is true that many plans have from time to time been suggested for overcoming or avoiding this difficulty; but there is no question that, in the majority of cases, the evil has its origin in the paper itself, and also that it may be still further influenced for better or worse in the albumenising.

At the period when highly-salted and sensitised paper with far less gloss was in vogue, blisters were of rare occurrence. It was only when the extremely high glaze was introduced that the evil made its appearance in a really troublesome form, and it was then found that the higher the glaze of the paper the more prone it is to blister.

If we take a print which has blistered and carefully remove the blister, in most cases we shall find that it is not the albumen alone which has separated, but that a thin layer of the paper (or at least some of its fibres) has accompanied it, which clearly shows that the sizing material is not sufficiently adhesive to the body of the paper to withstand the apparent strain put upon it by the coagulated albumen during the fixing and washing of the prints.

Let us just see how the albumenising may influence the blistering. As we have said in our previous articles, if the highest gloss be desired the albumen must be kept as much as possible on the surface of the paper. Now, before the paper leaves the mill it is heavily rolled, and some albumenisers, we are informed, even roll the paper again before it is albumenised, so as to render its surface still harder and impenetrable. The paper is then floated on thick albumen, removed immediately it lies flat, and dried as rapidly as possible—artificial heat being used for the purpose. It is easy to conceive that with paper so treated the albumen does not penetrate beyond its outer surface. But if, on the contrary the paper be floated for a longer period, so that the albumen soaks more into it, and afterwards be allowed to dry slowly, we shall have the albumen more in the body of the paper instead of being confined to its surface only. When the paper is sensitised the nitrate of silver coagulates the albumen, and that which is in the body of the paper acts, as it were, the part of a supplementary sizing material. It is found in practice that paper which has been floated for a long time on the albumen, and then dried slowly—although it may have the same quantity of albumen upon and in it—rarely blisters; but such papers do not possess that high gloss which now appears to be a *sine quâ non* of a good albumenised paper.

Blisters, when the paper is very thickly coated, have been attributed to the silver solution not penetrating the albumen completely so as to coagulate it throughout, thus leaving the under surface—that next the paper—in a semi-soluble condition. This may possibly be the case in some instances; but it will not account for the albumen, as it usually does, bringing away the surface of the paper itself.

Some albumenisers we know attribute blisters to coating the paper while it is too new, and with them we are in a measure inclined to agree. Good paper, it is well known, like good wine, improves by keeping—doubtless because the sizing material becomes harder with age.

In connection with the age of paper we may mention a somewhat curious experience which occurred some few years back. A photographer purchased at a sale a quantity of albumenised paper at a ridiculously low price—only a few shillings per ream—intending to use it for parcelling purposes. However, a few sheets were tried for printing, by way of experiment, and it turned out, as was anticipated, quite worthless for photographic purposes. The paper was put away and forgotten for a year or more, when, being in trouble with his printing, it occurred to the owner that it might be worth while to again try this particular paper. This was done; it then proved all that could be desired, and was, eventually, used up to the last sheet. Clearly by keeping it had undergone some change, for its character appeared to be completely altered.

At the present time the fashion runs very much upon tinted papers. These are produced by colouring the albumen by the addition of one or other of the aniline dyes—according to the tint desired. The amount added must be determined by experiment. A little colour is added to the albumen—the quantity being noted—and a small piece of paper floated and dried. It is necessary that the paper be dried, as it is impossible to judge with accuracy of the tint while it is wet. Of course when once the quantity requisite is arrived at it will do for all time, bearing in mind that if the thickness of the albumen be increased the amount of colour must be reduced, otherwise the tint will be too strong by reason of the greater thickness of the coating.

In our previous articles—which were suggested by the frequent assertion that albumenised paper as of old could not now be procured commercially—we have given as full and complete working details of albumenising generally as it is possible to do in writing; but it must not be assumed, because the process is simple, that neither experience or judgment are required in the operations. Like every other process in connection with photography a certain amount of skill must be acquired before complete success is ensured, and albumenising paper is no exception to the rule. It is for this reason that we have recommended the beginner to commence by preparing the paper in quarter-sheets only. As a piece of further advice we suggest that, in all cases, if the exact character of the paper required can be purchased ready prepared, it will be to the advantage of the small consumer to buy it in preference to preparing it himself.

It is now pretty generally understood that highly-sensitised paper is likely to produce far more permanent prints than one that is only lightly sensitised; also, that a lightly-albumenised and strongly-salted paper conduces to purple and black tones as well as permanency. We cannot, therefore, avoid thinking that albumenisers would do well to supply paper of different kinds—such, for instance, as that at present supplied to be sensitised on a weak bath for those who require a high glaze and light-brown tones, and a more lightly-albumenised and heavier-salted paper suitable for a strong bath, for those who seek for purple or black tones and enhanced permanence. No doubt if a demand for such a paper as the latter really exists the supply will soon be forthcoming.

PHOTOGRAPHS AND THE POST-OFFICE.

When the *carte de visite* was first introduced into this country it took hold of the popular taste with such startling rapidity that, before two or three years had passed, many fortunes, we are within the mark in saying, were made by it. Its sway was long continued; the old glass picture became a thing of the past in first-class studios, and it was long before any change in its style was permissible. "Vignetted" busts almost from the first were produced, but that was all. Gradually, however, arose a feeling that the full-length portrait on the *carte* was too *petit* for the process of portraiture, and the half or three-quarter length in time almost superseded the long favoured style, till at last, in the shop windows—the great index of popular demand—the full-length *carte de visite* became extinct. The cabinet size was introduced in this country, but fell flat. It was taken to America, where it became very popular; went to the Continent and succeeded; and, finally, slowly crept into popularity in the land of its invention, until at last it shows every promise in first-class studios of entirely ousting the *carte de visite.*

We hear from every direction that this is so. The manufacturer, the dealer, and the photographer himself, all remark what a change is taking—or, rather, has taken—place in the popular demand. Some studios rarely take a *carte* picture at all now; and in others, where a general class of work is done, the cabinet pictures taken usually equal, if they do not surpass, in number the *cartes* taken. Thus, one gentleman informs us that two years ago he used to take about twenty *cartes* to one cabinet, while now he takes more cabinets than *cartes.* From another we learn that he looks upon *cartes* nowadays as an exception. Promenades, boudoirs, panels, and the numerous large sizes are more in demand in some quarters; but the staple work of the average number of photographers is the cabinet.

With this change in style a new and pressing consideration is involved which, from what we hear in almost all directions, is becoming most serious. We refer to the despatch through post of the many parcels which photographers make up and send to their clients, and which must be counted annually by tens of thousands. The packet of a dozen *cartes* and their wrappers, or even of a single *carte* with protecting boards, forms a compact little parcel which is easily handled and very slightly liable to get bent or broken through concussion or pressure. But with the cabinet the conditions are quite changed; with the increased area there is more risk of damage and less strength to resist it. The consequence is—what really might be expected—the packets of cabinet portraits get damaged in transit.

If a few instances only occurred it would simply be the annoyance of a few pictures injured, and no attention need be drawn to the matter. But the numbers so injured are not counted by single instances; they are almost universal; we should think there is scarcely a photographer in business who has not had sundry pictures irretrievably injured in the post — pictures that were packed in a manner to which apparently no exception could be taken. The professional photographer is thus injured in a twofold way. The growing demand for cabinets is, to some extent, restricted by those sitters who wish to send their pictures in the main by post having *cartes* in lieu of cabinets in many cases, to avoid injury in the post-office. We are sure our readers will bear us out in this assertion. Secondly, the number of pictures so injured is sufficiently large to constitute a real grievance between photographer and client; for we gather from our professional friends that it is looked upon as a matter of course for pictures so destroyed to be "restored"—practically replaced by fresh prints and mounts.

Having been greatly impressed by this state of affairs, we have made it our business to write to the Postmaster-General, pointing out the widespread nature of the damage inflicted, the serious loss which in many ways it entails upon photographers, and asking him for any suggestions in regard to the mode of despatching such parcels. An official has called upon us to discuss the matter, and we must confess it seems rather difficult to see any remedy. He points out that the damage will occur principally in certain districts, and is caused by the arrangement adopted by the Post-office for picking up and dropping letters. This is done while the mail is speeding along at its full rate. By means of automatic arrangements the train drops or picks up bags of letters at sundry stations along its route without in any way slackening its speed, and the consequence is that if the bag be a heavy one, or contain such parcels as cabinet pictures, they are bound to be crushed if they should happen to lie in an unfavourable position at the moment of contact with the wire netting which forms the receiving receptacle. Taking the rate at forty miles an hour, which is often exceeded, it will be seen that the picture would be dashed against the unyielding wire with far more force than if thrown from the hand with the greatest strength possible, and with increased danger on account of the miscellaneous crowd of letters, &c., all adding to the weight of the impact.

At present, therefore, we see no remedy but increased—greatly increased—strength of packing, which adds both to the expense of materials and the cost of postage. This will introduce an irritating question. Many, if not most, first-class photographers send their portraits out without charging for postage; but the increased charge which only, under existing arrangements, ensures safe delivery will form a very serious tax upon their cost, and questions of who is to pay the postage will arise and form fruitful sources of annoyance between photographer and client.

With a view of diminishing the cost of postage to the utmost exent we have suggested to the Postmaster-General that he should send us, or publish generally, a list of those places where the mechanical dropping arrangements are in force, so that photographers may put packing of increased strength upon all parcels sent in those directions. If such a list be forwarded to us we will give our readers the benefit of the information to guide them in their packing arrangements.

We may say that in the course of our conversation with the official in question we asked if sending parcels of cabinets by parcels post would not add to their safety; but he replied that he was afraid not, as the Post Office sends many parcels-post packages by the ordinary mail bags.

In conclusion: we may say that we consider the question we have opened to be one of very wide interest, affecting a far larger circle than that of the photographic fraternity alone, and our columns will be open for remarks upon the subject. Two very forcible questions arise — "Could not better arrangements be devised? Is it a proper thing that, as admitted, it is a matter of necessity that thousands of parcels be annually injured by the mode of working at present adopted?" In this age and in our country the present answer to be given seems a slur on our civilisation. Let the British public see to it, and memorialise the Postmaster-General.

In glancing over the paper, a copy of which has been sent to us, read by Dr. Hunter at the last meeting of the Edinburgh Photographic Society, we are led to inquire if it be not somewhat unusual for the essayists in the active Photographic Society of Modern Athens to give a species of negative confession of their own religious faith by pronouncing upon that of certain others. It has always been the custom in that and, indeed, in every other well-conducted photographic society to abstain from reference to party politics and sectarian peculiarities of religion. It is so in an emphatic sense in the conducting of this Journal; and, this being the case, we are precluded from publishing the paper in question. As it partakes rather of a Hindostanic than a photographic character the loss to our readers will be the less severe. We may say, however, that Dr. Hunter, without entering into formulæ or technical details, merely expresses his preference for the now nearly extinct waxed-paper negative process, which he considers, from its simplicity and relative cheapness, to hold out to artists advantages which modern processes do not possess. In the course of his paper he gave much interesting information concerning the temples and religious beliefs of India.

Prophesying, especially in weather matters, is proverbially unsafe. We have all heard of the old lady who took her weather glass to the door telling it, with something very like an expletive, to "believe its own eyes" as it stood firmly at "set fair" while a torrent of rain was falling outside. M. Montigny, however, has risked his reputation by prophesying that we, or at anyrate the people of Brussels, are to have a dry summer. In examining the colours of stars through his scintillometer he has noted that they display a predominance of green and violet, which he proves to indicate drought, while blue foreshadows rain. He explains the fact by supposing that water or ice in great thickness is blue, and that, as the stars in their twinkling do not show that colour, water is absent, and, therefore, a dry season is to be expected. We shall be better able at the end of the year to say if his prophecy be correct.

Our contemporary, *La Nature*, states that painters are finding a new use for photography. It says that when an enlargement upon canvas is desired an image is obtained in black lines which are most difficult of removal by covering with colour. Painters, when they wish to rub in a quick sketch, use charcoal, the lines made by it being readily removable. Nowadays, however, our contemporary says, all that is done is to take a negative and project an image on to the canvas, which is then outlined in charcoal by the painter. Thus, it goes on to observe, by allowing the artist freer play to his poetic fancies, photography so used is of great service to him.

This is, no doubt, very interesting reading for the public; but, seeing that details of such a mode of working were first given in our columns a dozen or two years ago, it is rather difficult to find the novelty of the plan now spoken of as though it were quite a recent invention.

Our readers may have noticed the reappearance of the corpuscular light again after a period of absence. *The Times* Berlin correspondent telegraphed a week or two ago to the effect that it had been seen there with a brilliancy equal to that observed in November. It is unfortunate that more photographic work in connection with it has not been done, the illustration in *La Nature*, alluded to by us some time ago, being the only satisfactory photograph brought before the public.

The reactions of albumen are always of interest to the photographer, and the body is of such a complex nature—its exact formula never having been agreed upon—that there is still scope for much information to be gathered. M. E. Grimaux, in *Comptes Rendus*, says that albumen in dilute solution behaves very differently from what is observed when undiluted. According to his paper, when one-per-cent. solutions are heated to 194° Fahr. for some minutes a few flocculi separate, but when the solution is then filtered it does not become turbid after being boiled. Carbonic acid in the cold gives a gelatinous precipitate, which redissolves in a current of air. The albumen is converted into a body having properties like the albumenates, closely bordering upon those of caseine.

The old joke of bringing home chips of the North Pole has given way to equally humorous suggestions for photographing it, and, as we know, some very interesting photographs have been taken of regions not far distant from that often-attempted goal. There is every prospect that before long pictures of regions still more closely adjacent may be obtained, for the Russian Admiralty are contemplating yet another expedition, with precautions suggested by the "Jeanette" disaster. The idea is to take an expedition a certain distance by steamer, and then by sledges and on foot. The party is to be divided into three sets, one going before the other and finding camping grounds and establishing depôts. It is estimated that it would take three years to reach the pole and get back to Siberia. It will be remembered what interesting and graphic accounts were given of the difficulties met with in one expedition, and how wet plates were frozen but yet gave good negatives. Fortunately, all that is done away with, and the gelatine plate will work with equal facility in cold as in more temperate climes, and much better than in tropical countries.

It is to be hoped that whatever make of plate be chosen for the outfit it will be seen that it is one with a thick, opaque film, so that no lack of delicacy may be brought about through back-reflection—a point which, as we lately showed, is of very considerable importance, and must be doubly so for views with such a preponderance of light objects as would be found in those icy regions.

We have frequently alluded to the Liverpool Astronomical Society, and the earnest work it has done. They have, in a pamphlet separate from their *Transactions*, just published a catalogue of five hundred stars in the constellations Auriga, Gemini, and Leo Minor, which have been determined from photographs taken with the equatorial stellar camera by the Rev. T. E. Espin at the Society's observatory.

GAS BOTTLES *VERSUS* BAGS.

I venture to enter a demurrer to what I understand to be the strong contention of the Editors that, on the ground of safety from accident, gas bags should be superseded by bottles of compressed gas for working the lantern. To ground presumed safety upon any such supposed "improvement" can only lead to calamitous results. There are various reasons for and against both bottles and bags; but in regard to the question of "safety," at present (in my opinion) the bottles are far more dangerous of the two, and even with the improvement spoken of they will not be more than equal in safety.

The great advantage of bottles is, of course, their portability and the saving of trouble. I have been glad, ere now, to get a bottle and carry it home myself rather than have the delay of the retort business, when time was precious and the light of a blow-through jet would suffice. But this only applies to large towns. If it came to travelling about, a lecturer would be subjected to very much uncertainty as to his bottles always reaching him in time, unless he kept a rather large number in use. On the other hand, with bags he can make his oxygen anywhere, and can fill up his other bag (even for a village) at the *last town* where they have gas, and take it on. And the expense also is rather seriously against the bottles. We can make eight feet of oxygen for a fraction under 1s. 6d., whereas in bottles it is charged from 5s. to 6s. 10d. To those who use the lime light constantly this would make a considerable difference, and it is on their behalf I question your sweeping conclusion.

In what does the presumed greater danger of bags consist? Using them with the oxygen underneath the pressure *must* be fairly equal, and any tendency towards mixture the uneven pressure is shown at once by snapping in the jet. No signs or contrivances *whatever* can or will prevent gross ignorance, or nervousness, or carelessness from producing explosive mixture by such causes as wrong connections. But this all applies equally to bottles; and there is no conceivable way of distinguishing a bottle which cannot be applied in exactly the same way to a bag.

On the other hand, in the varying pressure which has hitherto accompanied the compressed method there has been a most serious element of danger. This cause of mixture may elude even fair ordinary care, and I believe has eluded it in many cases, the strongest pressure running into the weakest, and so causing explosive compound. Be this as it may, and whatever the cause, in the United States, where bottles are used far more largely, explosions have been both more numerous and far more fatal than here. It is very rare for a bag explosion, even when it does occur, to cause loss of life; but the explosion of a bottle is like that of a boiler or a shell. Ask Mr. R. A. Proctor, who has lectured in the States, what *he* thinks of the comparative safety of bottles and of bags.

"Dust" as an alleged cause of bag explosion I believe to be a pure myth; at all events no explosion has ever been traced to that cause so far as I know. It is very easy to *purposely* produce a dust explosion in a bag; but it is quite another thing whether explosive dust ever has or can have naturally occurred in a gas bag, and one is not the slightest proof of the other.

The danger above pointed out will be removed by the improvement you mention, and that great improvement will also remove the greatest practical drawback and difficulty in the use of bottles. I have reason to believe that another inventor besides the one you probably refer to has about perfected a governor-valve for the same purpose. But if, as I understand you to suggest, this is accompanied by some simple apparatus for lecturers to do their own pumping with, we shall then be confronted with *another* danger of a very real character. In compressing gas a great deal of *heat* is produced—sufficient, in a familiar experiment, to ignite tinder in a tube by the mere sudden pressure of the hand. Now, *iron itself will burn in oxygen* if a particle of lighted carbon be brought into contact with it; hence the danger is readily seen, and I fear will be practically illustrated if we are to have people generally compressing their own gas.

In case I am thought an alarmist, it may be as well to state that, after a very serious explosion of a bottle some time ago at the Royal Institution (where, if anywhere, things should be well managed), the iron *was actually found burnt;* and it was supposed, or said to be, that it had been ignited owing to the heat produced by pressure. Granted that this risk would be diminished by the lower pressure you propose, it will still remain very appreciable.

I do not, however, question for a moment that the improvement you so warmly commend is worth all you say of it. It is; and will be one of the greatest boons possible to many—myself included—who are so located as to be able to take advantage of it. No one will be more thankful for it than myself. But bottles will still continue to have one special danger peculiar to them, and may also burst through flaw or want of strength at any time; and, on the other hand, I fail to see one single reason why bags should be considered inferior in point of safety. The same man who would "come to grief" with them might, if he acted in the same way, produce just the same results with a pair of bottles; and the same dangerous point (when pressure is almost all gone by exhaustion of gas) occurs in both alike. If there be any difference, my belief is that safety still lies rather on the side of the bags, even with the improvement in the bottles; without it, bags have the advantage by far. But, in either case, something like decent competence and care are the true and only preventives of accident.

I must say, finally, that an occasional accident from sheer carelessness hardly seems worth all the fuss made; and the general public, happily, do not seem so scared as one might think all of us were. Such accidents occur with house-gas, and candles, and matches, and suchlike; but no one dreams of abandoning their use, though we do try to keep young children and imbeciles from touching them. It is, no doubt, true that there are lanternists who do need to learn the necessity for *constant,* deliberate care with their apparatus; but, let us keep our heads cool, and, meantime, acknowledge our debt to those who, like Mr. Hardwich, are by calm experiment working their way to as *near* "safety" arrangments as the case admits of.

LEWIS WRIGHT.

PHOTOMICROGRAPHY AT THE HEALTH EXHIBITION.

THE increasing interest in the absorbing question of hygiene, as evidenced by the crowds attending the present Health Exhibition at South Kensington, induces us to say a few words, without too largely trespassing upon the domain of medicine, on the remarkable exhibits in the section devoted to the French department connected with the subject of bacteriology. Naturally, a subject which relates to the laws and media governing health belongs to medicine and surgery; but, at the same time, it is common public ground, in which all who value health may be considered to have a universal right. The more extended the knowledge of the construction and uses of such instruments as have been now brought together—being those which are actually employed by such *savants* as M. Pasteur, of the Normal School of Paris, and Dr. Miquel, of the Observatory at the Park of Montsouris—the more likely it is that others may be induced to profit by their researches, and lend help to one of the most difficult yet most interesting questions of the day.

Photographers are generally busy people, and too much occupied with the eye of the camera upon the "face divine," or on the lovely or rugged features of external nature, to be able to make a sacrifice in time—and we may be explicit, and say such study makes large demands; but many photographers are also wedded to the smaller observing eye of the microscope, and it is to these more particularly that our remarks may be acceptable.

The present phase of our knowledge of contagious and infectious diseases, through microscopic research, shows such rapid strides amongst the aërial germs that already such study has taken a fair position with those which are the subjects of strict scientific investigation; yet, without the necessary precautions against contamination, it would be liable to very erroneous interpretation, for we have to deal with the most minute and ubiquitous living organisms in the universe. To fully describe in detail all the beautifully-constructed apparatus exhibited would demand more space than can be accorded in these pages, and, moreover, the generally-appended tickets explain to a certain extent either the construction or the use, or both, of the special apparatus.

In dealing with this subject, the order of procedure will be inverted by alluding firstly to the exhibit of Dr. Miquel, which embraces various apparatus of considerable originality. This gentleman—the author of *Les Organismes Vivants de l'Atmosphère*—for many years has devoted himself to the study of aërial bacteriology, and to him we owe the present state of the statistics in this department of hygiene. He has taken up the subject at the point that was left by Drs. Maddox and Cunningham, and with modifications of the apparatus of the former and the adaptation of an aspirator, he has converted their qualitative examinations of the air into a quantitative analysis, upon which he bases the results of his most extensive series of experiments. For many years, and by various observers, an attempt was made to analyse the dust matter floating in the atmosphere; but the methods employed were faulty in many ways, especially as, being without any attempt at culture, it would be impossible to say whether such organisms as were mixed with the ordinary air-borne inorganic particles were living or dead.

Dr. Maddox employed a vane which consisted of a kind of multiple funnel for the passage of the wind, and which supported in front of the point of the receiving funnel a thin ordinary microscope cover glass smeared with a sticky, sterilised material, the cover, with its deposited dust, after certain hours of exposure, being removed and placed on a culture-cell for prolonged microscopic observation. The results of an extended series of examinations were duly published in the monthly *Journal* of the Royal Microscopical Society. Dr. D. Douglas Cunningham carried the observations still further in India, and published a thin folio with many figures of the principal deposits as found in the air of prisons and sewers.

Both of the methods used could only deal with the qualitative aspect; hence Dr. Miquel not only modified the aëroscope of Maddox so that it might be constantly in service, but, by adding an air meter and aspirator, he verified the amount of air transmitted, and was thus led by degrees to perfecting the apparatus exhibited. He has now several registering aëroscopes and also a kind of steam injector, by which a constant current of steam can be blown through a tube and induce a strong current of air by aspiration in its course, thus leading to the passage, if required, of 12,000 litres of air through the aëroscope per hour. The large injector can be attached to several aëroscopes, or to sterilised bulb-flasks, sealed at their points, containing sterilised, nutrient fluids—as neutralised beef broth—so that the moment the point is nipped off by sterilised pliers and the injector set in action, the air begins to pass through the liquid, leaving its air-borne particles in the fluid—a couple of sterilised asbestos plugs being placed at the opposite end in the tube fixed to the aspirator, to prevent the influx of aërial germs when detached.

The experiment, which may last any reasonable time, being finished, the fine point is closed by the blowpipe, the bulb removed, and set in the culture-oven. By using a large number of bulbs containing fluid from the same sterilised stock, carrying the experiment over a number of hours, each bulb having received a definite quantity of air, and by noting later on how many of the bulbs in the culture-oven have "gone bad" or show cloudiness, he infers the amount of bacteria in the air at that particular period and particular place. Some germs rejuvenesce in less than forty-eight hours; others may need several days. Some rejuvenesce earlier or later in liquids of a particular density rather than in the same fluid of higher or lower specific gravity, so that the bulbs are kept at a constant temperature in the culture-oven for a sufficient number of days to determine that the clear ones remain without change.

Thus, if from yesterday's experiment 100 bulbs "went bad" out of 500, and today out of the same number of bulbs 200 "went bad," then the natural inference is drawn that in the same quantity of air today there are double the number of aërial germs. The actual number of bacteria or fungi (mildew germs) is not required; for to count such would be practically most fatiguing and unnecessary, though this has been done several times by Dr. Miquel and his assistants, when the germs were deposited on a glass slide and retained by a sticky substance.

But the inquiry does not cease here; for tables are constructed showing the curves of temperature, rainfall, force and direction of wind, moisture, and number of bacteria at the same hours of the entire experiment. We are aware that Dr. Miquel has now pending some researches confirming a hitherto unknown condition of the atmosphere as regards the maxima and minima of the bacteria in the air at certain hours of the day and night. There is also a portable form of injector which is used for mountain experiments; though in the first essays of M. Frendenreich, conducted for Dr. Miquel amongst the snow-clad mountains of Switzerland, a pump throwing a litre of air per stroke was used, the results being forwarded, with all due precaution against contamination, to Dr. Miquel for cultivation and comparison.

Still Dr. Miquel has not rested here. He has obtained the assistance of Commander Moreau and Dr. Plantymausion, of the Mediterranean service, and through their aid, using various forms of apparatus, he has been enabled to analyse the sea air, both near and far from the land. The interesting results are published in the *Semaine Médicale*, 6th March of this year, and the researches show the purity of sea and mountain air. At different points in the city of Paris, also in the sewers, experiments have been conducted at the same time and similarly to those at Montsouris, and thus a general idea is gathered of the aërial dust in very different places and conditions.

This article will be completed next week, when we will deal with the other parts of the exhibit, also M. Pasteur's, and with the photographic aspect of the subject.

TRANSATLANTIC JOTTINGS.

At a meeting of the Photographic Section of the American Institute a very cogent proof of the value of photography was given by a correspondent of Frank Leslie's *Illustrated Weekly*. Photography has almost destroyed the business of the miniature painter, and where his work was only mediocre, or worse, has improved him off the face of the earth, and the gentleman in question (Mr. McSpedon) faintly indicates a similar fate for the "special artist." This artist and correspondent, who has had a wide experience, says most of his sketches on his recent tour in the far West were made with the assistance of photography. Whenever he halted he went directly to the photographer, and through him gained the best and readiest means by which to illustrate his descriptions. He was convinced, he said, that the travelling artist or correspondent hereafter would have very little to do with the making of sketches. Voyages round the world have ere now been written from an arm-chair in Fleet-street; but the idea of the possibility of "our special artist" receiving his inspirations from a source no further from home than from a bundle of *cartes* on his studio table is a terrible picture to contemplate.

The discussion initiated by Mr. W. E. Debenham's interesting communication on the subject of the *Illumination of the Dark Room* is carried on with a lively interest in America, many writers testifying to the value of the yellow-green screens for dark-room windows in lieu of the old ruby. The remark of one writer is worthy of quotation on account of its attempt at describing a colour without reference to the spectrum scale which, there is no doubt, is "caviare to the general." This writer, treating only of gas-flame illumination, places at six inches from the gas-burner a screen of *olive-green* glass and two thicknesses of *lemon-yellow* tissue paper. The special tint of the olive-green he describes as being, when looked through, "that peculiar, rich, greenish-yellow so common in this latitude, in summer, in grass and foliage just at that moment when the sun has set and the sky is cloudless."

The editor of the *Photographic Times* (New York) describes a method he has employed, in several cases, with success for reducing the prominence of objects forming a background to that portion of a picture in which it is intended that the chief interest should centre. By means of the burning of materials, which produced a dense smoke at the back of the object to be delineated, he was able to fog the background, as it were, and throw up the desired object with any amount of force, in a manner far superior to the effect obtainable by stopping-out the background. Such an expedient should be very useful in the photographing of machinery, as a jet of steam might very easily be sent in any direction, and from the pure white colour it presents it would impress the plate in an instant before contrary currents of air sent it in the wrong direction.

Mr. H. J. Newton (whose soda developer has often been alluded to in these pages) gave at the Section above named an exact formula for quick work, which runs as follows:—

Carbonate of soda	15 grains,
Carbonate of potash	15 „
Sulphite of soda	15 „
Water	1 ounce,

and pyro. two and a-half grains to the ounce. He also adheres to his mercuric accelerator, and said he seldom found anyone to fail when following his directions. The iodide of potassium used in making the solution should be largely in excess, and the failure to make the solution in this manner will account for a large number of failures, he believes. We give this precautionary advice of Mr. Newton's for what it is worth. It is, however, difficult to imagine how the verdict of English experts who have examined it and pronounced against it can be reversed.

The very small quantity of sulphite given in the above formula is not likely to do much in the way of keeping the negatives free from yellowness. Its other functions, recently dealt with at length in these pages, would not be perceptible with so small a quantity. It is, however, difficult to account for the remarkable proportions of the ingredients in some developers published on the other side of the Atlantic. So much so is this the case that we are tempted to believe the formulæ mere blinds to hide knowledge considered more valuable.

Mr. Roche gives a formula for what he terms a "combination alkaline developer," which, he says, is "equivalent to all the alkaline developers put into one bottle." We do not think he is far wrong, and we should advise a few developers less to be put into the bottle; for, when we reckon up his proportions, we find that for every grain of pyro., in addition to two minims of ammonia (a very large allowance), he adds five grains of carbonate of potash, over three of carbonate of soda, sulphite of soda less than a grain, and bromide the twelfth part of a grain. A formula like this is almost sufficient to fog a piece of leather, though Mr. Roche states that dry plates would not fog in it nor become stained!

A method of making an aqueous shellac varnish, based on one first published in our pages by Mr. G. Watmough Webster, was given by Mr. Gardner at this Section. As it would be rather useful for some purposes we here give the method in Mr. Gardner's words:—He "took boiling water fifteen ounces, and to this added two ounces of aqua-ammonia, and two ounces of white shellac dissolved in three ounces of alcohol." We think the formula would be greatly improved by adding the ammonia to the spirituous solution of lac and then the boiling water as in the first-named case; otherwise there would be a violent disengagement of gas before the lac could be acted upon.

Mr. Edward L. Wilson has a droll disquisition on the connection between a photographer's prices and the state of his health; yet it contains some truths on the state of the photographic business. Speaking of the cheap man, he says:—"Working in a fret, as he does every day, hunger pressing upon him continually, he never has time to think of anything but his stomach, and so lets all the other good things of this world go by." * * * "Art journals, photographic books, &c." "Why do Rocher, &c., &c., get better prices than others? Because they feed well intellectually and physically, and, therefore, have more of Rocher, &c., to put in their work."

A correspondent of the *Photographic Times* (New York) gives a method of removing the albumen film from a sheet of paper that if successful may turn out to have a considerable sphere of usefulness.

The plan simply consists in soaking the print in a saturated solution of borax, when the film becomes loosened and may be stripped off. We have not yet tried the plan, though we may do so, as there are many instances where a stripped film would be very valuable.

EXPERIENCES ON THE THAMES.*

From Abingdon there is not much that is interesting until we come to Culham, about two miles lower down—the river flowing the whole way through fertile meadows and banks covered with wild flowers and forget-me-nots, whilst further in the stream in shady, secluded spots we pass by many banks of pure white water lilies.

Passing through the lock we reached the junction of the weir stream with the river proper. We thought it would be a good idea to try to ascend the weir stream and see what the mill was "like" (for the mills are usually picturesque). We found it extremely hard work rowing against this rapid stream, and, needless to say, we had the water entirely to ourselves. The Philosopher thought it very much like ascending the Niagara below the Falls. I did not think it was quite so bad. At length, after a hard pull, and dodging the swiftest part of the stream as much as possible, we succeeded in getting pretty close to the mill, and in a most sequestered spot near the Pool we moored our boat to shore. Whilst the Philosopher had gone with the camera to get a good view of the mill from above I made the first use of all our elaborate cooking apparatus, which had hitherto lain idle. We decided upon making some tea. The spirit lamp, of course, came into requisition, and unfortunately caused an accident that might have been serious. All was going on well between the kettle and spirit, when all at once I tilted the boat on one side, which overturned the kettle containing nearly boiling water, and the lamp full of spirit, causing the flaming spirit to flow in all directions. However, by the use of our rugs, I easily managed to extinguish the flames and put an end to what at first appeared to be a rather alarming state of things. Not to be done, I made a second and successful experiment at tea brewing, and this time without *contretemps*. The Philosopher never slept a wink that night, and on finding out next morning it required a handful of tea to make two cups he thought he knew the reason why, and decided he would never again have his nerves upset by tea of my manufacture.

From Culham we had hard work to get our "man o' war" along. The wind was diametrically opposite to the direction we wished it to be. It was now blowing quite a gale and the river became covered with white-crested waves—"breakers" the Philosopher called them—causing our boat to dance up and down as if we were on the sea, and sometimes we even shipped water. Finding we made very little headway we again resorted to towing. This change, however, in our means of progression was the cause of a very serious accident to one of our cameras; for, whilst towing the boat round a rather difficult bend, the towing line got entangled in the tall reeds, the boat gave a lurch, and the coxwain, to save himself, fell upon one of the rigged-up cameras by his side, causing a collapse of that valuable piece of apparatus. As no immediate remedy was at hand we packed the damaged camera away and waited until we arrived at Clifton Hampden to see what could be done.

Passing under the railway arch at Appleford we next came in view of the quiet village of Long Whittenham, where supposed Roman earthworks have been discovered and some fine Anglo-Saxon jewels exhumed.

Another short pull brought us to Clifton Hampden—an extremely-picturesque place, even including its inns. First we thought of staying at the "Barley Mow" on the right bank; we made an inspection and came to the conclusion that it was a very curious place. We then had a look at the "Plough" (the alternative), also a very curious, thatched, old-fashioned (and that is saying very little) place. We thought this was one of the earliest species of inn ever invented. We decided on trying the "Plough," and had not the slightest reason to complain. The only difficulty was (although the inn is so small as to possess only two or three spare rooms) that of finding our way upstairs, the staircase being nearly vertical, perfectly dark, and about eighteen inches wide. Our host of the "Plough" and all his had contracted habits in harmony with their tranquil surroundings, for we found 10 p.m. was their curfew hour (excepting the night we were there), whilst they are up between 5 and 6 a.m.

Our first thought, after having satisfied our somewhat wolfish propensities incurred by towing, rowing, and photographing, was to try to heal the wound caused to the camera. The Philosopher, who is ever ready on an emergency, and besides deeply learned in the physical and chemical properties of gelatine, at once thought of his favourite medium. But the good people of Clifton Hampden scarcely knew of the existence of this "desiccated extract of the ossiferous portions of defunct animals" (the Philosopher's own definition), and we failed in our efforts to obtain any. We next suggested there might be a carpenter in the place, and for a consideration there would be a means of either begging, borrowing, or stealing his glue-pot. At last, after some trouble, we got an introduction to this worthy man, who, on finding out what was the matter, suggested he could do the work better himself. We thought differently, and by means of a bribe obtained possession of the much-coveted pot. The Philosopher, who adds to his many accomplishments that of being a skilful mechanic, made a very neat mend. We hung it up to dry that night and next morning were glad to find it could again be pressed into service.

Rarely have we found any village so picturesque as Clifton Hampden, and rarely one so well ordered and neat. Almost every few yards we found something we thought a worthy subject for the camera. Our inn was as rural and quaint as could possibly be imagined, and we photographed it with two or three village children as an appropriate foreground. The church there is situated on the brow of a hill overhanging the river—

"Which, hid by beech and pine,
Like an eagle's nest, hangs on the crest
Of purple Apennine."

A prettier church or one more charmingly situated it would be difficult to conceive. It is a most attractive and graceful object (and for the camera too) as seen from the river, and will bear the closest inspection, for externally and internally it is about perfect. From the tower of the church we may obtain, at this high elevation, a fine view of Oxford, and of the silvery meandering streak, up and down, of Father Thames passing on his way to the ocean—

"The tranquil cot, the restless mill,
The lonely hamlet calm and still;
The village spire, the busy town,
The shelving bank, the rising down;
The fisher's punt, the peasant's home;
The woodland seat, the regal dome—
In quick succession rise to charm
The mind, with virtuous feelings warm;
Till where thy widening current glides
To mingle with the turbid tides,
Thy spacious breast displays unfurl'd
The ensigns of th' assembled world!"

Perhaps one of our most successful pictures at Clifton was that of the bridge, with the church steeple behind. To adorn a rather tame foreground one of us posed as the "complete," though unsuccessful, "angler." At first, if we ever had nothing to do, we used to get out our line and try to hook a fish or two. Neither of us are really piscatorially inclined; however, we did not wish to go up the river without such a usual accessory, so before starting we purchased rod and line. We were told we were going in for the "'something' at one end and a worm at the other." But we paid no heed to such base insinuations; we intended to show results. We read Isaak Walton's advice—"When you fish for roach or dace you must have a small hook, a quick eye, and a nimble hand." About the former there can be no doubt, for we have placed that *small* hook under a glass case; with regard to the latter we thought that between us we had a "quick eye" and a "nimble hand." However, we never caught anything, but were afterwards told by a man at one of the ferries that many people came and remained whole days without catching anything. "Extremely interesting occupation!" we remarked. After that we never were again the "something at one end," but for posing purposes frequently used the extended rod without line at all.

The village school at Clifton is another pretty "bit," but it becomes almost invidious to point out one or two when every cottage and every gateway seems made subservient to art-rules. We learnt the reason, however: the Squire owns the village, and is, or used to be, the Vicar besides; consequently he allows Clifton Hampden to be none other than a model village. We left Clifton with many regrets, and wondered whether we should

"Look upon *its* like again."

There are many easier ways to see and enjoy the beauties of the Thames, but we doubt if there be any which possesses so many advantages and attractions as that of rowing down the river in a small boat. There is no hurry, no race for coach or train, and it was, indeed, on one or two occasions, in the absence of a head wind, pleasant work quietly gliding down the tranquil stream, and admiring those lovely scenes around us—such scenes of which the poet speaks:—

"Everywhere
Nature is lovely: on the mountain height,
Or where the embosom'd glen displays
Secure sublimity, or where around
The undulating surface gently slopes
With mingled hill and valley—everywhere
Nature is lovely. Even in scenes like these,
When not a hillock breaks the unvaried plain,
The eye may find new charms that seeks delight."

After passing Clifton Hampden the hills, capped with clumps of towering trees, become very picturesque and assume a somewhat bolder character. We next passed Little Wittenham church nestling in a luxuriance of foliage, and then the river makes a circuit with low and fertile meads on either side—at this time heavy with a rich crop of hay being gathered in. Farther on we come to the River Thame, whereon, a short distance up the stream, Dorchester is situated. We regretted

* Continued from page 377.

we could not spare time to row up this interesting tributary to see that ancient "city" with its remains of Roman Amphitheatre and half-ruined abbey, and which now, like many another "grand old city," has long since descended to the grade of a poor village.

A short pull from the junction of the two rivers brought us to Shillingford, where we made some "shots" at the bridge, several of which were during heavy showers, which considerably "damped" our enthusiasm, and had the unfortunate effect of somewhat hastening our return to London. However, we obtained very fair results in spite of the rain, although we were by this time getting rather disgusted with the "Clerk of the Weather," and on leaving Shillingford we were not in the most cheerful mood, with water everywhere around us. Shillingford is another "antiquated old place," as books tell us. However, we failed to find anything of interest in the place, except the "Swan" Inn, duly patronised by us, and which is certainly about the most picturesque on the river, being literally covered with roses and other flowers.

J. J. Acworth, F.I.C., F.C.S.

(To be continued in our next.)

ABOUT PRINTING.

The revolution which, a few years ago, so rapidly deposed wet collodion in favour of the now almost universal gelatino-bromide seems to have concentrated the thinking and experimenting powers of the great body of amateur photographers on the production of the negative, which is merely the means to an end, to the exclusion, in particular, of the print, which is the end itself.

This fact was forcibly pressed on my attention by the observations of a friend—one of the most successful amateurs on this side of the Tweed —during a conversation on matters photographic a few days since. Pointing to a number of prints which looked fairly good in the absence of contrast with the best that the negatives were capable of giving, he said :—"I am really disheartened with the result of my efforts to produce good prints, and more than half inclined to give it up as a bad job. I don't think I shall ever exhibit a print again, or at least one of my own printing." The friend in question is not far short of being *facile princeps* of northern amateurs, and his collection of prints has been much admired by all who have seen them, including, I may add, himself, until very recently, when an incident occurred which revealed the fact that they were not nearly so good as they might have been.

It seems he had been showing some prints at a gathering of friends, when one of them—a clever professional photographer—requested to be permitted to borrow several of the negatives for the purpose of producing prints for his private collection, and when he returned them showed the owner of the negatives the prints he had secured. To say that the professional printer had produced better prints than the amateur conveys no idea of the actual fact. They were so much better, and so very different, that nothing short of actual knowledge would have convinced even an expert that they were printed from the same negatives. They were delightful in tone, brilliant, juicy, and different in form and arrangement. Squares had been made into ovals, oblongs turned to uprights, foregrounds increased or curtailed; and in one case where in the amateur's print the mast of a vessel reached quite to the top, in that of the professional it was surmounted by a charming sky with delicate cloud effects.

Now, although I do not say that all, or perhaps even the majority, of professional photographers are such clever printers as the one here mentioned, it is well known that, in the larger establishments at least, the printing is superintended by an operator whose whole time is devoted to it, and the amateur who enters into competition with work so produced is indeed heavily handicapped.

Should the amateur, then, either employ a professional printer when he wishes to see his pictures at their best on the exhibition walls, or content himself by privately showing to admiring friends such work as he can do himself? By no means. He has shown that he can hold his own in the production of negatives; and if he would only devote a little of the time and attention to the theory and practice of printing that he has given to them, I have no hesitation in saying that his work would soon compare favourably with the best artistic productions usually seen in our exhibitions.

The art of printing has been far too much neglected by amateurs—looked upon as merely a mechanical process, to be taken up at odd times when there was nothing else to do, and when negatives had accumulated to the extent of a dozen or two. If he sensitise his own paper, the bath, probably dirty and of uncertain strength, is hurriedly filtered, and the sensitising is carried on simultaneously with several other occupations, the result being that no two sheets are left in contact with the solution for the same length of time, and are consequently not amenable to the same treatment. If he use paper ready sensitised his stock has been on hand long enough to have undergone a change, or he procures a fresh supply that may be very different from anything he has before employed, and the single print from each negative that he requires is printed before he has made himself acquainted with its peculiarities, or ascertained the best method of obtaining good results on this sample of paper.

I have said "a single print from each negative," and wish to direct particular attention to this as one great cause of weakness in amateur printing. Negatives, like almost all other things, have each a special character of their own, requiring peculiar and sometimes very different treatment. Two that may to the untrained eye look precisely alike will, with the same treatment, yield results altogether dissimilar; while each with treatment suited to its character will give perfect prints. No doubt the trained eye constantly engaged in printing operations will know at once, in the majority of cases, how exactly to manage each separate negative; but the amateur, who prints only by fits and starts, must feel his way, and can only make the best work by a system of trial and error, which implies the making of several prints from each of his batch of negatives.

An examination of the collections of most amateurs, or even of their pictures in our exhibitions, recals also the fact that they are very unwilling to sacrifice any portion of what they consider a fine negative; and hence we see otherwise fine pictures spoiled by excessive foregrounds or objectionable marginal objects left to retain the full size and proportions of the plate, and which, if the pruning knife had been freely and judiciously applied, would have been gems of both pictorial and technical excellence.

I suppose there is no finality in the production of negatives; and, therefore, while not advising amateurs to "rest and be thankful" always with what they already can accomplish, I would urge them to rest in the meantime, and till they have mastered the difficulties incident to the production of prints as perfect as their negatives, each keeping before him the fact that the best negative in his possession is but labour in vain, so far as he is concerned, as long as he cannot produce from it an equally good print. But he will never succeed in doing this while he looks upon printing as a merely mechanical operation. He must learn to feel that it is one requiring both knowledge and skill; must regard each negative as a wise parent does each of his children, and try to ascertain its particular character and idiosyncrasy, not considering several sheets of paper wasted in the attempt to discover how best to make it yield the most perfect result. Neither should he encourage a hankering after the full size or shape of the negative, but must ruthlessly cut off a foreground that dwarfs the principal objects in the picture, or mask the sky so as to add to its height, and lop off the sides so as to convert an oblong into an upright, if thereby a better result be secured. In fact, he must consider the negative in all its bearings, not as a thing of beauty *per se*, but as a means of enabling him by thought, care, and skill to produce an artistic picture.

John Nicol, Ph.D.

WHERE TO GO WITH THE CAMERA.

[It is hoped that this series of articles will be continued at regular and frequent intervals during the vacation months, and we shall be glad to receive contributions to the series from any friends able to treat of new and interesting ground.]

A TRIP AMONG THE ENGLISH LAKES.

In the hope that the spell of good weather, which broke over the north about the last week of May this year, might continue for a week or two, I set about preparing myself and my "touring kit" for a long-anticipated trip among the English lakes. Although I may not be able to offer anything but "stale news" to many readers of this Journal —though my trip was suddenly cut short prematurely by family matters and what looked like a set-in of bad weather, and, besides, nothing very startling or very instructive occurred during my little trip—still, at times, a little light reading is beneficial to our general public, and I offer to the Editors a few notes on my ten days' experience among some very grand scenery.

I am happy to think that the days are far past when the production of negatives was a matter not only of great bodily toil but of difficult operation and doubtful issue at the best. We do not now scale Yosemite precipices with tons of baggage, nor even crawl through the country with uncanny-looking vans. We throw our camera over our shoulders, or carry it in our hand; nor need we "groan and sweat" under a tropical tent. We can put our prepared plates in a case or even in our pocket, expose them, and develope them at home with a cup of coffee or a lemon-squash as ready to our hand as our sulpho-pyrogallol. All this has given a great impetus to amateur photography; my only wonder is that the impetus has not been greater. As a matter of expedition the sketcher is not "in it" with us, while a man who can both draw and make a decent negative is a man to be admired and envied. Our science has now reached such a state, and our manufacturers have attained such perfection, that any person of ordinary intelligence can, with a little practice, make himself pretty certain at any time and under almost any circumstances of getting, if not a perfect picture, at least a fair and pleasing transcript of whatever he offers to his plate through the medium of his lens.

To attain the "consummation devoutly to be wished," what is the trouble requisite? A trifle—a mere nothing! Supposing the tourist to buy his plates packed, he requires nothing but a ruby or other non-actinic lantern, some packing paper, and a little gummed paper, besides a pocket book, and who is without one? These articles are absolutely all that are required beyond the camera, stand, plates, and lens that are so useful in photography. (It may seem curious—even inexplicable—that without one or other of these articles I never yet produced a negative that I could well send to an exhibition, but so it is.) The above articles were all I carried about with me, and the lantern I might have done without had I cared to ask photographers in Keswick and elsewhere for the use of their dark rooms.

As usual, like a fool, I could not content myself with one camera. I took my largest (a 10 × 8), and for instantaneous work I took also a smaller one—the same that went round the world with me. I not only carried changing-boxes for these cameras but also slides. I might have saved the trouble of one or other. I further took two pairs of strong legs; my wife usually carried one set, the other set carried me! My camera legs were "quite too utterly" heavy, but when once set up were certainly rigid enough and exceedingly adjustable, the worst thing being that I had to carry always a key or spanner for the nuts. I did *not* carry a sledge-hammer or a hydraulic press. The fact is I had somehow lost my ordinary stand; but I so liked the ease of adjustment for awkward places given by my heavy stand that I am trying to get a stand made on the same principle but of less weight, and not requiring a tool chest to be carried. This is a long story about my stand; but it is worthy of it, for it could be made nine or ten feet long—about one *storey* high, in fact. I decline to tell how many plates I took with me, but I brought home thirty-four exposed plates.

On the evening of May 27th we arrived at Lodore Hotel, by the side of Derwentwater, in Cumberland, my slides and changing-boxes being all filled. Next morning, about 6.30, I went with my big camera a mile or two towards Borrowdale, and got a couple of very good views from a point a bit up a hill, climbing which I found that though I had come in a train I had not come in training; but I must not be *entrainé* into these silly puns! After breakfast I climbed partly up Lodore Fall and "let fly" at a couple of views; but, as I expected, the wind among the foliage spoiled the effect. My picture is truly a "moving scene." There was also very little water in the fall—about the size of a grey horse's tail, but not nearly so big as the Grey Mare's Tail, near St. Mary's Loch, in Selkirkshire. Then my little camera came into requisition, and I took a few dark "bits" in the bed of the stream below the fall.

The 29th brought to light a very beautiful view of Borrowdale and Castle Crag. I found the view, before breakfast as usual, behind a village called The Grange, about a mile and a "bittock" from Lodore. It was a beautiful calm "bit" of river with tall reeds growing, and three cows who would not stand still—the *low* beasts! However, their distance lent enchantment to my view, and their restlessness has not done much harm. If a cow has two digesting apparatuses why should she not have two heads and two tails?

That afternoon we had a drive round Derwentwater, but no particular event came of it. I took two small views with rapid exposure; visited Friar's Crag, and resolved to let the Friar alone till some other time at least. Next morning, having hired a trap to take us to Grasmere, we returned to the Crag, but I only secured a view of the boat landing at Keswick. I know that views of Friar's Crag sell well, but it was a "sell" to me, for I could make nothing of it. Resuming our journey *en voiture* towards Grasmere, we drove through Keswick up a steep hill, getting every here and there glorious views of Derwentwater and its adjacents. At one time we had a lovely panorama of Bassenthwaite Water, and at another we saw the beauties of the Vale of Newlands. I exposed two rapid plates on views of this grand sort, not expecting good photographs, but merely hoping to fix on my mind the outlines of the mountains; but my plates were covered with curious meandering, crapey markings, which looked so detestable that I threw the plates away unprinted. This is a kind of mark that I have occasionally noticed before; it comes always in distant hills or sky. Will anyone explain the matter to me? Driving along the Vale of Naddle we got a good view backwards along the Vale of St. John, and at last, after passing the queerest ecclesiastical building in Britain—I dare not call it a church—we arrived on Dunmail Raise, whence we overlooked Grasmere lying in all its quiet beauty beneath us, with Helm Crag on our right—a hill sometimes called the "Lion and the Lamb." Both my wife and I saw the likeness distinctly, only it turned out that I was viewing the whole mountain, and she noticed only a big boulder at the top of it. We were quite satisfied all the same.

Arriving at Grasmere, and having refreshed, we set out view-hunting. Carrying the big camera we "prepared to mount," but after a long walk we turned back viewless. However, on nearing our hotel on our way back, I got two pretty views of Grasmere and Helm Crag; only one view has a gas house and a gas-holder for a foreground, and the other seems over-exposed, though printable.

On May 30th I began with a couple of views of Grasmere from a wood near the hotel, and then, catching sight of some particularly good photographs in a shop window I proceeded to inquire where the artist lived. I found he was Mr. T. A. Green, a native and inhabitant of the village, and to his abode I proceeded, not only wishing to know the producer of such artistic work, but hoping to get leave to change and pack plates in his dark room. This facility was given me at once and cordially, and I had the privilege of seeing some very fine work by Mr. Green, not to mention partaking of various cups of tea with Mrs. Green. While "fossacking" about Mr. Green's place I came upon one or two exceedingly ingenious affairs—a very good wash-trough for prints, a very useful system for joining several prints from several negatives, a first-rate stand for carrying printing-frames, but, neatest of all, an arrangement for carrying a big camera along a bad road, or even up the "fells" of that district. I tried to persuade Mr. Green to give your readers the benefit of this vehicle, but his modesty seemed to stand in his way—or, rather, in *your* way. I hope he will relent and let us have a description and drawing. The thing looked like a cross between a bicycle and a plough. It had a wheel in front and long curved handles like a plough, and the camera case sat about the centre of gravity. Considering that Mr. Green takes a 15 × 12 Rouch's camera up some of the highest mountains it will be believed that some such contrivance is required. I found the convenience of a proper dark room for packing plates, and, having a small bottle of sulpho. pyro. and some ammonia and bromide, I developed a couple of plates and found all going well as regards exposure. Every tourist, I think, ought to develope a plate now and again when he gets the chance. Not only is it a check as to exposure, but his camera or slides may have sprung a leak, which without this precaution would remain undetected and the whole tour lost.

Our best day was the 31st of May, and a glorious day it was. My wife and I drove early to the foot of Rydalmere—not to the *bottom* of the lake, as some have it. We began with a bridge over the Rothay, in a darkish situation. It is a good enough footbridge built on rough piers of stone, but I could not quite get the whole bridge in, which does not look very well. I carry only one lens for each camera. For my 10 × 8 I use a rapid rectilinear—a cracked one, by the way. I am sure that people make more mistakes by using a host of different lenses and plates than in any other way. For some reason I cannot state I do not like views taken with wide-angle lenses, and when any one lens does not suit my view entirely I simply pack up and "shunt."

At the foot of Rydalmere I got several lovely views which have been depicted by painters and photographers without number. On a calm day, when the reeds are steady, some of these Rydal views are as well adapted for our work as any I know. This same morning—before breakfast, I omitted to say—we rowed across Grasmere and got a view of the "Wyke Cottage," once the residence of the Barbara Lewthwaite of whom Wordsworth sang. All this time the weather had been lowering in the evenings, and everyone felt sure that bad times were coming; but the rain kept off as long as it could apparently. Grasmere is to Derwentwater what Maggiore is to Como. Derwent and Como are perhaps grander, the hill lines more imposing, and the sheet of water more extensive in appearance (of course Lago Maggiore is larger than Como really); but for peaceful scenery commend me to Grasmere and Rydal, as also to the parts of Maggiore about Baveno and Pallanza. I do not wonder at poets making their homes among the quiet Westmoreland lake scenery.

On Monday we did but little, there being too many tourists about; but on Tuesday, June 3rd, we took a drive up Langdale, Mr. Green being in our company as *cicerone*. The Pass and Pikes of Langdale are very imposing, but there was a nasty haze on the hills which rather made me fear for the results of my work. However, on the way up the valley I got four or five views which at least repay the trouble of taking them and carrying the camera a mile or two. Though we knew there was almost no water in Dungeon Ghyll we determined to climb to it, and a fine climb we had on a very close, warm day. Having tired myself very much climbing a steep gully we found that we were on the wrong road altogether, for we had climbed Stickle Ghyll in place of Dungeon Ghyll. However, having carried my camera for miles at 103° in the shade in California, I was not to be beaten. So we retraced our steps, and finally, exhausted, we reached Dungeon Ghyll—an ugly-looking fissure in a rock, with a mere driblet of water flowing through it. The wind, too, had risen as ours fell; but I had a "shot" at the Ghyll in spite of the wind moving the ferns and shrubs, and the result is pretty fair.

On our return to Grasmere I found the whole sky dark with curious-looking, square and pyramidal objects. The passages of the hotel were also lined with these strange objects, and at first I attributed them to some novel kind of meteoric shower; but on closer examination I found them to be cameras and stands. A few gross of the members of the Amateur Field Club had turned up at the hotel. I was so amazed that I have lost count of dates and numbers: for my wife says it was on the Wednesday and that there were only six gentlemen, and no doubt she was right. I had on the Wednesday a "crack" with one of these gentlemen, and I found he had been getting some good views, making a lot of drop-shutter exposures. I am not fond of such quick work for landscapes, but with the wind that prevailed it was the only way to do.

We drove to Ambleside in the afternoon. I took one view of the old mill, and went to bed hoping that the weather next day might be better than it promised at night. Rising early on Thursday morning I found a steady, determined downpour of rain, and, as it looked like lasting, we started for home by the first train we could get from Windermere.

I had thirty-four negatives 10 × 8 to develope, besides a few smaller ones; and having now got them done I have to report a very fair average. My exposures have all been about correct, and in some cases the distant hills have been preserved with sufficient clearness; but the great majority of my plates are spoilt with insensitive lines about half-an-inch wide and an inch from the edge of the plate. This necessitates my cutting down my prints, which in most cases sadly mars my intended compositions. This is the more exasperating because the quality of emulsion is first-class. In spite of the nuisance of coating and drying gelatine plates I shall have to recommence the process if I cannot get good emulsion, *well laid on,* in the market.

If I secured nothing else I gained a considerable amount of exercise and health, and I can recommend a tour to the Lakes to anyone who is dyspeptic or out of sorts. Travellers, however, must have their pockets full of money, for the hotels are very dear. With all my experience of hotels I do not think I ever got less for my money than at some of the hotels by the Lakes. The charges depend more upon "season" than upon reason. ANDREW PRINGLE.

THE ROYAL INSTITUTION.

MONSIEUR E. MASCART ON COLOURS.

It is a bold undertaking to address you in a foreign tongue on a subject which is not new to you, and in a theatre in which you are accustomed to hear the greatest minds expound their discoveries. You will find, without doubt, that it is legitimate on my part to ask all your indulgence, under the desire that my honoured friends shall not have to regret the invitation they have done me the honour to give me.

THE SPECTRUM.

Light is characterised by two qualities—its intensity and its colour. The comparison of two lights having the same colour can be made without having recourse to our organs of sense and by physical means; but it is impossible to compare different colours without the intervention of the physiological impression. It has been known since the time of the labours of Newton that white light—or, to be more precise, the light of the sun—is formed of a great number of different colours, and that the union of all these colours in the same proportion, acting upon the eye either simultaneously or in short intervals, reproduces exactly the impression of white.

Starting with the preconceived idea of an analogy to the notes of the gamut, Newton divided the solar spectrum—that is to say, the image obtained by decomposing white light by means of a refracting prism—into seven different colours. In reality this division is arbitrary, the colours passing the one into the other by insensible gradation, and each of them being characterised by their refraction in a prism, or, rather, by the length of the undulations to which they correspond.

When we reunite at one point a portion of the rays of the spectrum, we obtain either one of the primitive colours, more or less pure, or a new tint. If we arbitrarily divide the spectrum into two parts, and reunite the rays of the separated parts, we obtain two distinct colours, the superposition of which again reproduces white light. This can be proved experimentally by means of the ordinary spectrum, and it is effected naturally in the phenomena of rotary polarisation, by which the most brilliant colours are obtained.

VISUAL LUMINOUS IMPRESSIONS.

These general properties are stated only in order to deduce two conclusions. It should be noticed that the mixture of pure or homogeneous lights in any proportion whatever produces always on the eye a single impression—that of a single colour. Whilst the ear can distinguish all the notes which constitute harmony the eye seizes but upon one colour, without the power of distinguishing if it be really simple or formed of different lights. In the second place, the mixture of colours provokes but one new impression. That of purple, for instance, can be obtained by mixing red and violet, and all the varieties of rose colour are nothing but mixtures of purple and white.

White light can be reproduced by two simple colours only, such as red and green. In a more general manner, if three carefully-selected colours of the spectrum be isolated—such as certain shades of red, green, and violet—it is possible, by mixing them in different proportions, to imitate the impressions produced by all colours. Artificial colours, formed by rays taken from the spectrum, for example, may be either simple or composite, without the eye being able to distinguish between them—except, perhaps, when they have a shade of purple or rose, because these two colours are known not to exist in a simple state.

It is the same whether the colours be those of nature or those artificially manufactured. An object appears coloured because it returns to us a portion only of the light which it receives from the general supply. The separation may be made by transmission, as in coloured glasses; or by reflection, as by metals; or by diffraction, as by the wings of certain butterflies; and by the coronas which are sometimes seen around the moon. The portion of the light which does not reach the eye is absorbed, or sent off in a different direction. By studying the phenomena of fluorescence it will be seen that an object has not colour in itself; it can but utilise from the general supply of light the tints which are proper to it, and the aspect which it presents is very different according to its mode of lighting. A red riband, for example, placed successively in the different colours of the spectrum appears black, except in the red portion of the spectrum; it then returns by reflection an almost homogeneous light. A rose-coloured riband appears to be illuminated in a very unequal manner in various parts of the spectrum; the light which it reflects is, therefore, very complex.

THE PHENOMENA PRESENTED BY MONOCHROMATIC LIGHTS.

It might be asked, what would be the effect in nature if the light of the sun were absolutely homogeneous. Certain bodies would absorb it completely, and appear black; others would reflect it more or less actively, and they would exhibit more or less luminous intensity. If no other standard of comparison existed the eye would give the sensation but of white, black, and intermediate shades. It does not appear to be necessary to give any proof; but an experiment is never useless, and it always serves to impress ideas.

Pascal said that nothing would cause the properties of air to be better understood than to be where it did not exist; in the same manner, nothing would better serve to make known the properties of colour than seeing the aspect of the world under the influence of homogeneous light. The volatilisation of a salt of soda in the flame of a Bunsen's burner realises this condition in a manner almost perfect.

With similar illumination fabrics of the richest colours appear but white, black, and shaded; the art of the painter exists no longer. Behold under this light a superb picture by Ed. W. Cooke, lent to me by Sir W. Bowman, and which represents the aspect of Venice under the setting sun. It seems nothing but an engraving. Here, again, see two landscapes painted under the influence of the sodium light by an artist who thought he was employing none but black and grey colours. He was using, in reality, the most brilliant colours, as you will see when you look upon the picture in ordinary light. This bouquet of flowers is nothing but a collection of white and grey blotches upon black foliage. The human figure assumes a cadaverous appearance. It is necessary to witness a spectacle like this several times over to completely appreciate all its features of sad and sepulchral monotony. Assuredly it would be a strange punishment to be obliged to live under these conditions; and we should be filled with joy indescribable if the wand of a fairy brought out in their ordinary colours the objects around us, as I do at this moment by lighting a strip of magnesium. I am sure that you yourselves feel a sort of relief at coming to the end of this lugubrious experiment.

COLOUR-BLINDNESS.

The recognition of colour being due to the impression produced on the retina, it is a foregone conclusion that the human eye will not always exercise this function with equal accuracy.

At the outset the different parts of the retina are unequally competent to indicate colour. To distinguish the details of an object it is necessary to direct the attention towards that object; that is to say, to produce an image on the central region of the retina, where the acuteness of physiological perception is much the strongest. It is the same in relation to colours. When the gaze is concentrated in a fixed direction, and a coloured object is placed in the visual field in such a manner that its image is produced laterally, it will be noticed that the perception of its colour becomes enfeebled more and more the farther it is removed from the line of central vision, and is lost towards the limits of the field.

But the most important fact is that different observers do not distinguish the various colours with equal facility, and they even confound with each other colours which appear to us to be the most discordant—such, for instance, as red and green. The discovery of this particular form of infirmity is due to Dalton, who was affected in this manner to a very high degree, and who analysed the errors of his judgment with the greatest care. We are in the habit of calling "Daltonism" that which you call "colour-blindness;" and that is, perhaps, abusing the name of a philosopher who has several other titles to have his name handed down to posterity. This defect of the eyesight, so long unperceived, is in reality very common. There are fully ten persons out of every hundred who in comparing colours commit errors sufficiently grave to give the power to put them in evidence for close examination. In general, this imperfection of sight is not inconveniently serious, and is unconsciously corrected by habit, the recollection of objects, and the judgment of others. The case, however, becomes extreme when they cannot distinguish, for example, red from green, a cherry or a ripe strawberry in the middle of foliage, a red light or a green light in railway signals or those used in navigation. Artists have often a marked predilection for certain colours. Lesueur put blue in profusion in all his works. Your great painter, Turner, appears to have sought more and more for red tones. There is reason, perhaps, to inquire whether the choice of colours by certain painters is absolutely intentional, or whether it is the consequence of a physiological state.

People are often colour-blind from birth, but this defect of sight is sometimes the result of an accident; in certain nervous affections it is manifested occasionally in a temporary manner and under the most bizarre forms.

COLOURS IN APPARENT RELIEF.

Vision is more liable than the other senses to numberless errors and illusions. To speak only of those which relate to colours the effects of the contrast of two adjacent colours may be cited, or those which follow the impression of an image, or, again, the subjective colours seen with closed eyes because of a mechanical action of the eye, and I will limit myself to bringing before you several experiments relating to the apparent relief of colours.

When we examine an image of the spectrum upon the screen, produced by a direct-vision prism, the various colours appear to be upon the same plane; but if we slowly turn either the diaphragm or the prism the illusion is presented of a wave in relief, of which the red extremity is in advance. The effect is more distinct when the slit of the diaphragm has the form of a V; the spectrum now appears to be a veritable cylinder. On replacing the diaphragm with another having the word "DAVY" upon it in transparent letters, we can see upon the screen, and with extreme exaggeration, the letters standing out in relief, as is sometimes the case with the names fixed over certain shops.

THE INVISIBLE RAYS OF THE SPECTRUM.

In addition to the colours which are seen habitually, the solar spectrum contains other radiations—the one set less refrangible than the red, and distinguished by calorific properties; the other set more refrangible than the violet, remarkable for its photographic effects and by the action which it exercises on fluorescent substances. The ultra-violet solar spectrum produced by the refraction of a prism extends almost to the same length beyond the visible spectrum as the length of that spectrum itself, and Mr. Stokes has demonstrated that the electric arc gives an ultra-violet spectrum five or six times longer.

It is astonishing that sight is restricted to so small a part of the radiations emitted by luminous sources. We may remark, however, that it is the same with the other senses. The touch will give no idea of the temperature of a body, except between very restricted limits; the ear perceives neither the deepest nor the most acute sounds, and the highest sound it can hear produces a painful impression. At the infra-red end of the spectrum the visible spectrum is arrested almost abruptly, and the efforts of Brewster but little increased the limit of the range of rays to be seen by the eye. It is only by ingenious processes—such as those which Captain Abney has employed with so much success—that we have obtained a complete history of this region.

On the other side of the spectrum the visibility persists in a remarkable manner. Helmholtz has discovered that, by taking the requisite precautions, it is possible to see the entire ultra-violet spectrum, so far as it has been revealed by photography. Having had occasion to study the light emitted by metallic vapours, I have proved and published that, with a prism of Iceland spar, ordinary eyesight can distinguish the ultra-violet spectrum to three or four times the length of the luminous spectrum. One of my *collaborateurs* with keener eyesight has seen and mapped all the rays it was possible for me to photograph. If, instead of considering the refraction of these rays, which varies with different substances, they are defined by wave-length or period of vibration, it may be said that the ordinary luminous spectrum is one octave in length, and that it is possible to see another octave more refracted.

In describing the different properties of light I wish here to interpose a few remarks. Sir W. Thomson has expressed surprise that Nature has forgotten to give us a special sense to enable us to see the magnetic phenomena in the middle of which we live. Here, on the contrary, we are in the presence of radiations which do not exist in the light of the sun—or, at least, which do not reach us—which are energetically absorbed by most transparent substances and in particular by the humours of the eye, rays of which we know absolutely nothing in ordinary life, and which nevertheless act upon the retina. The nervous couch of the retina is extremely sensitive to their action. Does it not seem that in this case we possess superfluous sensibility, and that there is a want of harmony in the structure of the organ and the uses it should perform?

A question arises in relation to this subject which is of great interest from a philosophical point of view, namely, whether man is susceptible of an organic perfection, and if it be possible to follow the line of progress marked by the seeing these colours, and consequently in the structure of the eye. One eminent Englishman has not disdained to occupy himself with this question. Mr. Gladstone has made a complete collection of the expressions employed by Homer to describe the colours of objects. It comes out clearly as the result that the terms of Homer are applied in a very uncertain manner, for the great poet seems to have confounded green with yellow and blue with black.

Before quitting the curious problem whether the sensation of colour is as yet but little developed, it may be remarked, perhaps, that the interval which separates us from Homer is a very insignificant one in the history of humanity; that the Greeks, but a short time after Homer, made great use of colours on their walls and painted statues, of which the specimens are so numerous that the frescoes of Pompeii present the most varied colours; and that even an attentive examination of modern authors tends to lead to the same conclusions as those which are drawn from the writings of Homer. In the middle of the seventeenth century, at the period in which Lesueur made a special use of blue in painting, is it not singular that a specially naturalistic poet, La Fontaine, never once employed the word "blue" to describe a coloured object or the colour of the sky? The smallest novel of to-day would furnish a collection of names of colours comparatively important. Literature has for its object the recording of the facts of history or the passions of man to produce the desired impression on the mind of the reader. The painter concerns himself alone with design and colour. For some time past—at least in France—it appears as if the parts had been interchanged: literature is becoming pictorial and painting impressional. Without recourse to a modification of our organs, the change of ideas and the desire to present something new suffices to explain the highly-coloured language of contemporaneous literary men.

Otherwise, if humanity is capable of such rapid development in the direction of perfection, it becomes necessary to admit that the people who have remained in the stone age, like the natives of Cape Horn, have not participated in the general progress. The French expedition, which remained for one year at Terra del Fuego, conceived the happy idea of studying the natives from this point of view. The language of the natives had names for only two colours—the one for red and analogous tints, the other for blue and green; but this poverty of language was due solely to the circumstance that colours do not play an important part in the existence of the Fuegians, since it was found that after a little practice they could distinguish and classify the colours and their different shades as accurately as the most civilised European. The organic development of their visual apparatus left nothing to be desired.

(To be concluded in our next.)

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 9,417.—"Portable Photographic Lens Mount." S. D. McKellen.—*Dated June* 26, 1884.

No. 9,440.—"A New or Improved Apparatus for Drying Photographic Plates." L. A. Groth; a communication from L. Micciullo, Bassano, Italy.—*Dated June* 26, 1884.

No. 9,461.—"Panoramic Photographic Camera." A. M. Clark; communicated by P. Moëssard.—*Dated June* 26, 1884.

No. 9,531.—"Improvements in Photography." A. G. Brookes; communicated by T. S. Nowell, Boston, U.S.A.—*Dated June* 28, 1884.

No. 9,612.—"Preparation of Surfaces for Printing or Etching by Aid of Photography." A. G. Brookes; communicated by E. Kunkler and J. Brunner.—*Dated July* 1, 1884.

No. 9,641.—"Self-Acting and Self-Supporting Frame for Fastening Photographs to Glass." R. C. Wittmann.—*Dated July* 1, 1884.

PATENT SEALED.

No. 1,908.—"Improvements in Obtaining Relief Printing Surfaces." Henry Rafter, artist, Lee, Kent.—*Dated January* 22, 1884.

Producing Coloured Photographs.

This invention, by Albert Kepler,* Achille Morin de Premion, and Alfred Pigeau, received provisional protection only.

This invention has for its object improvements in the process and apparatus employed for producing coloured photographs, by means of which ordinary positives are rendered transparent, and consists in the employment of a certain solution or compound hereinafter described, by means of which and the aid of suitable apparatus, and in the employment of a wash for removing the surplus solution, the positives are made transparent and ready for being coloured at the back; after which, on applying suitable artists' oil colours on the back of the said positive, a most accurate and faithful representation of the objects in all their colours results—but which up to the present time by ordinary photography are only produced in black and white—by which means the cost of producing durable and brilliant coloured photographs is greatly reduced and simplified.

In carrying our invention into practical use or effect we take one or more ordinary photographic positive or positives and place the same in the preparer—which may be a metallic box, chamber, or receptacle so arranged as to admit of being adjusted to and maintained at a uniform temperature without any great variation or loss of the heat—in which preparer we have previously placed a suitable quantity of the solution or compound hereinafter described; this solution or compound is kept at a uniform temperature of 90° Cent.—say 195° Fahr.—which is maintained for three hours, during which time it is allowed to act on the positive or positives, and at the expiration of this time it is allowed to cool and coagulate and remain in that state for twelve hours. At the end of this time the preparer is again heated in order to allow of the withdrawal of the said positive or positives.

The solution, compound, or bath hereinbefore spoken of is composed of equal parts of clarified resin and essence or spirits of turpentine in about equal proportions, which are melted together and maintained at or in a liquid state or that due to a temperature of 85° to 90° Cent.—say 194° Fahr.—and this must be kept up whilst the positive or positives are in the bath for about twelve hours.

On removing them from the preparer they will be found to have a thick layer or coating of the solution or compound adhering to them, from which it is necessary they should be freed. For this purpose we employ a dryer consisting of a metallic trough or receptacle arranged with a jacket or casing into which steam, hot air, hot water, or other suitable and convenient means for heating—being adjusted to, and maintaining the required temperature—is or are allowed to pass so as to maintain the same temperature as that in the preparer, namely, 90° centigrade—say 195° Fahr.

The positives are placed at the bottom of the dryer—which is or may be provided with a false bottom and a ready and convenient means for removing the positives—and the heat causes the solution or compound to melt and run off from them to the bottom of the dryer; and when the solution or compound is fully liquid and has passed off the positives may be lifted out and suffered to drain for a few minutes without cooling, when the remaining solution or compound may be easily removed from the positive by the aid of a wash, consisting of benzine applied by the aid of a sponge or wad, or in any other convenient or suitable manner.

The positives are then laid on a perfectly-clean surface for a period of a few minutes till dry, varying according to the dryness and temperature, when they will be found ready to be painted at the back with the desired artists' oil colours, each of which is laid on uniformly over the surface it is intended to occupy without any regard to light or shade on such part; and in consequence of the materials used and the manner of employing the same, the paper on which the positive has been printed permits the colours to penetrate into and amalgamate with it in such a manner as to render them indelible whilst retaining the brilliancy and durability of oil paintings, and they may be then cemented or mounted on a suitable surface or surfaces and subjected to a strong pressure to render the adhesion complete.

By preference we employ the best artists' oil colours, which may be either those contained in tubes, or we may take the dry colours and mix them as required.

Our Editorial Table.

Double Albumenised, Ready-Sensitised Paper.

We have received from Mr. Otto Scholzig specimens of the different brands of ready-sensitised, albumenised paper. These are of two classes—"brilliant" and "enamel"—both being evidently more highly albumenised than the usual samples of foreign manufacture. On trial we have found these papers to give every satisfaction—printing rapidly, and toning easily by three or four of the most ordinarily employed formulæ. The toning formula issued with the paper consists of a combination of the acetate and carbonate baths; but we have found the plain acetate, the carbonate, and the borax formulæ to work equally well. With a leaning in the direction of brown shades, probably the phosphate would be preferable to any other bath. In spite of the strength of the albumen film we have experienced no difficulty in the matter of either blistering or cracking of the surface, and the film retains its brilliancy throughout the whole of the operations.

BURNT-IN ENAMELS. By R. T. WALL. LONGFLEET, POOLE.

WE have had submitted to us a specimen of photo-ceramic work executed by the process recently patented by Mr. R. T. Wall, in which the sensitive material employed is an extract of white pepper. This, upon exposure under a negative, forms an image in exactly the same manner as the ordinary "dusting-on" process; and, vitriable colours being employed, the image may be burnt-in in the usual manner. Without having tried the process we cannot speak of its capabilities; but, judging from the specimen before us, it appears well suited to the purpose to which it is applied.

HIGHLY-SALTED ALBUMENISED PAPER.

FROM Messrs. Rivot and Co. we have received samples of albumenised paper prepared according to the system of heavy salting advocated by us in the last and present issues of this Journal, and upon the advantages of which, as contrasted with light salting, we do not in this notice feel called upon to enter. When excited on a sixty-grain bath, as recommended by Messrs. Rivot and Co., it yields brilliant results. The particulars of salting and nature of the albumen employed were given by Messrs. Rivot and Co. in our correspondence columns of last week.

PHOTOGRAPHS. By B. J. FALK, New York.

SOME examples of a peculiar class of photographs are before us. Whether they can be considered as advancing the claims of photography to be considered an art is a matter of taste; but they, no doubt, exhibit evidence of cleverness in their production — a cleverness, however, which belongs rather to the stage carpenter than to the artist. The following account, taken from the New York *Dramatic News*, sufficiently describes them :—

"One of the most difficult feats in modern photography has recently been achieved by Falk, the Broadway photographer. It represents the heroine of the Curfew clinging to the tongue of the bell and swinging out over the town. The lady who consented to be the subject of this picture is the actress, Mrs. Charles Watson, and some idea of the discomforts she underwent while the photograph was being made may be gained from the following detailed account, which was procured from Falk by a representative of the *Dramatic News* :—The bell itself, which was specially constructed for the purposes of this picture, was of papier maché, and about three feet wide. As the object of the picture was to represent the heroine of the Curfew as she was being swung to and from the belfry tower, and as a papier maché bell is hardly substantial enough to support even the lightest form, the difficulties of picturing realism by artificial means loom up in all their staggering proportions. The bell having been made fast to the top of the skylight, was fixed at the proper angle by wires, which were so fine as to be invisible against the background. At the same a stout wire, painted such a shade as to lose itself in the colour of the background, was suspended from a brace in the centre of the skylight. This wire was attached to a belt which encircled the waist of the plucky heroine. By the aid of this central support she was enabled, while appearing to cling to the tongue of the bell, to reach the corresponding angle without any strain on the bell proper. The support for her hands was furnished by a stout rope which passed through the tongue of the bell. To obtain the proper effect a certain amount of realism was required, and it was intended that at the last moment the victim should really dangle in the air with no support under her feet. As, however, the slightest motion of the feet would have been detrimental to the picture it became necessary to attach wires to her heels, which wires, in the hands of an assistant, were to aid in raising and lowering the feet to the proper position. To add to the realistic effect it was desired to give to the dress and hair the floating tendency which under such conditions it is known to assume. As there were no blizzards or cyclones available for the purpose, this was effected by attaching numerous threads to an equal number of bunches of hair as well as to the trail of the dress. These appendages were operated by the mouth of the assistant, whose hands were employed in working the heel supports. When all preparations had been made the box on which the sitter, or rather swinger, stood was pulled from under her, and she was left to whatever support the central wire offered. This was a most dramatic situation. The agonised expression in the picture was more truth than fiction. There she hung waiting for release; every second seemed an eternity. A few feet away stood the photographer, calmly contemplating the helpless misery of his victim, yet, at the same time, closely watching for her swaying body to remain motionless for a second. It ceases to sway for an instant only, but this was enough to allow the light which had been concentrated upon it to do its rapid work. The signal is given and all hands rush to her support. She is cut down, a restorative in the form of wine is applied, and the agony is over. The severe strain upon the nerves of the brave heroine may be calculated when the reader is informed that it was only after the twelfth attempt that the final successful result was obtained, since in the other exposures there had been just sufficient motion of the body to destroy the sharpness of the picture."

As regards the technical qualities of the work it is needless to say that, as might be expected from Mr. Falk's establishment, it is beyond suspicion.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
July 8	Bolton Club	The Studio, Chancery-lane.
„ 9	Photographic Club	Anderton's Hotel, Fleet-street.
„ 10	London and Provincial	Masons' Hall, Basinghall-street.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AT the meeting of this Society, held on the 26th ult., the chair was occupied by Mr. W. M. Ashman.

Mr. F. W. HART showed a case containing chemicals and appliances for developing quarter-plates, in the construction and arrangement of which economy of space had been especially studied and effectively accomplished. It consisted of a zinc box measuring six inches by four and a-half by three. This box when empty formed a washing trough, in which was a plate rack for holding the plates whilst washing, and by which they might be lifted out to drain. The case also contained two celluloid developing dishes, two zinc dishes, and a box containing chemicals.

Mr. J. BARKER inquired what was the proper way of using Schlippe's salt for intensifying negatives. With him it had stained the plate.

Mr. W. E. DEBENHAM said that it was necessary before using it to throughly wash out the mercury solution that preceded it. How long had Mr. Barker washed?

Mr. BARKER replied about ten minutes.

Mr. DEBENHAM said that half-an-hour was not too much. If the plate had been thickly coated with emulsion a longer time would be required.

Mr. A. MACKIE asked whether Mr. Debenham would explain what diffraction was. The subject had lately been introduced into the question of the use of lenses and stops.

Mr. DEBENHAM replied that when light passed the edge of an opaque substance a portion was turned very slightly out of its path and suffered diffraction. This portion was so small as to be quite insignificant compared with the whole volume of light passing through any but an extremely narrow aperture. As they had seen photographs taken with a pinhole aperture of $\frac{1}{150}$th of an inch, in which no effect of diffraction was visible, and that was much smaller than any diaphragm that photographers were likely to use, it was not likely to trouble them. A more probable danger was the reflection from the edge of the opening. When a hole of very small diameter was made in metal or card the hole really was apt to be a short tube, from the sides of which, compared with the amount of light directly transmitted, a considerable quantity of light would be reflected.

The CHAIRMAN observed that the subject of diffraction scarcely had a photographic bearing.

Mr. J. B. B. WELLINGTON showed a sample of gelatine, which when soaked in water displayed some curious markings. He inquired whether they indicated anything that would probably cause green fog. No very decided opinion was expressed by the members on the point.

This being the annual meeting, the Secretary then read his report, from which it appeared that the members had much cause for congratulation. It was noticed with satisfaction that the balance in the hands of the Treasurer showed an increase upon that in the last balance sheet, proving that the experiment of fixing the qualification at a low rate had been made upon a sound basis. The characteristic feature in the proceedings of the Association during the past year had been the series of monthly lectures, proposed and organised by the Curator, Mr. A. Haddon, and given by various members of the Association on subjects of photographic interest. Apart from these lectures many demonstrations had been given and articles exhibited, the discussions upon which had given rise to new theories, and instigated further experiments and investigations on subjects of photographic interest.

The acknowledgments of the Association were given for several donations, special mention being made of a volume on light and optics from Mr. J. Burgess; a blackboard and easel from Mr. J. H. Hare and Mr. Burgess; a changing and developing-box from Mr. W. E. Debenham; and copies of photographic publications regularly mailed by English and American publishers.

After a feeling allusion to the loss that the Association and the photographic community had sustained by the death of one of the members, Mr. H. Baden Pritchard, the circumstances were referred to that had prevented the late Secretary, Mr. C. B. Cutchey, from giving the full amount of time and attention to the affairs of the Society that he would have wished, and which eventually led to his resignation and the appointment of Mr. J. J. Briginshaw, the present Secretary. The increase in the funds and in the number of members introduced the expression of the hope that each recurring anniversary might witness a higher position won, and that the Association would find increased stability and a sure prospect of progress in usefulness.

REPORT OF THE CURATOR.

MY object in addressing you this evening is twofold—first, to thank those of our members who so kindly and willingly came forward in answer to my appeal to give us lectures on those subjects they were well acquainted with; and, second, to remind those members present this evening, and who may not have been present at all the lecturettes, what ground has been gone over by the lecturers.

The subjects dealt with in the lectures cover almost the whole of photography, in a general way. Mr. Darker showed us a series of beautiful experiments on light, mainly polarised, so as to give us an idea of the force with which we are constantly dealing; and a thorough acquaintance with which would, he considers, the better enable photographers to cope with the many difficulties they have every day to encounter.

Mr. Debenham told us what the lens attached to an ordinary camera obscura was when Daguerre first began to use it for photographic purposes, and how, step by step, it has been improved. The lens as used by Porta could only cover a plate f with a stop $\frac{f}{20}$ or $\frac{f}{30}$; by using a converging meniscus instead of a plano-convex a much greater area could be covered, other things being equal. He showed us a series of lenses from the very early attempts down to the most recent, and these, as most of you know, will now effect with $\frac{f}{5}$ almost as much as the original lens would with $\frac{f}{20}$ or $\frac{f}{30}$. In the course of the lecture it was remarked that opticians of the present day aim too much at microscopic definition at the centre, and neglect more than they should do the marginal definition. When they turn their minds to the improvement of this quality of the lens we may hope to see a great advance in the performance of the photographic lens.

Mr. J. Traill Taylor gave us a very interesting lecture on the manufacture of lenses, showing us what kind of tools are necessary for the production of the different curves on the surfaces of the glass, and the rough glass as received from the glass manufacturer; also the different grades of emery and putty powder used in the grinding and polishing of the glass to the curves determined upon by the mathematician. Mr. Taylor has done us a good turn by illustrating his lecture in the manner he did; but, unfortunately for him, I hope he will not stop there. Some four or five of the members of the Association are now learning from a practical man the *modus operandi* from beginning to end as regards the production of lenses. Will they stop there? I hope not. What I should, therefore, be glad to see would be the publication of a series of curves by means of which, with two lenses as a nucleus, one could lengthen or shorten the focus of such a combination, either by the addition of another lens or by the substitution of a lens of different focus for one of the two already in the mount, and, in addition, that all, or at least most, of the positive lenses could be used singly for landscape purposes. Mr. Taylor has partly promised to give us the necessary curves for doing what I have here pointed out, and I hope he will be as ready in redeeming this promise as he was his last to lecture on lenses.

Mr. W. K. Burton gave us two formulæ for the production of emulsion—one by the boiling method, and the other for very rapid plates produced by means of ammonia. The Ag Br produced by either of these methods can be allowed to subside, and then the supernatant liquid containing the altered gelatine and the salts resulting from the double decomposition poured off, so that perfectly-pure Ag Br is left behind. By "pure" I mean the sensitive salt freed from gelatine and foreign salts. Mr. Burton seems lately to have modified his formula very considerably as regards the quantity of gelatine associated with the Ag Br during boiling, and also the acidity of the liquid, in presence of which the ripening action goes on.

The next lecture should have been on the *Art Side of Photography: What to Select, What to Avoid, and the Reasons*; but, unfortunately, those acquainted with the subject are bashful and reserved, or do not care to enter upon ground which must be disputed at every inch. But, nevertheless, I hope this gap will be filled up during the next year.

Mr. W. M. Ashman told us of the different methods that are and have been adopted in order to prepare paper suitable for photographic purposes. He exhibited specimens of prints produced on paper sensitised on baths of different strengths, and showed also the great advantage gained in some cases by using ammonia gas before printing. Here, again, a link is wanting. This is a lecture *On Toning and Fixing*; but this, I think and hope, will be supplied by Mr. Ashman during the next season.

Mr. A. L. Henderson showed, as far as he possibly could in the time and under the circumstances, the method he adopts in order to produce his beautiful enamels, which are always so rich and full of detail, and, above all, as far as our present experience goes, permanent. The result obtained by Mr. Henderson during the lecture was quite sufficient to prove that he was the right man to call upon to give us a lecture on this subject, which by dint of hard work he has made entirely his own. This subject is so important that if photographers of the present day wish their work to be handed down to posterity they should take it up a little more seriously than it has been. I do not say that any one could go and produce right off an enamel such as Mr. Henderson is in the habit of producing; but with Mr. Henderson's lecture before him is he not in a better position than Mr. Henderson was when first he commenced work?

We cannot have too much of a good thing; so I for myself am glad that our Secretary has obtained the promise of a lecturette from Mr. Berryman on this same subject. Perhaps Mr. Henderson himself will be able to see an easier way of producing his enamels when he learns how others are working in order to produce like results.

Mr. T. Bolas gave us a most instructive and interesting lecture on the production of photographic pictures in fatty ink. He showed us how a Woodburytype relief could be used in order to produce a picture on ruled paper, so that the image could be transferred to zinc and stone, and then how the former could be used in order to produce prints at the same rate as letterpress.

Mr. W. Coles, during the last lecturette, showed us results and demonstrated on the spot how it is possible to alter the density of negatives which from force of circumstances have been produced either too dense or too weak. From what he told us I gathered that photographers ought always to try to get as much silver reduced as possible, and then, if necessary, to reduce the density by after treatment. When metallic silver only is left in the film there is less chance of after changes than when the silver is converted into some other form, the stability of which we know very little. When intensification is absolutely necessary, bichloride of mercury followed by Schlippe's salt seems to give a more permanent result than any other in the experience of the lecturer. Local reduction is most valuable, and in the hands of some can undoubtedly be made to improve negatives very much. For this purpose Mr. Coles prefers Mr. E. H. Farmer's reducer—ferricyanide of potassium and hypo.—in consequence of one solution only being required, so that as soon as the reduction is nearly completed the action can be arrested by washing.

The last chapter in this short history is in connection with Mr. F. W. Hart's lecture, wherein he gave us the exact dimension of furnace to be built, the proportion of carbonates and sand to be used with the haloid salt of silver to be reduced, and even the kind of fuel to be used in the furnace. The best precipitant for the silver from washings of prints Mr. Hart finds to be dilute H Cl, and from the hypo. ordinary sulphide of potassium; but in neither case should they be used in too large an excess, as the resulting compound of silver is slightly soluble in them, and, in addition, in the case of the sulphide, the smell to many is anything but pleasant. Mr. Hart told us that within his own experience he is able to recover about ninety per cent. of the metal employed, so that if photographers would only take heed of what he said they would be able in a very short time to diminish considerably the expenses in the printing department. A large amount of silver in many establishments, I am sure, goes down the sink, because the heads do not think it worth the trouble to save the hypo. for treatment. All photographers would not, most probably, care about reducing their own residues; but, fortunately, refiners are glad to do it for them at a small charge.

In conclusion: I beg once more to thank those gentlemen who so kindly gave us the lecturettes and responded so heartily to my appeal. One thing only I regret—that is, the small encouragement you have given to the lecturers. Nothing can, I conceive, be more disheartening to lecturers than to see only a small audience after the hours they have devoted to the preparation of their lectures. In future, therefore, if the experiment that has been made be continued, I hope to see a larger attendance; this will be the means not only of disseminating the useful knowledge imparted in the lectures, but, at the same time, of proving that the subjects of the lecturettes are of interest. The experiment is at an end. The result I leave to you to judge. If you think it a success, I will endeavour in the course of next year to lay before you an equally inviting *menu* and feast for the mind.

After the usual votes of thanks to the officers of the Association, the election of officers for the ensuing year was made, and resulted as follows:—*Trustees:* Mr. W. K. Burton and Mr. W. Cobb.—*Curator:* Mr. A. Haddon.—*Treasurer:* Mr. W. H. Prestwich.—*Secretary:* Mr. J. J. Briginshaw.

An alteration in Rule 7 was then, after some discussion, carried. The rule now stands as follows:—"The subscription shall be 5s. per annum, payable in advance in the first week in July. Each member on election shall pay the annual subscription, but from his second subscription shall be entitled to a rebate proportionate to the number of months that had elapsed during his first year before his election."

EDINBURGH PHOTOGRAPHIC SOCIETY.

THE eighth meeting of the Session was held in 5, St. Andrew-square, on Wednesday evening, the 4th ult.,—Mr. W. Neilson presiding.

The minutes of the last meeting having been approved, Messrs. John K. Dawson, Alex. B. Dawson, and Richard Kerr Miller, C.E., were elected ordinary members.

A lengthy discussion took place on the new edition of the rules, proofs of which were submitted at last meeting by the Council. It having been agreed at that meeting to term them "laws," they were read *seriatim* and very fully discussed, Messrs. Forgan, A. B. Stewart, Forbes, and Craig Christie taking prominent parts. Some of the changes proposed were not adopted by the meeting. The laws of the Society and the order of business at its meetings were finally adopted as revised.

The CHAIRMAN intimated that he had made inquiries about the alteration of the municipal laws as to photographing in the public gardens of Edinburgh, and he found that no modification would be entertained, in consequence of the great nuisance that had arisen through excursionists having photographers among their number and bringing about a disorderly crowd.

Dr. ALEXANDER HUNTER read a paper *On the Waxed Paper or Calotype Process*, illustrated by upwards of ninety calotype prints, few being less than 12 × 15. These were examined with very great interest, and a cordial vote of thanks to Dr. Hunter was passed by acclamation. [Dr. Hunter's interesting paper dealing more with his Indian experiences than with practical photography, past or present, we merely refer to it briefly in another portion of our impression.]

Mr. NORMAN MACBETH, R.S.A., brought before the notice of the members the importance and desirability of making the study of the picturesque more an object of this Society, and for its encouragement in this direction handed for inspection the work which was awarded the first prize of the South London Photographic Society last year. That Society have instituted as one of their principal aims in their proceedings the setting apart each month the best production then submitted for competition—without names of parties concerned, but having a title or motto attached to each work. These again, at the close of the session, are submitted to a competent judge (unknown to the members, at least not having seen the works before), who adjudicates, and assigns the best. With a view to have a similar effort made in the Edinburgh Photographic Society he (Mr. Macbeth) tabled a resolution that it was his intention at the first ordinary meeting to move—"That we adopt such a proceeding, and appoint a small committee, who shall draw out the proposal in detail and regulate its management. This proposal to be afterwards submitted to the Council for their approval and recommendation."

Owing to the lateness of the hour several items had to be passed over.

The next meeting of the Society will be held on Wednesday, 1st October.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE monthly meeting of this Association was held on Thursday, the 26th instant,—Dr. Kenyon, President, in the chair.

The minutes of the May meeting were read and confirmed, and Messrs. Barker, Evans, Hartley, Hughes, and Moore were elected members of the Association.

The Rev. H. J. PALMER proposed, and Mr. A. W. BEER seconded, a resolution that the Shrewsbury excursion to Condover, Acton Burnell, Pitchford, and Buildwas Abbey take place on Thursday, July 17th, in lieu of the excursion to Churchtown, and this was carried unanimously.

The Rev. H. J. PALMER read a paper descriptive of a recent visit to Hawarden, and exhibited a number of specimens of his work there, including some fine portraits of the Premier.

Mr. R. CROWE described a number of exhibits sent by Mr. Atkinson, of Liverpool, including some bottles of corrugated metal for the safe carriage of concentrated developing solutions, Samuel's very ingenious changing-box slide, a camera fitted internally with Kirkby's shutter, and Blair's tourograph. The last exhibit excited much interest from its many novel and ingenious features. Mr. Crowe pointed out many of its advantages over other cameras, and especially its lightness and strength, the capital arrangement for the rising front and swing back, and the exceedingly clever double dark slide.

The CHAIRMAN announced the donation to the Society of fifteen 10 × 8 prints, by Mr. Beer; three numbers of *Photography*, from the editor in Chicago; and one number of the *Photographic Times*, from the editor.

Mr. H. SIMPSON described a cheap and compact camera and case combined, invented by himself. The case consists of a box of quarter-inch baywood covered with American cloth, and measures 12 × 7 × 10 outside. The side is hinged to the body of the case at the bottom. The camera bellows are fastened to the centre case. To use the camera, the side is unfastened and laid down at right angles to the case. The bellows and rising front are drawn out and kept perfectly rigid by wire supports, as used in the scenograph. These supports are strongly hinged one-quarter of an inch inside the case, and when closed up fold over the camera front. The side is hinged on the top, and a bag and frame (similar to that described on page 114 of the ALMANAC for 1881) is drawn out of the box. The bag is preferable to a bellows in this instance, as the former may be fastened within one inch of the edge of the case, thus leaving two inches of clear space inside between the end of the bag and the camera bellows. The frame is supported in the same way as the camera front. The plate is placed in an arrangement of metal gimbals held in position by brass screws and slides, thus giving the effect of a double-swing back. The gimbals are carried in a metal frame, which works in the two inches of space referred to, and is moved backwards and forwards by a rack-and-pinion motion. The pinion passes through the top of the inside of the camera, and through a packing-box at one end, where it is turned by means of a small stock key.

Messrs. Beer and Riley exhibited prints of negatives taken during the last excursion to Rivington Pike; Mr. Cornish some views in Devonshire; Mr. Plympton pictures in Hereford and Gloucester; and Mr. Crowe some instantaneous pictures taken with Kirkby's shutter.

After votes of thanks to the Rev. H. J. Palmer, Mr. Crowe, Mr. Simpson, and the other exhibitors, the meeting adjourned.

LEEDS PHOTOGRAPHIC SOCIETY.

THE usual monthly meeting of this Society was held in the Philosophical Hall, on Thursday, the 5th ult.,—Mr. Washington Teasdale, F.R.M.S., in the chair. Messrs. Dawson and Hagyard were elected members.

Professor RUCKER, F.R.S., made some observations upon *Photographic Lenses*, of which the following is an abstract:—The ideal lens would so deflect the rays of light which fall upon it from any single point that, after passing through, they would meet in a second point which would thus form the image of the first. In real lenses this condition is not fulfilled, for two reasons. In the first place, convenience dictates that the surfaces of lenses must, in general, be either plane or spherical, and rays of light which diverge from a single point cannot, by passing through a lens bounded by such surfaces, be made to converge to a single point. Hence a defect arises which, since it depends on the spherical form of the surface of the lens, is called spherical aberration. In the second place, such ray of white light is broken up into its constituent colours, and to the separation of these is due (among other effects) that the position in which the best optical image is formed is not necessarily that in which the clearest photographic pictures will be obtained. [In the lecture the principal methods of diminishing these defects were briefly discussed.] Spherical aberration may be minimised for objects at a given distance by giving the lens a suitable form, but the connection will be less perfect for other distances. The distance from the lens at which the image is formed is also dependent on the distance of the objects. A lens in which this defect is marked fails to form a clear picture of objects which are not all at nearly the same distance from it. The blurring due to this is diminished by reducing the size of the pencils of light which pass through the lens by means of a stop. This, however, is attended with the disadvantage that the amount of light which falls on the plate is reduced, and therefore also the quickness of the lens is diminished. If the stop be placed close to the lens the rays which pass through it at different angles are brought to a focus at different distances, so that either the centre or the edges of the field are indistinct. In this case the field is said to want flatness. By moving the stop away from the lens, rays parallel to the axis pass through the centre, while those inclined to the axis are transmitted by parts nearer to the circumference of the lens. The fact that the focal length is different for the central and circumferential parts is thus utilised to diminish the curvature of the field. This remedy, however, tends to produce distorted pictures; but the nature of the distortion is different according to whether the stop is in front of or behind the lens. By placing it between two lenses, opposite distortions may be made to neutralise each other. The use of two widely-separated lenses is attended with the drawback that the quickness and angle are diminished. Finally: chromatic aberration, or the breaking up of white light into its constituent colours, has to be avoided; and this may be done by the use of compound lenses, the various parts of which are formed of different kinds of glass. The principal points referred to may be thus summed up:—A small stop increases the depth, but diminishes the quickness of the lens. Moving the stop from the lens diminishes the curvature of the field, but increases the distortion and reduces the field of view. By the use of two lenses, with a stop placed between them, the distortion may be diminished, though a great distance between the lenses reduces the field of view. A large aperture increases the quickness; a large focal length diminishes it—the time of exposure being inversely proportional to the square of the diameter of the opening, and directly proportional to the square of the focal length

The principles above enunciated were illustrated by the care of a combined objective for landscape and portrait work.

The CHAIRMAN, in opening the discussion, referred to several points mentioned by Professor Rucker, and illustrated the principles by facts from his own experience.

Mr. PEARSON said he had a shutter made by a well-known maker which worked between the lenses of a doublet, and consisted of two circles passing each other in the centre of the lens. According to Professor Rucker this varying aperture must be gradually cutting off the vertical rays in a vertical, but not in a horizontal, plane, and it would, therefore, appear that a shutter made on this principle must give a blurred image.

Messrs. Marshall, Warburton, Bramson, Reffitt, and Walker also joined in the discussion.

Mr. J. B. Spurge, of London, was introduced to the meeting by the Chairman, and very heartily received. He exhibited and gave a description of his sensitometer for testing gelatine plates.

Mr. Asquith exhibited an instantaneous shutter, simple in mechanism, but most effective for the purpose required.

The CHAIRMAN, on behalf of the Sciopticon Company, exhibited the new quarter-plate camera, Manx stand, and lenses for ditto. This camera was much admired on account of its extreme portability and the great range of focus it possessed.

The meeting was then adjourned.

NORTH STAFFORDSHIRE PHOTOGRAPHIC ASSOCIATION.

THE ordinary monthly meeting of this Society was held on Monday evening, the 30th ult., at the Mechanics' Institute, Hanley,—Mr. Charles Alfieri occupying the chair.

The minutes of the previous meeting having been read and confirmed, the Secretary presented his financial report for the past six months, showing a balance in hand of £1 7s. 9d. The report was adopted.

On the motion of Dr. Griffiths, an excursion was arranged for to-morrow (Saturday), the 5th inst., to Alton Towers and Croxton Abbey, the party to meet at Stoke-on-Trent, and proceed thence per rail to Alton.

The CHAIRMAN cautioned the more inexperienced of the members against over-exposing their plates. He last week found the light very actinic in the same district (Derbyshire), an exposure of one second having been too much in taking a view of Haddon Hall.

Mr. W. B. Allison passed round some fine platinotype prints from negatives of groups of ferns.

After some conversation upon various topics of photographic interest the meeting terminated.

BERLIN ASSOCIATION FOR THE CULTIVATION OF PHOTOGRAPHY.

THE Association met on the 22nd May, when Dr. Kayser occupied the chair in the absence of Professor Vogel, who was attending a meeting of the Senate of the Technical High School.

The Chairman laid on the table the specifications of three patents, amongst which was Schlotterhoss's automatic printing arrangement.

Herr Pietschmann wrote to say that he wished to arrange for a photographic tour amongst the mountains this summer, and invited members of the Association to join him.

Herr Schultze showed a shutter to be placed behind the lens.

Herr Scamoni, of St. Petersburg, sent a number of photo-mechanical prints after well known pictures.

Herr QUIDDE called attention to some peculiar matt streaks on a few mounted cabinet pictures, which proved to be caused by small cracks in the surface of the paper, and which were not noticeable in the unmounted prints.

Herr JOOP thought the albumen with which the paper was coated was at fault, and recommended mounting the pictures before they had become quite dry, or, if for any reason it were inconvenient to do so, the pictures when taken out of the water might be roughly dried with blotting-paper and then placed between sheets of paper and rolled, albumenised side outwards.

Herr QUIDDE called attention to the gold, silver, and bronze medals to be awarded for the best portrait at the forthcoming wandering meeting of the German Photographic Society.

Professor Vogel, having arrived, showed a couple of Obernetter's photogravures after views from nature, which excited considerable interest.

A communication from Dr. Lohse, of the Potsdam Observatory, was then read, in which an account was given of the heliographic work executed at that celebrated institution. Dr. Lohse is just finishing a view of the sun measuring about a foot in diameter, which shows the structure of the sun's surface in a remarkably sharp manner. The mirror of the heliostat must be exposed to the sun as little as possible, or else the heat would change its surface. Then the air must be perfectly still, which it very seldom is, otherwise the picture would be useless. In order to seize a suitable moment Dr. Lohse observed the sun by means of a large reflector placed in a cupola of the building, the heliographic instrument being placed on the ground. The exposure was made by means of an electric attachment connected with the instantaneous shutter.

Professor Vogel spoke about the zinc baths often used for the ferrous oxalate developer. He had been prejudiced against them by finding that certain black specks, which occasionally appeared upon otherwise good dry plates, quite disappeared whenever he gave up employing the zinc dishes and used *carton-pierre* ones instead. Indeed, it had been found that these specks could be artificially produced by means of particles of zinc powder. He thought they were caused by small particles scratched off by the sharp corners of the plates from the surface of the dishes, and that they somehow reached the face of the film. It was also to be remarked that they were not only found when new zinc dishes were used.

Herr Joop recommended for use with the ferrous oxalate developer thin wooden trays coated with asphalte.

Professor Vogel then spoke of his new sensitive-to-colour collodion process. In giving his formula for the silver bath he had forgotten to mention that two to three per cent of alcohol should be added to the sensitising bath, otherwise it would be repelled by the plates. The action of the dyes he had used was very various, and differed with the kind of plates used. The action of the dyes was proportionately smallest with gelatine plates, but there was also great difference between wet collodion and dry collodion plates. Some worked best with wet collodion and some with dry. At present he was directing his attention principally to bromide of silver collodion emulsion plates, on which he found the effect was, on the whole, best; but, unfortunately, the necessary short-fibred cotton was not to be obtained just then. Herr Gädike had given him some beautiful collodion emulsion, but it had proved unsuitable in consequence of the long-fibred cotton from which it had been made. As a matter of curiosity, he mentioned that he had tried a quantity of collodion emulsion six years' old, and found it quite useable and furnishing the best results. It was quite easy to work with collodion emulsion. It could be stained at pleasure by the direct addition of alcoholic solutions of dyes. The plates coated with it were ready for use in a few hours. If it were desired to hasten the drying the plates might be laid upon a vessel containing hot water. The exposure was about three times as long with collodion emulsion as with wet collodion stained plates. The development was alkaline. In ease of manipulation the collodion emulsion process exceeded all others.

The meeting was shortly afterwards adjourned.

Correspondence.

DARK-ROOM ILLUMINATION.

To the Editors.

Gentlemen,—A letter in your last issue from Mr. Andrew Pringle, in which he charges me with want of courtesy, calls for some notice on my part.

It is impossible here to go through the whole of Mr. Pringle's lengthy communications on the subject of the proper light for use in the dark room. The gist of them, however, as I understand, was that different persons found different results in the agreeable character or the reverse of red and yellow light; that whilst admitting that the yellow light which he had tried gave more illuminating power in proportion to its action upon the sensitive plate than the red, yet he personally preferred red, because "yellow-green was obnoxious to him," and that he "deprecated all attempts to lay down the law on such matters for other people." In summing up he said:—"Let the photographer take the one of these colours that he likes best, try his most sensitive plate under the most crucial tests likely to be required, use the most light he can with safety, pay his money, and take his choice."

That there is varying susceptibility to different coloured rays with different individuals I am ready to admit, and have admitted; but I believe that those who find greater "comfort" in the use of red light than of yellow form a very small minority. The receipt of letters containing opinions similar to that expressed in one to hand this morning—"you have been the means of relieving the eyes of others from the dreadful red light that is so painful to most people"—confirms me in this view.

If there be really the conflict that Mr. Pringle supposes in the medical testimony on the matter, let each, meantime, do as Mr. Pringle advised in his first article—decide for himself. I have no doubt as to which colour will generally be found the least trying.

Mr. Pringle's idea that as he had expressed an opinion contrary to mine I was bound in courtesy to give him further "denial or contradiction" seems to me curiously illogical. It appears to me that it is sometimes more courteous to pass over a contradiction rather than to contradict again, and to be eager, in schoolboy style, to have the last word.—I am, yours, &c.,

July 1, 1884. W. E. Debenham.

To the Editors.

Gentlemen,—The vexed question as to which light—that transmitted through a greenish-yellow, or that through a ruby medium—is the best to use in the operating-room will probably never be settled unanimously. No doubt different subjects are variously affected, and the mere statement of a person that he finds the one or other coloured light in all respects the most suitable to work by is likely to be productive of no very conclusive result.

I would suggest a physiological test that may, perhaps, be of use in assisting to decide which light is best adapted for any particular individual. Thus, all things being equal—the same amount of visual power being given, the eyes being exposed to each light for the same duration of time and under similar circumstances, and so on—it is possible that the pupils would, on the admission of white light, become contracted to a greater or less degree in direct proportion to the amount of irritation respectively caused by the differently-coloured rays in the deeper structures of the eyes.—I am, yours, &c., F. R. Fisher.

Grosvenor-street, W., June 30, 1884.

Notes and Queries.

"How shall I prepare silk so as to print upon it?—B. Perkins."——Reply: Dissolve one ounce each of chloride of sodium and gelatine in twenty ounces of water, float the silk upon this for one minute, and when dry excite upon a sixty-grain silver bath. Tone and fix in the same way as for paper prints, and when washed and dried iron between damp cloths.

R. B. wishes to be informed what are the best proportions in which to form the ferrous oxalate developer.——Let him make saturated solutions, in separate bottles, of neutral oxalate of potash and protosulphate of iron, and acidify the latter with sulphuric acid; then, just before using, mix them in the proportion of one part of the iron solution to four of the oxalate. Under certain circumstances the proportions may be one to three; but for general purposes the former proportions will answer best.

George A. French wishes a formula for a developer for eburneum pictures, such as those introduced by Burgess, of Norwich.——We respond by giving the formula employed by Mr. Burgess himself, namely:—

Pyrogallic acid	3 grains.
Citric acid	3 ,,
Glacial acetic acid	10 to 20 minims.
Water	1 ounce.

J. George Gibson wishes to know what course to adopt in order to effect registration of some photographs, and the advantage accruing from such registration.——Let him send unmounted copies to the Publishing Office of this Journal, together with one shilling and sixpence for each photograph, and the Publisher will see that the proper forms are filled up and the registration effected. The advantage is that no one can legally copy a picture after it has been thus "entered at Stationers' Hall."

"Will you inform me how the ready-sensitised paper of commerce is prepared? I would like to be able to prepare some for my own use.—R. A. Larkin."——In reply: Each maker has his own method of preparing it, which he keeps as a trade secret. Some mix the preservative substances with the silver; others float the back of the paper, after sensitising, upon the preservative. Within the past few days we tried a solution of oxalic acid for this purpose, and it toned quite easily. Some employ other acids, such as citric and tartaric; but our correspondent had better make a few trials for himself, and adhere to that which he finds to answer his purpose best.

Rev. F. D. says:—"I have a large and fine graphoscope, the large lens of which shows photographs with very pronounced fringes of prismatic colours. Ought it not to be achromatic? and, if so, would it not then answer ever so much better for showing the colours of the painted photographs of flowers which are seen to such effect in this instrument?"——In reply: For the examination of plain photographs and engravings it would certainly be an improvement to have the lens achromatised; but it would not answer at all in the case of the painted flower subjects spoken of, as the chromatic aberration of the lens is the cause of the relief by which these coloured flowers are characterised when examined in the graphoscope.

London and Provincial writes:—"Apart from the fact of the orthographic lens, as constructed twenty-five years ago, not giving orthographic projection, has it any other fault in consequence of which it could not be employed for rapid landscape or group work? So far as I am able to understand its principle of construction it appears as if great things ought to be expected from it."——We reply: If well made—that is, if the corrections are properly effected—the orthographic lens gives good definition with a moderately-large aperture, and with gelatine dry plates may be employed for portraiture, groups, or landscapes. In the last-mentioned class of subject it may be used with a drop shutter. An opinion has lately been placed upon record that in a modification of this form of objective will be found "the lens of the future."

William Stubbs (Melbourne) sends for examination a panoramic photograph, produced by a camera invented by Mr. John Somerville, Dunedin, New Zealand. The picture is about twenty-four inches long by six inches wide, and is in true panoramic perspective; that is to say, it is not composed of a number of views taken in plane perspective by a wide-angle lens and then joined together. We are asked to give our idea of the utility of such a camera.——In reply: The advent, several years ago, of the pantascopic camera of Johnson and Harrison was hailed with great delight by many on account of the wide angle included and the perfection of the definition. Although several were made, the result, from a commercial point of view, was not considered to justify the continuance of their production. As we have received no information from our friends at the Antipodes as to the mechanical construction of the Dunedin camera, we cannot offer any opinion on its merits. There are, however, numerous subjects for the representation of which a panoramic camera is not only advisable but necessary.

A. J. Macdonald inquires if there be any machine available for coating plates with gelatine emulsion?——From this query we imagine that Mr. Macdonald does not read this Journal very carefully, otherwise he would have seen, several times mentioned, that a machine was patented in this country by an American gentleman a few years ago, and that the patent has now expired. He would have seen, further, an announcement only a fortnight ago that another patent for a second machine had been applied for during the past month.

Exchange Column.

I will exchange, for anything useful in photography, a large mahogany camera (rigid) with four single lenses; would make a good enlarging or copying camera.—Address, J. Edwards, 79, Ashford-road, Eastbourne.

Wanted, a half-plate, square, bellows-body camera, in exchange for a repeating-back camera, to take two *cartes de visite* on half-plate, and a good portrait lens.—Address, F. M. Pugh, 18, Kirchen-road, Ealing Dean, W.

I will exchange a dolphin table, interior and exterior backgrounds, and one large piece of rock (imitation), for a 10 × 8 bellows-body camera with two or more double backs.—Address, Mr. Holgate, photographer, Caryon-street, Burnley.

Wanted, whole-plate (or larger) folding camera with double dark slides, and rapid symmetrical or other good lens; also rolling-press. Will exchange tricycle, pair of silver wine-slides, gold albert, breast-pin, signet ring, half-plate camera, portrait lens, plate-washing trough, and leather case, 13 × 9 × 2¾.—Address, W. L. Knott, 68, King-street, North Shields.

I will exchange cameo press by Marion, cost £5 5s., for cabinets and *cartes*, nearly new; Seavey's boat, *carte* rolling press, lime-light apparatus, lantern, gas-bag, and pressure-board, new; also a set of slides and an oxygen retort. Wanted, 10 × 12 or 8½ × 6½ portable camera, with two or more dark slides, by a good maker.—Address, Mr. Pridgeon, 73, Marlborough-terrace, Newport-street, Swindon, Wilts.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

Photograph Registered.—

Miss Emma Caroline Lawford, The Sisters' House, Fulneck, near Leeds.—*Photograph of Water-Colour Drawing of the Chapel, House of the Principal, and Schools, Fulneck, near Leeds.*

S. R.—Received as we are going to press. In our next.

R. Brooke.—Thanks. By all means send us a report of the meeting in question.

S. S.—One or other of the zinc etching processes will be the best for your present purpose.

Ferrotype.—The *Photographic Times.* Write to Mr. J. J. Atkinson, Manchester-street, Liverpool.

Romany.—Messrs. Marion and Co., Soho-square, will, doubtless, supply the ornamental glasses you require.

Erratum.—In Mr. W. H. Harrison's article last week "phosphorous acid" was by a printer's error given as "phosphorus acid."

N. D. P. Slide.—Your slide is very similar to one patented some time since, except that it is more bulky and somewhat heavier. The slide will be returned.

Turos.—If you refer to our Almanac for the current year you will find the formulæ you require. For fixing, use four ounces of hyposulphite of soda to each pint of water.

E. R.—Ten grains to each grain of gold is the proper proportion to use. It is quite a matter of taste; some prefer one and some the other. Why not give both a trial and judge for yourself?

J. B. Rogers.—Yes; your surmise is quite correct. It is a decided case of green fog, and in its very worst form too. Discard the plates for your most particular work, if not altogether. The latter will be the best course to pursue.

B.—Soak the glass in a strong solution of washing soda or American potash, and afterwards in dilute sulphuric acid. This treatment will render glass which has been employed for collodion negatives perfectly clean, so that it may be utilised for dry plates.

G. E. Williamson and Son.—Mr. Woodbury's stannotype process is patented, so that you will have to secure a license to work it. The Woodburytype patent expired some years ago; hence you can employ that, if you choose. As you are aware, it requires a somewhat expensive plant.

Printer, and One or Two other Correspondents.—To the communications received we do not reply, for the reason that the writers have not conformed to our rule by enclosing their names and addresses. In all instances, when this rule is not complied with, the queries are consigned to the waste-paper basket.

E. J. Wheeler.—If you ask our advice, we should recommend you to defer your experiments in collotype printing until we get somewhat cooler weather. Even in experienced hands this is a troublesome process to work in an elevated temperature. You may certainly expect to meet with difficulties now which will be absent when the temperature is cooler.

Wm. L. Knott.—So far as we can judge from the plan forwarded we fear you will not be able to efficiently utilise the backyard for portraiture. It is so surrounded by high walls, and is so circumscribed in space, that you will practically only get a top light. Your best way will be to build a studio over the whole of the yard, but raising it to the height of the surrounding buildings.

J. Charles.—With the lenses you possess you will have no difficulty whatever in taking breaking waves on plates of moderate rapidity. Your drop shutter is about as good as any you can possess for the purpose.

T. B. L.—Your idea is certainly very good. The india-rubber solution will, to some extent, insulate the print from the cardboard. Should the latter contain anything deleterious to the picture, a greater degree of permanence might be expected from the employment of the india-rubber mountant; but there is the unfortunate fact that the rubber itself perishes—becomes resinised—and then the print comes off the mount.

A Perplexed Printer.—The cause of the hardness of the carbon print is that the tissue is in a too-soluble condition; hence the delicate half-tints wash away. This is a very prevalent trouble during hot weather. The remedy is to bring about a more insoluble condition in the tissue. There are two or three ways of doing this. One is to retard the drying, after it is sensitised, by hanging it in a room where the atmosphere is somewhat moist. Another plan, and the better to adopt when time will permit, is to keep the tissue for several days before attempting to use it. Always keep the developing water as cool as possible.

J. Adams.—A battery of lenses, such as you suggest, would be about the best selection you could make. It is quite true that for large portraits lenses of the "rapid" series can be employed with advantage. If you procure the instrument from either of the two opticians named you may rely upon their quality. The cheap lenses by some of the foreign makers are sometimes very good, but by reason of the small price charged for them not allowing of a very careful examination and correction, they are frequently very inferior. It is much a matter of chance whether you get one of excellent or one of mediocre quality. The form of lenses about which you specially inquire must, in our opinion, be employed with somewhat small apertures, which render them slow in action.

A Risky Job.—The following extract is taken from a letter, dated Mossul, Mesopotamia, written by Dr. Brownski to Professor H. W. Vogel, Berlin:—"Some time ago a happy chance put me in possession of the holy book of the *Jezides*, erroneously called "Devil worshippers" —a book which has hitherto remained secreted and unknown, in spite of the most diligent search after it. This book contains an account of the religion and part of the history of this mystical sect, and there is only one single copy of it in existence. All that Mr. Layard (? Sir Austen Henry Layard) and other authors have written, basing their statements upon hearsay, is false. Intentionally-false statements were made to these gentlemen, and they were imprudent enough to accept them as genuine. They were unaware that the most sacred command addressed to every Jezide is to keep the secrets of his religion (even to the smallest detail) strictly from the knowledge of persons of other religions. The book having fallen into my hands in such a manner that I could only retain possession of it for a few hours, and in order not to thoroughly spoil the whole 'game" (for many persons far more innocent in this respect than I am have gone home headless from the Jeziden districts), as I happened to have a small photographic apparatus at my disposal I copied the book as quickly as possible, page by page. Fortunately all the plates (ferrotypes) turned out well, and now I am engaged in translating this Jeziden bible from the Arabic into German."

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician,
For three Weeks ending July 2, 1884.
These Observations are Taken at 8.30 a.m.

June	Barometer.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max Shade Temp.	Min. Tem.	Remarks.
12	30·32	E	65	59	106	77	56	Hazy.
13	30.33	E	64	57	98	75	55	Hazy.
14	30.26	NE	62	57	117	72	57	Cloudy.
16	30·21	W	58	51	98	64	51	Cloudy.
17	30.19	N	57	51	92	63	50	Overcast.
18	30·21	NE	56	51	—	59	50	Cloudy.
19	30·26	NE	59	55	95	73	54	Overcast.
20	30·25	E	58	55	102	71	55	Overcast.
21	30·24	E	57	53	102	70	53	Cloudy.
23	30·05	N	63	58	115	72	58	Hazy.
24	30·01	NW	60	55	113	77	52	Cloudy.
25	30·08	NNW	64	60	111	75	58	Overcast.
26	30·18	NW	66	57	116	83	56	Bright & Clear.
27	30·16	NW	68	62	113	83	59	Overcast.
28	30·23	E	69	62	116	80	57	Hazy.
30	30·11	W	62	57	116	77	54	Hazy.
July.								
1	30·19	W	65	60	116	78	57	Hazy.
2	30·20	SW	66	59	105	80	55	Hazy.

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1262. Vol. XXXI.—JULY 11, 1884.

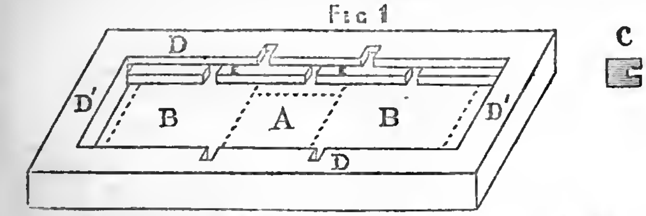
PRINTING STEREOSCOPIC TRANSPARENCIES.

As the subject of stereoscopic transparency printing has been recently revived, and a discussion raised at one of the meetings of the Photographic Club by Mr. Lawrence Baron as to the best methods and appliances to adopt, in response to a wish expressed by one or two friends we propose to describe a printing-frame we devised and had constructed some years ago which, while obviating the necessity for cutting the negatives, enabled the necessary adjustments to be made with rapidity and precision.

In its simplest form—that is to say, when required for use only with negatives of the old stereoscopic size, $6\frac{3}{4} \times 3\frac{1}{4}$—it consisted merely of a negative frame (*fig.* 1) and a sensitive plate-carrier (*fig.* 2) of peculiar construction. The former consists of a sort of tray, about three-quarters of an inch deep, with an aperture A, in the centre of what may be called the bottom B B, of the exact size the pictures are required to be—two and three-quarter to three inches square according to taste; or a shallow rebate may be sunk to receive masks of stout zinc or cardboard, so that the shape and size of the pictures may be varied to suit the subject and circumstances.

The longer sides of the frame consist of mouldings having the section shown at C (*fig.* 1), the ends being solid. On the upper sur-

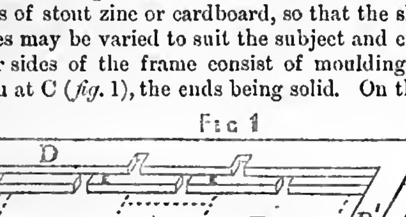
Fig 1



face of each of the sides D D two slots are cut as shown, so that when the plate-carrier is placed in the centre of the frame its projecting runners will drop into the longitudinal grooves E E, only one of which is visible in the diagram, a space of (say) one-eighth of an inch remaining between the lower surface of the plate-carrier and the bottom of the tray. In the lower floor of the groove E at each side are cut three similar slots—one in the centre, the others equidistant therefrom and corresponding with the width apart of the projecting runners of the carrier.

The carrier, which is shown in *fig.* 2, with its under side uppermost, consists of a block of perfectly flat wood half-an-inch thick, three and a-quarter inches wide, and eight and a-quarter inches

FIG. 2

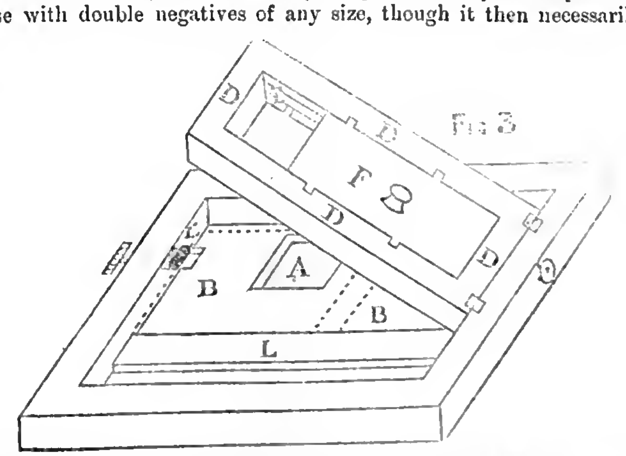


long. Across one end is glued a strip of very hard wood or of brass three-quarters of an inch broad and one-sixteenth thick, with a perfectly square edge. At the opposite end a groove H is cut, three-eighths broad, three-eighths deep, and the same distance from the extremity of the carrier. A strip of very hard wood or brass, J, an eighth of an inch thick and of such length and width that it reaches from side to side of the carrier and projects one-sixteenth of an inch beyond the surface, is kept in position by a good, strong spring or springs, as shown. The projecting runners K K K K may conveniently be made by driving into the sides of the carrier short lengths of brass rod an eighth of an inch or three-sixteenths thick, allowing a-quarter of an inch in length to project. The reverse side of the carrier has a knob by which to hold it.

Now, it will be seen that if a plate measuring $6\frac{3}{4}$ by $3\frac{1}{4}$ (the size of a stereo. slide) be pressed down upon the centre of the block it will be gripped between G and J by the spring, and so securely held. Further: if the carrier with the plate downwards be placed in the centre of the frame D D D D the runners will drop into the longitudinal groove, in which position the carrier may be freely moved to either end of the frame without the surface of the plate coming in contact with anything. But as soon as the carrier reaches the extreme end of the frame its runners on either side coincide with the two of the lower slots, and the plate and carrier drop into contact with the bottom of the tray, in which position—if the respective dimensions of the runners and the slots be properly arranged—there is no chance of abrasion of the contact surfaces by lateral motion.

To use the frame the negative is laid face upwards at one end of the tray, its position being fixed by a strip of thin brass shown by the dotted lines at either end, so that the proper portion comes opposite the aperture A; the carrier, with its sensitive plate, is placed in position and run to *the opposite* end of the frame, when the plate falls into contact with the negative, the left-hand half of the former being superposed upon the right-hand half of the latter, or *vice versa*, and while thus held in contact the first exposure is made. Now, by means of the knob, lift the carrier into the central groove, and while sliding it to the opposite end of the frame incline the latter in the contrary direction, when the relative positions of negative and plate are reversed, and the second exposure is made.

This form is, as we have said, only suited for negatives of the old standard size, but the same principle can easily be adapted for use with double negatives of any size, though it then necessarily



becomes a more complicated arrangement. *Fig.* 3 will, however, sufficiently explain the more complete frame. Here D D D D is again a frame identical in size and construction with *fig.* 1, but *minus* the bottom, which converts it into a tray. F again represents the carrier, which is in every respect similar to *fig.* 2. The tray in this case is separate and the frame attached to it by hinges; its size will depend upon the dimensions of the negatives to be used. In order to permit a three-inch square to be printed from any portion of either half of (say) an 8 × 5 negative it is necessary to provide movable guides regulated by screws, two of which are shown in L and L′, the third, corresponding with L′, being hidden by the hinged frame D D D D. The position of the negative shown by the dotted lines may be varied, by altering the positions of the guides or stops, so that the top right-hand corner or the bottom left-hand or the centre of either half of the negative may be selected.

It would be quite useless to attempt to give working dimensions without knowing the size or sizes of negatives to be employed, the distance apart of the lenses, the distance apart the images are required, and the size of the half pictures—all elements of importance. A frame for $7\frac{1}{2} \times 5$ negatives only may be made whose extreme dimensions will be $12\frac{1}{2} \times 10$, and allow every latitude. If, however, it be required for use with $6\frac{3}{4} \times 3\frac{1}{4}$ negatives as well, more elaborate adjustments would have to be made in order to accommodate the greater range required in the sliding parts. The frame for $6\frac{3}{4} \times 3\frac{1}{4}$ negatives measures about $12 \times 4\frac{3}{4}$, and can be constructed for a few shillings.

Sixteen or seventeen years ago, when stereoscopic work was more in vogue, we had several of these frames made of various sizes for ourselves and friends, and found them a very great convenience, more especially when duplicates were required from the same negative. The adjustment once made, the trouble is no greater and the time occupied longer only by a few seconds than in making a single transparency by superposition.

PERMANENCY AND THE FIXING OF PRINTS.

We now propose to complete our survey of the various causes that may have a tendency under certain conditions to interfere with the stability of a print by referring to the concluding operations of fixing and washing. The story is really a very old one. It is now about a quarter of a century since the theory and practice of fixing was thoroughly investigated, contributors to these columns taking an earnest and important share in the experimental trials and the forming of the resulting theory.

Once more we refer to the old method of toning and fixing, the adoption of which resulted in such a quick and heavy crop of faded prints in some instances, while in others left prints which to this day are in good condition. It was shown that, in many cases, the tone was produced by the aid of sulphur deposited from the decomposed hypo. within the texture of the paper, and, further, that this class of toning led to the production of prints which faded most quickly. The term "sulphur-toning" was devised for this mode of action, and, as was soon seen, it was brought about in many ways, though as these were somewhat intricate as to their chemical bearing they were not understood by non-chemical photographers, who in practice merely followed the indications of their teachers—the experimentalists of the day. They gave up, whether for better or worse, the old "toning-and-fixing" system, and universally adopted that of alkaline toning.

This great step taken, we are afraid that in a sense photographers rested upon their oars. They took some credit to themselves for adopting the process that science suggested. Some rendered themselves thoroughly familiar with its *rationale*, and others had a smattering of knowledge about it; but the greater number of workers looked upon the new system merely as a new recipe. Hence all through the chapter there has been a liability to ignore the main points upon which permanency depended, and, as numerous pictures have been brought before us which have been injured through a want of attention to these matters, it is plain that good may be done by pointing out once more where danger might be imported unawares into the processes involved in completing a silver print.

The main part of the substance removed, after toning, from a print by the "hypo." solution is chloride of silver. This is converted into thiosulphate of silver, and its chlorine goes to form chloride of sodium. Hypo.—correctly termed "thiosulphate of soda"—has the power of dissolving about half its own weight of chloride of silver, its mode of action being first to convert it into thiosulphate of silver, and then to combine with this new salt and form a double salt—thiosulphate of silver and soda—which double salt is soluble in hypo. This seems all very simple, but complex reactions are very readily caused to set in. In the first place, this thiosulphate of silver is very easily decomposed when not combined with hypo.; and, in the next, it is very liable to be formed when there is only a small quantity of "hypo." present. From this it will be gathered that one condition of success is the presence of a sufficiency of hypo. during the fixing of a print. We may here further add that when the double salt is dissolved in hypo. it may be converted into another—an insoluble—double salt when an excess of chloride of silver is presented to it.

This is, perhaps, sufficient of theory to show how we may be guided in fixing a print. If we had all the chloride of silver present in the unfixed print separated and able to be added by degrees to the fixing solution we would find that a quarter of a pound of hypo. will dissolve the contents of a great many sheets of paper. But the very fact of this not being the case is the cause of the large quantity of hypo. which, wisely, has always been recommended to be employed in fixing operations.

Seeing that the hypo. is distributed through a large bulk of liquid, while the chloride of silver lies all within a circumscribed space (the texture of the paper), it follows that unless a large excess be used the conditions will all favour the production of the insoluble salt in the paper itself—a salt which is so unstable that it begins to decompose almost at the instant of forming if there be not more hypo. present.

This, too, is the reason why it has always been recommended to keep the prints moving continually while in the fixing bath. To follow out an instance of the wrong method—that is, leaving the prints to soak without keeping them in motion—we shall see that the first action of the hypo. is to dissolve a layer of chloride from the print and take it up as a double salt. As the solution penetrates the print it contains less and less hypo. as the chloride becomes dissolved, till at last saturation is arrived at, and the action of the chloride of silver still undissolved is to cause a precipitation when it is presented to the restricted layer of liquid held between the prints. This precipitate at once begins to decompose, producing in so doing sulphuric acid and depositing sulphide of silver, the sulphuric acid being ready to decompose fresh hypo. as soon as it comes into contact with it upon the removal or stirring of the prints and the liberation of the changed liquid lying between them.

It is not our intention to enter at all into detail here. We wish broadly to explain the theory undergoing the consistently- and persistently-recommended practice of using a large excess of hypo. in the fixing of prints. Those who wish to have a full account of the original experiments and the theories drawn from them will find almost all they need in vol. vii. of The British Journal of Photography.

We must, finally, point out that in the washing of the prints there is equal risk of producing the dangerous form of silver salt unless intelligent care be taken. When the hypo. solution containing the silver salts is much diluted it is apt to decompose very quickly, especially if it contain a large proportion of silver. These are just the conditions that prevail in washing the print: that portion of fixing solution within the print will—if there be a difference, as is most probable — contain a larger proportion of silver thiosulphate than the bulk of the fixing solution, and so be more prone to decompose; hence, when the prints are placed in the washing water, unless the adherent solution be quickly removed a deposit will certainly occur, and so a want of permanency characterise the print.

We have had prints sent to us many of which were visibly stained through want of this elementary precaution; how many more, therefore, must exist where an equally bad, but at first invisible, effect has been produced! A professional photographer has informed us of a batch of his prints having been once left to a junior hand to finish the washing after fixing, and which were entirely destroyed through his want of attention at this stage. He threw the whole batch into a dish of water, left them there for half-an-hour or so, and then turned the tap on. Almost every print was stained and marked, and it was only through the stains that the way the prints had been treated was discovered. If the carelessness had not been quite so gross the prints would have been circulated bearing within them the seeds of decay, and loss of reputation would have resulted. It is not always that such lack of attention can be detected, and there is little doubt that the fading of many thousands of pictures could be traced to similar causes.

With the use of as few scientific terms as possible we have thus taken our readers over the whole field of the production of a silver print; and it is to be hoped that we may have shown the pitfalls which lie in the way in a manner that will be understood even by the tyro—our remarks, as we stated, having been intended more for the new race of photographers springing up than for the experienced hand.

CALOTYPE OR WAXED PAPER PROCESS.

An allusion to this process in our last number as still being practised by some prompts us to devote a brief space to its consideration, especially as on account of its being the earliest of all negative processes, and its long having fallen into a state of desuetude, comparatively little is known of it by those who have more recently adopted photography as a pastime or profession.

The calotype process was so named by the late Mr. Fox Talbot, its inventor, although by some of the admirers of that gentleman it was designated "Talbotype," its nomenclature afterwards receiving the additional title of the "waxed-paper process," from the circumstance of the paper upon which the negative was taken having been rendered translucent with wax previous to, instead of after, the production upon it of the negative. But notwithstanding the variety of its appellations and, what is of more importance, the variety of formulæ and routine methods of action, the process remained in principle very much the same as when it was first published by Mr. Talbot.

Described in generic form the calotype process, as originally published, included, first, the iodising of a sheet of suitable paper; secondly, the exciting of this paper shortly before using, by means of a solution of nitrate of silver, acidified by acetic acid, with a small addition of gallic acid. The developer was gallic acid, with or without the addition of aceto-nitrate of silver. When fixed and washed the paper was rendered translucent by waxing. By means of this primitive negative process, most admirable portraits, landscapes, and other scenes have been obtained; and, in breadth of effect and other art qualities, some of these early photographs have not yet been very greatly surpassed.

Photography having become a living thing in the hands of many ardent experimentalists it advanced, and, as subsequent history records, has advanced with rapidity. Mr. Talbot's system of iodising the paper was cumbrous, and, when viewed by the light of 1884, somewhat inefficient. He effected this by impregnating the surface of the paper with iodide of silver. This was done by floating the paper upon (or sponging it over with) iodide of potassium in solution, and, after drying, treating it in like manner with nitrate of silver. All the soluble salts were subsequently removed by washing, leaving the paper of a pale primrose colour. A modification of Mr. Talbot's method of iodising was introduced. It consisted in adding a solution of iodide of potassium to one of nitrate of silver, by which iodide of silver was precipitated, which after washing was dissolved in iodide of potassium. This solution was then applied to the paper, and the latter after being dried was floated upon water, by which the iodide of silver was precipitated in a finely-divided form on the paper.

Innumerable were the additions afterwards made to the salting bath; for, not content with dissolving the various ingredients in pure water, many professed to find advantages in employing rice-water and boiled whey instead. Many also were the formulæ for salting communicated to the public, and very heterogeneous were their components. They embraced iodide, bromide, fluoride, and cyanide of potassium; chloride of sodium; sugar of milk, honey, albumen, isinglass, gelatine, gum arabic, and iodine. Things had become much complicated when Mr. Frederick Townshend appeared (just thirty years and one month ago) in the *rôle* of reformer, and demonstrated how simple the process might be made. It would be futile to give here illustrative formulæ showing the progress of improvement; but we may mention one which shows the state in which the negative paper process was left near to the time when the efforts of photographers were being directed towards the attainment of a reliable dry collodion process.

Plain paper is immersed for over an hour in the following:—

Iodide of potassium	15 grains.
Bromide of potassium	5 ,,
Water	1 ounce.

To this sufficient iodine is added to render the solution of a sherry colour. When dry the iodised paper is excited by being floated for about five minutes upon a thirty-grain solution of nitrate of silver to the ounce of water, one minim of acetic acid being added for each grain of silver present. The same precaution must be taken in the formation of this bath as in that for collodion, namely, it must be saturated with iodide of silver previous to being employed. The paper is drawn over a glass rod to remove the surplus solution, and is then blotted off by means of perfectly clean bibulous paper. Paper thus prepared remains good for twelve hours; but if it have to be kept for several days it will then be necessary to float it for from half-a-minute to three minutes upon plain water to remove more of the free nitrate of silver. The longer it is floated the better will it keep, although at the expense of sensitiveness.

The exposure required in the camera was in those early times, when gallic acid was the developer, estimated not by seconds but by minutes. We here allude to the application of the calotype process to landscape photography, a slow lens being employed. With the process as practised by Talbot for portraiture, when gallic acid and aceto-nitrate of silver formed the sensitiser as well as the developer, we have obtained portraits in fifteen seconds, and street views in proportionately less time; but when the paper has been prepared for keeping several hours an exposure of a minute and a-quarter, with a lens working at $\frac{f}{8}$, was necessary.

Upon removing the exposed paper from the dark slide it is floated upon a saturated solution of gallic acid (about three grains per ounce of water), until the details are all visible, when the image will be of an unpleasant red colour, and it may then be completely immersed. After ten or fifteen minutes the image will have acquired great vigour, when a few drops of the sensitising solution may be added to the gallic acid, and the negative again immersed. It now acquires a dark colour very rapidly, and after examining the image by transmitted light, and ascertaining that it is fully developed, the negative is fixed in hyposulphite of soda. Having been afterwards washed and dried the paper is rendered translucent by being waxed. Some have performed this operation by placing the paper on a warm slab, and then applying wax to the surface, which, by melting, impregnated its texture, the surplus being afterwards removed by blotting-paper and a warm flat iron. Others have dissolved the wax in oil of turpentine and immersed the negative in this solution for a brief period.

The advantages of paper over glass for the tourist photographer do not here require mention; but in another article we shall speak of certain refinements upon the process, by which some of the more modern photographic discoveries have been pressed into the service of this the first of all negative processes. The mistake must not be made that, because of the material being paper instead of glass, good detail and sharpness cannot be secured; for, on the contrary, by care in selecting the paper and in focussing, a very sharp image may be obtained.

WHAT IS THE MOST SUITABLE COLOUR FOR A PHOTOGRAPH?

In discussing this subject we set aside all consideration of the vexed question which has been so much discussed of late—that one tint, or tone, may possibly prove of greater permanence than another in silver prints—simply confining ourselves to the subject of the most desirable colour for a photograph, regardless of the means or process by which it is produced. It is quite true that with silver printing the colours to be obtained are very limited indeed, as they are confined to tints ranging from a warm brown, through purple, to a more or less decided black. By the platinotype process both a good sepia colour and a black are obtainable. By the carbon, Woodbury, and the collotype processes any desired colour can be easily produced in the admixture of the pigments employed.

Now, does the public taste demand that all photographs—simply because they are photographs—shall be in the well-known photographic colour and have a glazed surface? It would appear so, if we can take as a criterion the fact that in the majority of cases when pictures are produced by any of the latter processes they are as close imitations of silver prints as it is possible to make them. The tint itself may vary, but the photographic colour is retained. Even in enlargements made in carbon and worked in monochrome the usual photographic tint of brown or purple is, as a rule, employed.

Prior to the advent of photography, it may be mentioned—although prints from engraved plates or wood blocks could, of course, be made in any colour—we have never seen a print produced at that period at all approaching a photographic tint. They were actually produced in almost every colour but that just mentioned, which, in the case of photographs, was, after all, not one of selection but of necessity, and certainly cannot be considered in any way artistic.

Seeing this, it not unnaturally suggests the further query—"Is the ordinary colour and surface of silver prints for ever to be considered the *acme* of perfection in photographs?" We think not, inasmuch as we have noticed during the past year or two unmistakable evidences to the contrary, and that the public taste for certain subjects will demand a variation. It was no uncommon thing, at the last exhibition of the Photographic Society of Great Britain, to overhear visitors remark, while examining pictures by the platinotype process of a sepia or black tone, or by the carbon process of a red chalk, sepia, or black, that they were excellent "because they were so very unlike a photograph." Visitors to the exhibition, for many years past, have been familiar with the charming portraits of children, printed in a red chalk or a sepia colour, by Mr. R. Faulkner and also by Mr. W. J. Byrne, and the admiration they have always commanded—more particularly from the non-photographic portion of the public and the press.

Recently we were shown some excellent cabinet-sized pictures (portraits) which were very artistic, and were also decidedly novel. These were rather large vignetted heads, printed by the carbon process, of a red chalk colour, on somewhat rough drawing-paper. They were mounted on the ordinary cards, but had, apparently, not been rolled so as to destroy the original roughness of the paper; hence they looked very much like small chalk drawings. This appearance would have been enhanced still further had the portraits, instead of being produced with a plain, flat background, been taken with one on which a few hatched lines had previously been made just about where the shoulders of the sitter came.

We have also seen some exceedingly good pictures possessing a certain amount of novelty, chiefly arising from their colour and the style of mounting. These were panel-size portraits—apparently enlargements from smaller negatives—printed in platinum and of a black colour. They were mounted on plate paper with an imitation India tint and wide margin, and had been rolled on a plate so as to give a plate-mark like that in an engraving. Of course they were framed without the ordinary orthodox mount. When completed, these pictures possessed very much the appearance of engravings, as they had—by reason of their colour and matt surface and the style of mounting and framing—lost much of their photographic character. If we mistake not, some pictures very similar to these were shown at the last exhibition—only they were in carbon and, perhaps, of a somewhat blacker colour. For years past, by the carbon process, enlargements have been made on tinted crayon papers, and finished in chalks or crayons; but generally they are made in the usual photographic colour instead of in black, which, in this case, we cannot help thinking would be an improvement.

Hitherto our remarks have chiefly been directed to portraiture, but they apply equally well to landscapes. These, if printed in sepia or black, either by the carbon or platinotype processes, and then mounted on plate paper with the usual Indian paper tint, being also "plate-marked," would prove very effective, as the matt surface of the paper, together with the colour, destroys much of the photographic appearance of the pictures.

In the foregoing remarks we have only alluded to pictures in sepia, black, and red; but of course, if the carbon process be used, any other colour might be substituted. Although, apart from the usual photographic tints, the different coloured tissues obtainable in commerce are somewhat limited, still there is little doubt that if additional colours were in demand they would readily be supplied.

The subject of this article suggested itself from the fact that photographs are now being produced, though to a limited extent, in colours other than the orthodox photographic tint, and that such pictures are apparently much appreciated by the more artistic portion of the public. Therefore, we think that an increased taste for pictures of this character may, with advantage, be cultivated by photographers in the future.

We have carefully re-read Mr. H. B. Berkeley's letter in the Parent Society's *Journal*, without discovering the slightest ground for the charge of "misrepresentation" which he makes against us in his communication this week. That Mr. Berkeley wrote in the interests of the Society, or at least intended to do so, we quite believe; and had he confined himself to the main intention without interfering with the business of journals which have nothing whatever to do with the Society nor the Society with them, all would have been well, and we, at least, should have allowed Mr. Berkeley to air his little grievances in peace. But when "in the interests of the Society" he devotes the greater part of his letter to matters over which the Society has no control—matters, too, nearly affecting the "weekly periodicals"—we felt bound to take some notice of the affair. From what we have already said we have nothing to retract, and it is scarcely worth while saying any more.

At the present time, when a choice recipe for concocting a claret-cup would be more important than the votes on the Franchise Bill, and a rumour that ice had given out would be more disastrous than a drop in consols, there is almost a feeling of satisfaction to be experienced in reading the latest account from the seat of heat. Dr. J. Hilfiker has been taking particular note of the diameter of the solar orb during the last twenty years, and he states that there is evidence of a change in the diameter of the sun according to the frequency of the spots; the more the spots the less the diameter, and *vice versa*. As we have been having a considerable number of these singular visitants of late we may expect the sun's diameter to be reduced, according to Dr. Hilfiker's theory.

Still, whatever the diameter, we have lately had an almost tropical heat, and we have heard of no diminution in the actinic power of the sun's rays having been observed in any quarter. Perhaps the new sunshine recorder, lately described by Professor H. Macleod before the Physical Society, may give us some interesting data as to the recent solar radiation.

At such periods as the present, when the sun obtains its greatest altitude and is not overcast in the middle of the day, there are few studios that do not suffer from the heat, notwithstanding all that may be done to protect them. We have seen automatic ventilators made use of, but the effect has been little proportioned to the expense. Our contemporary *La Nature* has described a new atmospheric turbine which, it appears to us, might with very little trouble be so applied as to work a fan in connection with a ventilating apparatus with some degree of real efficiency. The apparatus is the invention of M. Sanderson, and has already been in use in three separate places, where it has done admirable duty in pumping water, &c. The construction is simple, being merely two semicircular fans mounted at right angles to one another, at an angle of 45° with a shaft working horizontally. Like an ordinary windmill it will work without being set, and whatever the quarter from which the wind blows it is equally potent in a hurricane that would either stop or destroy an ordinary mill. This new motor has been termed by its inventor the "*pantanemone.*"

THE use of a convenient apparatus for regulating the temperature automatically, causing a drying chamber to remain at a constant heat and soforth, is too well known to need attention to be drawn to it. There are many pieces of apparatus for the purpose before the public, each having its own special excellence and, we may add, defects. According to the *Lancet*, however, an important advance in the mode of construction of such instruments has been made by Dr. Reichert, of the University of Philadelphia, who has designed a new thermostat, whose principle of action is essentially the same as that of the older instruments, but which is more efficient in use. The range of temperature is obtained by the employment of a graduated plunger of peculiar make, which forces the column of mercury towards or from the gas regulator, thus arranging for the presence of a greater or less degree of heat to maintain the column of mercury at this point.

THE late Sir W. Siemens, who did so much for the science of lighting, is to have an appropriate monument in Westminster Abbey in the shape of a memorial window, subscriptions to which are limited to one guinea. A very powerful committee has been formed, the Hon. Secretary being Mr. J. Forrest.

WATT'S *Dictionary of Chemistry* is almost a household word. We regret to announce that its talented author is no more. He died suddenly, on the 30th ult., of syncope of the heart. He was engaged at the time of his death in writing a new and abridged edition of his *Dictionary*, also in editing a new edition of Richardson and Watt's *Chemical Technology*, and the thirteenth edition of Fownes' well-known *Manual of Chemistry*—all of which works are of the highest value to the photographer and the chemist.

THERE is every probability that nickel and nickel-coated vessels and instruments will gradually become more general, now that Fleitmann's discovery is so popularised. In 1879 he discovered, by a process of reasoning which proved correct in practice, that the brittleness of pure nickel—which had hitherto been an insuperable obstacle to its extended use—could be got rid of in a simple manner. He considered the unworkable character of the metal (which still prevailed, though it was pure to a fractional percentage) was due to occluded carbonic oxide, and he added a small quantity of magnesium to get rid of the brittleness. The addition was perfectly successful, though even in quantities so small as one-eighth per cent. Metal so treated can be welded at a red heat with iron and steel, and the welded sheet can be rolled out without breach of continuity to a very great extent. For rolling-press rollers and beds such an arrangement should to be of the greatest value.

AN interesting paper by Dr. H. Hager appears in the columns of a foreign journal, treating of matters chemical. It is upon the *Drop Method of Chemical Analysis*, and affords hints for many useful modes of testing some of the chemicals employed in photography. The method is named from the fact that drops only of the material operated upon and the reagents employed are made use of. The list of materials required includes red and blue litmus paper and turmeric paper; extract of indigo paper, which is turned yellow by hot nitric acid and caustic alkalies, but not by ammonia; rosaniline paper, as a test for alcohol; potassium ferrocyanide paper, as a reagent for ferric salts (to which it gives a blue colouration); copper and uranium (deep brown); gold (greenish-brown); platinum (brownish-green to reddish), &c. Potassium sulphocyanide paper is turned decidedly yellow by bismuth nitrate, bluish-black by salts of copper, red by solution of gold, white by mercuric nitrate, black by mercurous nitrate, and blood-red by ferric salts. Potassium iodide paper is turned red by mercuric salts, green by mercurous salts, and yellow by solution of lead. For detecting chlorates: half-a-drachm to a drachm of the liquid is put into a small test tube along with a slip of the paper, half-a-drachm of dilute sulphuric acid added, and heat applied. If a chlorate be present the liquid turns yellow. Mercurous nitrate paper when moistened is turned black in the presence of vapour of ammonia; caustic alkalies and alkaline monocarbonates stain it greenish-brown to black; whilst the alkaline bicarbonates leave it colourless. Silver bichromate paper turns yellow with free hydrochloric acid. The author gives other tests for substances not likely to be met with in photography; but the list above given, as will be seen, is made up in the main of substances likely to be met with on the shelves of the photographer's laboratory. The method of employing the test consists in letting a drop of the liquid, or solution of a solid, fall upon a slip of the paper, and it seems to be so exceedingly simple and useful that we may expect little sets of the test papers to be prepared and offered for sale. They would be of considerable value in the photographer's dark room, if only for the occasional identification of forgotten or unlabelled chemicals.

FILMS DISSOLVING IN THE HYPO. BATH.

IT has been observed that gelatine negatives, if left in the hypo. fixing bath all night, sometimes dissolve from the glass, whilst at other times no such action takes place. This effect of solution came under my own observation for the first time quite recently under circumstances that admitted of some investigation of the phenomenon.

It happened that by an oversight two plates were left in the hypo. baths all night; and in the morning, whilst one was found to be uninjured, the other had lost the film entirely from nearly the whole of the plate, only a slimy, shapeless ridge of gelatine remaining on a small portion of what had been the negative. The plates were from the same batch—two of a dozen of a commercial make that had been obtained to see "what they were like," and then used in the ordinary course. The immediate cause of the dissolving among the film, therefore, had to be sought in the hypo. baths themselves, although it was still possible that the make of plate might have so much to do with it that those of another constitution would resist the solvent action.

On examining the hypo. baths it was noticed that the one which had not injured the negatives was almost perfectly colourless—evidently freshly mixed. The specific gravity of this solution was 1,145, and a measure of a thousand-grain capacity of the liquid was evaporated to dryness in a porcelain dish. This yielded solid matter equal to nearly one-fourth of the whole, showing that there was one part of hyposulphite of soda to about three of water.

The other bath—that which had dissolved the gelatine—was examined, so far as its specific gravity was concerned, and found to be 1,090. It was somewhat discoloured from use, but was not what would be called an old bath. I have an objection to the use of any solution that has become so weak as to require a long time for dissolving the unaltered silver or so contaminated as to stain the film. It unfortunately happened that before I could make a complete examination of the second solution it had been noticed that the vessel was not full, and some fresh, strong solution had been poured in, amounting in quantity probably to about one-third of that which the vessel already contained. It was with the hypo. bath thus altered, therefore, that I was compelled to make my experiments; but the effect of the addition that had been made would probably only diminish its characteristics without entirely removing them, and so, indeed, I found it.

The plates which had been accidentally submitted to the action of the two baths were, as has been stated, of a commercial make. The surface was more matt than in plates of my own make, and the film apparently thinner, although not wanting in opacity, and more easily scratched. These appearances led to the inference that the quantity of gelatine in proportion to the silver haloid present was small. From their rapid fixation and absence of yellow colour in the unexposed film it was probable that no iodide was present.

One of these plates and one of my own manufacture, made with a hard gelatine and containing some iodide, were marked with a diamond, so that each could be easily broken into three parts in the dark room, and were then exposed in a camera, the dark slide of which was arranged to slide so as to give three exposures on each plate, corresponding with the divisions in which the plates were to be broken apart. After development the plates were divided along the diamond marks, and one piece of each was placed in each of the baths as follows:—No. 1 bath was the fresh and strong one, which had not affected the plate in the first instance. No. 2 was the one which had dissolved away the film, but which had been somewhat modified, as described, by the addition to it of about one-third of its bulk of strong solution; and No. 3 was the No. 1 solution diluted with twice its bulk of water. The third bath was made in order to try whether the mere fact of the first bath being stronger was the cause of the immunity from solution of the film left in it, or whether there was something acquired in No. 2 which had produced the solvent action.

In a little time the commercial plate in each bath was fixed. Shortly afterwards the plate containing iodide and immersed in the strong hypo. bath was also fixed, but a considerable time elapsed before those of the same make in the two weak baths were fixed. I may mention, *en passant*, that I have often been surprised to see it recommended to use weak hypo. baths, accompanied by statements that the haloid salts of silver are as rapidly or more rapidly dissolved in them than in a stronger solution.

The plates were left in the baths all night. In the morning those in the first and third baths were found unaltered, but those in the second bath had become softened and slimy, and for some distance round the edge entirely dissolved away. No doubt the addition of fresh solution to No. 2 had so far attenuated its solvent action that it would have required longer time to dissolve the film from the whole of the plate. The fact that No. 3 had suffered no injurious action showed that the solvent power of No. 2 was not due merely to its being a more dilute solution of hypo. than No. 1, but that the property had been acquired.

As the dissolving bath No. 2 had had sufficient plates fixed in it to render it somewhat discoloured, whilst Nos. 1 and 3 had scarcely been used at all, it seemed probable that a certain quantity of ammonia had been carried into it with the developed plates, and that alkalinity might have something to do with the solvent effect upon the gelatine. To see to what extent alkalinity existed, portions measuring one thousand grains each were taken from Nos. 1 and 2. Small quantities of weak hydrochloric acid were added to each by degrees. The acid was that known as the dilute of the pharmacopœia, to one part of which nine parts of water were added. Of this weak solution the fresh bath took thirty minims before any acid reaction was visible on test paper, whilst the other required about thirty-six minims to produce a similar effect. The bath which dissolved the film was, therefore, slightly more alkaline than the other, but the difference in this respect was so very small—requiring only about one-twentieth of a grain of real hydrochloric acid in more than two ounces of solution to equalise it—that the true cause must probably be sought for elsewhere.

If time and opportunity permit I shall probably continue my experiments in the matter; but meantime, perhaps, the indications given will induce some other experimentalists to make further researches into the cause of the peculiar reaction between two of the materials—a gelatine film and a hyposulphite bath—that are now in such constant use. W. E. Debenham.

OXYHYDROGEN EXPLOSIONS.

Not being in the secrets of the manufacturers I cannot say what is the nature of the dust which is found, often very abundantly, in gas bags when, owing to accident or design, the contents of the interior are laid bare; nor am I chemist enough to be able to ascertain this from an inspection of the powder. I presume it to be steatite or French chalk, or some other form of silicate of magnesia, such as powdered talc. Now, as the former of these is represented by ($3\ Mg\ O, 4\ Si\ O_2$), and the latter by ($4\ Mg\ O, 5\ Si\ O_2$), it is not easy to conceive of inflammability as connected with such dust, either in its state of purity or after being subjected to the action of the gases in the bag.

But although *I* am not able to indicate the nature of any change in the powder after its "reposition" in a gas bag, some change appears to be induced, if one may judge of this by the very peculiar smell of the powder after a time. One thing may be assumed, namely, that if the dust be rendered inflammable it scores in favour of the safety of gas bottles as against gas bags.

I do not gather from the article by Mr. Lewis Wright, in the last issue of this Journal, to what extent he understands dust to be productive of explosions of any class; that he disbelieves in it as a cause of gas explosions he has stated. But in instituting a comparison between the United States, where it is well known that gas bottles are extensively used, and this country, where, *as yet*, bags occupy the most prominent position, he cites a witness whose testimony is against himself; for in the New World—where the go-ahead, regardless-of-consequences spirit prevails—we hear very little of explosions arising as a consequence of employing bottles, or even of explosions in themselves irrespective of cause, and this notwithstanding the fact that the lime light is used there to an extent exceeding by fiftyfold its employment in England. I have, fortunately, access to many of the class journals and newspapers of the United States, including those in which the details of gas explosions of all kinds would be recorded, and, so far as I have been able to institute a comparison, oxyhydrogen explosions might be said to be but little known there.

I have yet to learn of the first explosion that has taken place in consequence of a bottle having been used instead of a bag either here or in the United States. I have used both, and give preference to the bottle. Quite realising how unsafe it is to indulge in prophecy, I yet venture to say that in a "few short years" gas bags will be but little known unless as a reminiscence. In this I take ground similar to that of the enthusiast of a former epoch who prophesied the success of steamboats, nothwithstanding the adverse opinions pronounced against them by our own and the French Admiralty authorities, and even by Napoleon himself.

As regards dust as a source of explosion: this terrible force does not appear to be adequately appreciated. It is not yet a period of three years since the destruction took place of one of the largest and finest breweries in the world by fire, directly traceable to the explosion of dust which was being conveyed through an air-shaft, in the vicinity of which a light was burning. This caused much talk in the neighbourhood at the time, and a professor of physical science in one of the universities published a most interesting statement with respect to the length of time required for the destruction by fire of a log of wood, *as* a log, as thin boards, as shavings, and, lastly, as a fine powder suspended in the air. Some suggestive and instructive points on this subject have been given in the New York *Sun* of the 6th ult., an extract from which I may fittingly introduce here:—

"Professor Peck, the chemist, has made some experiments that demonstrate the enormous power of sawdust, various flours, starch, and grain of all kinds. In one of the experiments he took three-quarters of an ounce of starch, and, by raising it as dust in the air, ignited it in a compartment intended to represent a room. When exploded it threw a box weighing six pounds twenty feet into the air. You can judge yourself of the power of the material. Half-an-ounce of starch ignited in the same way was shown by the Professor to lift the cover of a box, and a heavy man standing on it, three inches.

"One of the most dangerous materials is the wheat dust of flour mills. When burned it goes off like a flash. One of the first movements in making flour is to rattle the wheat and pass a heavy draught at the same time over it to carry off the highly inflammable dust. Yet, despite all care, the air often becomes perfectly loaded with it. Prof. Peck has shown what flour would do by taking a box with a capacity of two cubic feet and placing it in a little flour, the light of a lamp entering through a hole in one corner and the muzzle of a bellows through the other. The cover of the box was nailed on, and a man took his place on it. The Professor then worked the bellows, and the small amount of flour within immediately filled the air in the box as dust, the *facsimile* of a dust-laden mill being produced. The flour immediately ignited from the lamp, and in a second the cover was blown off and the man lifted several inches into the air, while a blaze of fire burst out from all sides. A number of interesting experiments were performed by the same gentleman, showing that in our large mills and manufactories where dust was likely to be formed there lurked a power as dreaded as dynamite.

"Peck states that one pound of carbon and two and two-thirds of oxygen, when they combine to produce carbonic acid, will evolve heat sufficient, if applied through a perfect heat engine, to lift nearly 600 tons ten feet into the air. Then he assumes that if forty per cent. of flour is carbon, it would require two and a-half pounds to accomplish this result."

From the above extract it will be seen that dust is an agent of great potency in the production of explosions, although it has not been as yet adequately recognised as such. J. Houston.

COMMERCIAL FABRICS SUITABLE FOR DARK-ROOM ILLUMINATION.

[A communication to the Photographic Society of Great Britain.]

The paper that I have the honour to read before you tonight was intended for our last meeting; but as there was not sufficient time to do justice to the discussion on Mr. Debenham's paper upon the same subject, and to receive my contribution, it was decided to defer both until this evening.

The tone of Mr. Debenham's paper, and the warmth of some of the observations that it elicited at its close, brought to my mind some remarks made by my friend Mr. Bird, at the meeting on March 28th, and which I will venture to quote. Mr. Bird said:—"The great discrepancy between the scientific evidence and the experience of skilled observers indicates that something is wrong somewhere. May it not happen that our knowledge of the chemical effects of the spectrum is not so exact as it might be? When some observers are convinced that a light modified with yellow paper and a green glass will give the maximum of luminosity and the minimum of chemical action, it is bewildering to be assured that spectrum analysis demonstrates the contrary. Further inquiry is necessary to clear up the subject." Exactly so; further inquiry is necessary to clear up the subject. But permit me to ask is there any reason why this inquiry should not be carried on in a friendly spirit—why it is necessary that there should be any personal feeling imported into this question, or any question that may come before the Society? Is it not possible to discuss this matter without ranging ourselves into two hostile camps, the one taking ruby red as their ensign, the other orange? In my contribution to this matter I mean to be *entirely* practical. I have endeavoured to carry out the experiments, the results of which I shall lay before you, with a view to enabling you to pronounce upon certain fabrics, readily procurable, a verdict as to their suitability in all respects for the illumination of the photographer's work-room. I wish to steer entirely clear of all the subjects that excite so much feeling. Spectral analysis, coloured glasses—whether stained red, flashed, canary, green—are all out of my province. The materials I shall recommend are easily procurable, easily adaptable, and in my experience, as a commercial dry-plate maker and user, answer the purpose most thoroughly.

But, first of all, great stress has been laid upon the hurtful effect of red light upon the eyes; but it seems to me as if the persons who urge this argument imagine that those who make and those who use dry plates did nothing but stare at their red light; but in all well-arranged works the eyes of the workers are not directed to the light, but to the work they have to do. The light, whatever it may be, should be arranged to illuminate the work, and shielded from the eyes. When you read a book or write a letter your eyes are directed to your book or paper, not to the light, and the working of dry plates is, or ought to be, no exception to this rule.

As to the real cause of the evil Mr. Bird, I think, hit the matter exactly when he said:—"There can be no doubt that the sudden transition from dark to light is extremely trying to the eyes." If we consider for a moment the anatomy of the eye, we shall soon see how this is. The iris is the thin membranous coating, in the centre of which is seen the pupil of the eye. This pupil varies in size according to the action of the muscular fibres of the iris admitting more or less light into the interior of the eyeball, and the diameter of the pupil is so varied from about $\frac{1}{3}$rd to $\frac{1}{20}$th of an inch. Now these muscular fibres, known as ciliary muscles, are brought into play by the amount of light presented to the eye; the stronger the light the more they contract the pupil, and the weaker the light the greater is the dilation of the pupil. But these muscles come into play comparatively slowly. If you go from bright sunlight into an obscured apartment you can at first see but little; in a short space of time the muscles effect the dilation of the pupil, and you are enabled to see more or less perfectly. On the contrary, you go from an obscured chamber to a brilliant sunlight and you are pained and dazzled by the glare of light; but in a short time the ciliary muscles have succeeded in contracting the pupil of the eye, and, allowing no more light to enter than is requisite, vision becomes normal.

But here comes the moral of the story. The ciliary muscles act *slowly*, and *sudden* transitions from obscurity to bright light are hurtful; the sudden access of light strains the muscles in the effort to rapidly close the pupil. The remedy, of course, is to avoid sudden transitions—if necessary, to wear a veil, or enclose the eyes in protectors of gauze wire and coloured glass of the proper tint when leaving the dark-room.

More than a year ago I read a paper before this Society upon *Photography in Relation to Colour*. It will probably be within the recollection of those who heard that paper, and of those who afterwards read it, as it appeared in the *Journal* of the Society, that of all the coloured bands I exhibited on the screen—which I have again placed before you—the yellow gave a greater sensation of brilliancy to the eye, while its photographic effect upon a bromo-iodised gelatine plate was much less than any of the other colours. This fact, to my mind, showed the direction in which experiment should be made; for, other things being equal, there could be no doubt that the red light then so common for laboratory illumination was *per se* more trying to the eyes than a yellow light. The next step was to discover material easily obtainable, which could be purchased commercially, either of the right tint or capable of being made of the most suitable tint. After some search I have found a fabric called "bookbinders' cloth"—no doubt procurable in many places. My samples were procured at Messrs. Berry and Roberts's, 21, Bride-street, near Ludgate Circus. This fabric, in combination with a yellow paper, procurable wholesale of Messrs. Spalding and Hodge, Drury-lane, and retail at many dealers in photographic goods, has given in my hands a diaphanous screen which, whilst having quite sufficient illuminating power, is absolutely innocuous to the most sensitive plate.

To elucidate the question as to the best colour I fitted up the lantern which I now place before you. You will observe that it is not unlike a magic lantern. It contains a paraffine lamp, and is opaque on three sides; it has a double-bent chimney to prevent the passage of white light and to afford ventilation. The fourth side carries two glasses, connected by a hinge of cloth, and so arranged that pieces of the material to be tested can be readily placed between them. When this apparatus is used the lamp is lighted, the colour or combination to be tested placed between the glasses, and the sensitive plate exposed at a distance of eighteen inches from the screen, through which the light from the lamp must pass to reach the plate.

Before going further permit me to call your attention to a chart of colours and combinations, with their symbols. The symbols have been written on pieces of clear glass the size of the sensitive plates, in bold characters, with opaque varnish. It is evident that the portion of a sensitive plate underneath the characters will have been shielded by them from the light, whilst all the rest of the plate will have been exposed to its full power. Thus, we shall find the characters should come out clear, even though the rest of the plate has been fogged by the action of the coloured light.

THE CHART.

Colours and combinations.	Symbols.
Ruby fabric	R. F.
Orange ,, ...	O. F.
Yellow ,, ...	Y. F.
Ruby and yellow fabric	R. Y: F.
Orange and yellow ,, ...	O. Y. F.
Ruby and orange ,, ...	R. O. F.
Yellow fabric treated with aurine	Au. Y. F.
White paper ,, ...	Au. P.
The above two in combination	Au. Y. F. and Au. P.
Ditto, but with two sheets of the paper ..	Au. Y. F. and Au. P_2.

I made also many experiments with green fabrics of various shades, but I found a tremendous loss of light without the slightest corresponding advantage; and, as I have no wish to overload my paper with useless material, I have thought it best to omit all reference to them, and only to bring before you those experiments which tend to practical usefulness.

I must now ask to have the light lowered, that I may pass before the paraffine lamp in my lantern the various colours and combinations that I have to bring before you.

I place between the glasses with which my lantern is furnished a single piece of the ruby fabric, and also exhibit the sensitive dry plate that has been exposed for five minutes to the light passing through this ruby fabric at a distance of eighteen inches from the coloured screen. Upon the sensitive plate was imposed a piece of clear glass bearing the letter "*R*" in thick opaque pigments. The portion of the plate under the letter has consequently been shielded from the light, whilst the rest of the plate has had the light full upon it for the five minutes. All the plates I shall show you have been fully developed for four minutes with a maximum dose of alkali.

You will see that the *R* comes out clear upon a decidedly dense ground, showing that one thickness of ruby lets through a great deal of actinic light. I now place a piece of the orange fabric in the lantern, and show you the result. You will notice that the orange has been even less efficient than the ruby.

Now we pass on to the yellow fabric. You will notice how much brighter the light appears—that is, there is much greater illuminating power; yet the action upon the sensitive plate is actually *less* than with either the orange or ruby.

We will now put into the lantern combinations of these colours. We will take, first, ruby and orange. The result is still a considerable veiling of the plate. Yellow and orange give less veil than ruby and orange. Ruby and yellow give less veil than either of the other two—due, no doubt, to the protective power of the yellow.

It being quite clear that yellow gives more illumination, and has at anyrate as great a protective influence on the plate as either red or orange, I decided upon adopting yellow as my standard colour; and my experiments were then directed to finding materials most suitable for a coloured screen—whether fabric or paper, or a combination of the two.

I took some thin, close-texture white paper, and coated it on both sides with a solution of aurine in varnish—dry-plate negative varnish one ounce, aurine one drachm. This had the effect of making the paper both tough and transparent. I also coated the yellow fabric with the same solution, and the results I will now place before you.

The first is a single thickness of aurined paper. This shows the veil considerably. I now put in a piece of the yellow fabric treated with aurine. The veil is still there in a very slight degree—much less than with the yellow fabric *minus* the aurine—the illuminating power being about the same. On placing the aurine paper and fabric together we get a screen that gives a good illumination and affects the plate very little. As a matter of practical experience this screen is perfectly safe either for the making or the development of sensitive plates.

I now place in the lantern one piece of yellow fabric and two pieces of aurined paper. This gives a fair amount of light, and its effect upon the sensitive plate is absolutely *nil;* no trace of the lettering can be made out. I consider this last combination absolutely perfect, either for daylight or artificial light, and should have no fear about working in a room lighted by a window of any size if covered by these materials.

As reference has been made to the *greens*, I tried them both as fabrics and coated glasses, and found them eminently unsatisfactory. Whenever a green can be got to have but little influence on the plate it is always terribly low in illuminating power. I have brought a few of my experiments to show you, as the results were at anyrate unexpected by me.

I have here a dark-green fabric, one thickness. It allows very few illuminating rays to pass, yet its action upon the plate is very great. The next is a light green—plenty of illumination, and the action upon the plate actually less than with the dark green. Dark green in combination with orange is better, but a lot of actinic light still passes. Dark green with yellow is a slight improvement upon the former. Light green and orange is actually better than dark green and orange.

I think it is clear that of the three colours experimented upon—yellow, red, and orange—yellow has most illuminating power, combined with the least actinic effort upon the plate. I find, for practical purposes, that one thickness of yellow fabric with one piece of paper treated with aurine to be absolutely perfect, to give a light comparatively pleasant to the eye, and to be perfectly innocuous to the most sensitive plate. For daylight I would advise one thickness of yellow fabric with two thicknesses of aurine paper to form the covering for a window of almost any size, with absolute security.

A most practical and convenient way of arranging these materials for the window of a photographic laboratory I find to be as follows:—Have an inner frame made to the window, let the lower third have another frame, which can be opened to admit white light when necessary; cover this third with one thickness of yellow fabric and two thicknesses of aurine paper. Let the middle portion have one thickness of each; let the top portion have one thickness of fabric. Now, have a rolling-blind, made of American cloth, fitted to the top of the frame. In taking the plates from the packet, placing in the dark slide, and commencing the development, use only the light of the lower third. When the development is well started the blind may be drawn up two-thirds of the way, and when the development is completed the blind may be drawn up entirely, and a flood of useful non-actinic light will pervade the apartment.

In some such way as this the working of dry plates will be found as easy and as pleasant as our old friend collodion. By increasing the quantity of light gradually, the strain on the ciliary muscles of the eye will be reduced to a minimum, and we shall have fewer complaints of damage to the eyesight. J. R. SAWYER.

ON LANDSCAPE PHOTOGRAPHY

[A communication to the Derby Photographic Society.]

THE love of Nature is more or less an inborn feeling belonging to all capable of development and cultivation. It is this feeling which calls forth the Isaak Waltons of our day, from the busy haunts of men, to wander in deep tree-shaded dells where the music of trout-haunted streams charms the ear, or along the margin of rivers, loitering through level meadows whose quiet breadth and beauty delight the eye. Thus the angler gets much of his pleasure from being brought face to face with Nature in her ever-varying beauty.

It is not less so with the pursuit of the landscape photographer in his search after the "beauty-spots" of any locality where he may chance to be wandering; for surely no other calling—or amusement only, it may be—could bring him into such intimate communion with Nature, or afford him such ample opportunities for educating himself into a higher appreciation of the beauty by which he is surrounded. I may carry out the simile of the fisherman and the photographer further in their prospective and retrospective enjoyments; for much of their pleasure lies in anticipation, as it also does in looking back at their journeyings. And as the fisherman recals his piscatorial victories in this and that stream, and the many instances connected therewith, so does the photographer, in an intensified degree, as he turns over the products of his past labours and looks with loving eye on his past achievements with the camera. Every picture he has taken has some tale to tell; and I know of no more pleasurable feelings, after long years have passed away, than those caused by the inspection of a book of old prints taken by one's self. It recals the past more vividly than aught else, and a thousand forgotten events start up in the memory, proving the exposed plate was not the only thing in which an impression had been made.

The advent of gelatine plates has placed in our hands a new power, and brought into the field a host of amateurs who would never otherwise have entered our ranks. When we look back at the toil and labour of a quarter of a century ago—the cleaning of glass, the careful packing of chemicals, baths and dishes, the difficulty of transporting them from place to place, the carrying of water, the smell of chemicals, and the slopping in the stuffy tent—one cannot wonder, now that so many difficulties have been cleared away, at the great accession to our numbers. Even in those days—all difficulties overcome—how delightful it was to carry home the treasured results of a day's labour! Collodio-albumen dry plates—all useful in their day and generation, and slow as they were (fancy standing in a view from three to ten minutes), each had some advantages over the wet ones, for they could be carried about in places where it was hopeless to get your travelling tent.

My last love was the wet plate. It was little trouble to prepare, kept well, and was slow and sure. Slowness was its only fault, and I "stuck to my beer" till only two years ago, for I never had a better or more trustworthy friend.

Of course there were many things we could never hope to get with these slow, old plates, or even with the wet ones. Now we can attempt almost everything with gelatine—from the quietest scene to the restless sea-wave, the rushing train or the rapid movement of a galloping horse, but are constantly reminded that the greater the speed the greater the risk. I have found it so, for I have spoilt more plates during the last two years, *since I gave up beer*, than during the whole of my previous experience.

But I must tell you this is partly owing to trying so many different makers, including some of my own. Let me advise you not to waste time in making plates, but find the one you like best. Let it be as slow as you can get it, and stick to it. Even then you will have failures from the faults of others, through uneven coating, &c. Never mind; if you want to make pictures it leaves you perfectly free to give your whole attention and time to the artistic part of the work. It comes cheaper, and, most likely, better in the end.

We take it, then, that no other occupation gives more advantages to its followers in the study and knowledge of Nature than landscape photography—not even that of the artist; and, though we have not the use and charm of colour, nor the same power of adaptation and selection as our brother of the brush, yet much can be done by the patient and painstaking photographer who bides his time and watches for the best effect before he secures his picture. Like the fisherman who baits his hook with that which is most likely to take his fish, the photographer baits his camera with the best plate he can procure. Both, then, must wait patiently for the proper time to secure their prize.

And now, perhaps, I may offer a few words of advice about this "proper time," and any other matters connected with outdoor work which I may think of as being useful to beginners; for it is to such only that I can hope to make this paper useful. Let us suppose, then, that you are fully equipped with a trustworthy camera and dark slides, a lens or two of different lengths of focus, and that you are possessed of plenty of pluck and patience to bear up against adverse conditions, disappointments, and failures. You have tried your plates and know pretty well how long such and such a lens, with its smallest stop, takes to secure an ordinary well-lighted subject. You drop from the train at some little country station and are eager to begin work. Don't hurry. Wait till you see something really worth taking, and then see that the light comes in the right direction to give your picture the best effect. A cross or side light is generally the best, throwing shadows and bringing out the subject in relief. Never take a view with the sun shining plump behind you, for the result will surely be flat and uninteresting; there will be no contrasting light and shadows to give the charm so essential to a photograph, which has no colour to hide its shortcomings.

In the early days of photography the marvellous amount of detail given by camera work covered all other deficiencies. Its products were looked upon as mechanical miracles which had no connection whatever with the world of art. It is not so now; and he who would excel in his work would do well to study the methods by which our best painters have produced their best effects. A spotless and untouched negative was once the photographer's pride and boast; and no doubt it tended in its day to the production of clean and good mechanical work. Now science and art go hand-in-hand, and few, I presume, will be content with such results as even satisfied the photographer and his friend. Hard representations they were, like soot and whitewash, with great white spaces for the sky—no clouds, no production of light and shade, such as I am thankful to say is now required at our hands. Vertical lines were over everything, but perpendicular to the base of the picture; and sometimes they were bowed not a little, so that a square tower assumed the shape of a barrel.

But all these things are defects of the past, and can be so; and the photographer now rejoices in the possession of such improved lenses and such good cameras that he can use his magic plates—improved, perhaps, more than anything else—to the best advantage, and has little to think about but the artistic part of his work. Let us turn to another phase of the subject. Minute finish in a painting and mere detail in a photograph do not make a picture. Something more is looked for. Elaborate finish in a painting is often a matter of patient, misspent labour rather than the outcome of observant knowledge and brains.

In a photograph the finish *is* there, whether you will it or not—every pebble, every leaf, every twig, and every blade of grass. But to make your photograph a work of art (I use this expression advisedly; for, if you put art into your work, what else is it, whether you use colours or chemicals?), you must see first that your subject composes well—that is, that the principal lines balance each other, and that the distribution of light and shade in masses is harmonious and complete. "How is this to be done?" you say; "we cannot move trees or buildings, neither can we turn on the sunshine in any direction we may wish." No; but the camera may be moved till the very best standpoint is got, the composition may be helped by the introduction of figures and appropriate clouds, and, as for the light and shade, there is no other way than taking the view at the proper time.

It has often been recommended to give up a day to the study and selection of your subject before taking out your camera; and if this were done more frequently we should, no doubt, get better work. The two great points, then, to aim at in your picture are the composition of its main lines or features and its clearness or proper disposition of light and shade. Birket Foster's *Pictures of English Scenery* combine finish with breadth as far as it is possible to go, and come nearer, perhaps, to the work arrived at by the photographer than the production of any other artist. I would recommend this to your notice. Some artists, indeed, give you much finer effect, with great breadth in their treatment. Study all you can, and fuller knowledge will gradually dawn upon you as to what really makes a picture. You will begin to see the *modus operandi* of the painter, and it will be your pleasure to follow him, however imperfectly and humbly.

We need not have any false shame in owning such help as we may thus get, for the assistance we receive is reciprocal. Sometimes there is more art in a really good photographic picture than painters are willing to acknowledge. No class of men are more indebted to the use and beautiful products of photographers than are artists; they make frequent use and get much valuable help and knowledge from the works they often pretend to despise.

The next piece of advice I have to offer is to recommend the use of a note-book wherein to enter every plate you expose—the date, title of subject, time of day, and the kind of light, together with the limit of lens and stop, amount of exposure, and any other remarks you may deem worth recording for future guidance. In the same book, upon developing, note the result. You will find this a valuable book of reference, where you may refresh your memory when doing similar work, and so save many a blunder. New beginners are often surprised and not a little perplexed, when developing a batch of plates, to find one with an exposure of one or two seconds, perhaps, thoroughly exposed, while another exposed three times as long is only half done—all because of the greater difference, not at first appreciated, in the amount and quality of the light. Compare an open, sunlit landscape, contiguous to no very near dark object, with that of a wood scene where the little light one obtains comes filtered through green lenses, and where dark robes of trees come within a few yards of the lenses.

Compare also the taking of the exterior of a church with the interior. In both these cases the difference in the amount of light you are working with is enormous. A ream of such extreme experiences in your note-book is most valuable. A while ago I recommended the use of the slowest gelatine plate you can get because I think they are capable of producing the most uniformly good work, and are more manageable in development; neither is there the same danger of getting them fogged if you use a bag to change them in, as I sometimes do.

Speaking of a changing-bag: I may say you will find this a very useful article; for, besides its first use, it serves as a large focussing-cloth and a protection from rain. But take an umbrella with you on your journeys by all means. It packs easily with the legs of your camera, can be tied to them when not wanted, and will often be found useful to shade the lens or yourself from the sun. Many a time in taking buildings, or, may be, a railway bridge in some exposed situation, an umbrella has been a good friend in warding off the wind and preventing vibration or the overturning even of the camera.

Take also with you on every journey a piece of string. No photographer should ever stir from home without it. I once had the shutter of a 15 × 12 dark slide blown back, snapped off, and carried twenty yards away while stooping for a stone to weight it down, because I had forgotten my string. These are apparently small and trivial matters, but I have recorded a case in *Camera Catastrophes*, published in one of the almanacs, where a piece of string saved me from the loss of many pounds.

I have only lightly touched on a few points relating chiefly to the artistic side of photography. The subject is a wide one and cannot be compassed within the limits of a single paper. Mr. H. P. Robinson has recently published a clever little book, called *Picture-making by Photography*, where you may find many valuable instructions—more particularly, perhaps, as to grouping figures in landscapes, which will lead you much further on in the path I have pointed out.

RICHARD KEENE.

MR. DEBENHAM ON "THE ILLUMINATION OF THE DARK ROOM."

[A communication to the Photographic Society of Great Britain.]

At the last meeting of this Society, when Mr. Debenham read his paper on *The Illumination of the Dark Room*, I brought up the result of a few experiments in connection with this discussion, but the lateness of the hour prevented me bringing them forward. I wish to do so now, and am desirous, at the same time, of drawing attention to a few points in Mr. Debenham's communication.

Here is the result of an experiment to which I referred in the discussion on Captain Abney's paper. A negative is formed of one and two thicknesses of orange paper and canary medium placed side by side. The common orange paper lets through, it will be seen, much more light than the canary medium. Here is a transparency taken by contact, the source of illumination being an ordinary paraffine candle at a distance of twelve inches. At a first glance the orange paper seems to have the best of it, but it will be found on closer inspection that the inequalities in its texture brings it down to about the same level as the canary medium. With two thicknesses the canary medium has a slight advantage in protective power; but the superiority of the orange paper in the illuminating power of the light transmitted is most marked. I show here a similar experiment with canary medium, orange paper, and the yellow paper which Mr. Debenham uses in his lamp. The latter is a thin paper of very uneven texture, but it is a decided improvement on canary medium. Three thicknesses transmit as much illuminating power as two thicknesses of orange paper, the two thicknesses of orange paper being the safer medium, though only slightly so. The weak point, however, in all papers and fabrics is that so much of their safety is due to *general* absorption.

Here is a comparison of orange paper with three coloured glasses. Holes were cut in a sheet of orange paper, a little smaller than the pieces of glass, but corresponding in shape. The paper was then placed on a gelatine plate, with the coloured glasses covering the holes. The edges of the plate were then protected with black velvet placed loosely round, and the whole presented square to a fish-tail gas flame at a distance of four feet. Where the plate was only protected by orange paper (which has already been shown to be about equal in protective power to canary medium, by gas or candle light) the light has had a considerable effect. A slight effect has been produced on the part protected by stained red glass. The second glass—an orange glass, sometimes called "stained red"—shows protective power very little superior to that of the orange paper. The third glass is a piece of very dense ruby, equal in tint to about *three* thicknesses of the ordinary ruby glass. The exposure was not sufficiently prolonged to produce any appreciable effect through it, but its safety is purchased at the expense of illuminating power.

I have here a piece of the stained red glass used in this experiment. A portion of the surface at each end had been removed, leaving the centre untouched.

Here is a plate which was exposed beneath it. The part protected by the central portion of the glass remains untouched with an exposure sufficient to impress the two ends. This slip of glass forms part of a large piece I obtained from a glass merchant at Kensington, and it is similar to the stained red glass used by Captain Abney, which was labelled "Chance's stained red." In his paper of March last, Captain Abney makes use of the expression—"I do not mean orange or flashed silver glass, which is often spoken of as stained red." Before making any experiments, therefore, Mr. Debenham should have endeavoured to obtain the precise glass which Captain Abney used. Instead of doing so, he obtained a glass which he himself describes as a silver flashed glass. In a communication to the Society in February, 1883, Captain Abney describes this silver flashed glass as unsafe, inasmuch as it lets through some ultra-violet rays. The reason why Mr. Debenhan found cathedral green a more protective supplement to it than cobalt glass is therefore apparent. Cobalt glass lets these ultra-violet rays pass through, and cathedral green cuts them off. I may here mention that the rays which produce the greatest effect on bromide of silver are generally recognised to be in the dark blue, not in the violet and ultra-violet, as Mr. Debenham states in his communication. In the experiment by which Mr. Debenham endeavoured to show the inferiority of stained red glass to canary medium, had he used the glass recommended by Captain Abney he would have obtained some such result as I now pass round. Here stained red shows itself superior to orange paper, orange paper to canary medium, canary medium to orange glass, whilst the thinner flashed silver appears very bad indeed. This was taken by lamplight, and is a fairer test than that given by Mr. Debenham; for photographers do not use a light so rich in rays of high refrangibility as that emitted by burning magnesium. But even when so actinic a light as that given by magnesium ribbon is used, the stained red holds its own, and the others appear in the same order. As might be expected, a much stronger impression has been produced through the orange glass on account of the richness of the light in ultra-violet rays.

One word in reference to green glass. I have seen no green glass that does not let any blue light through, and photographers will do well to follow Mr. Debenham's advice to take "obvious precautions" when using a lamp—part of the light from which comes through green glass, unsupplemented with any other colour-absorbing medium. In Mr. Debenham's arrangement for using two lanterns—one glazed with orange-red, and the other with green—the approximation to white light is produced not by the mixture of red and green rays only, but by a mixture of red, orange, yellow, green, and, in a lesser degree, blue rays. Such a mixture of coloured rays is not unlike that which passes through canary medium, excepting that it contains a larger proportion of blue rays, and is therefore less safe, and at the same time whiter.

I beg, finally, to refer to a previous discussion in this room, when Mr. Debenham corrected me for making use of the expression "cathedral green." I have since found that that expression is in common use amongst glass merchants, one of whom showed me a transparent glass which he called "cathedral white." As I see such glasses are quoted in Chance's list as "cathedral tints," *not* "tinted cathedral glass," I consider that myself and others that have spoken of "cathedral green" were perfectly justified in using the expression.

C. RAY WOODS.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

The Exhibition of this Society, for 1884, will be held in the Gallery of the Royal Society of Painters in Water Colours, 5A, Pall Mall East, London, S.W. It will be inaugurated by a *conversazione*, open to members and their friends, at 8 p.m., on Saturday evening, the 4th of October. The Exhibition will remain open daily (Sundays excepted), from Monday, 6th of October, until Thursday, 13th of November. All packing-cases must be sent (carriage paid), addressed to the "Photographic Society of Great Britain," care of Mr. James Bourlet, 17, Nassau-street, Middlesex Hospital, London. They may be sent *before*, but must arrive *not later* than Thursday, September 25th. No packing-cases can be received at the Gallery. Pictures by hand will be received at the Gallery, 5A, Pall Mall East, on Thursday, September 25th, until 9 p.m.

Photographic transparencies will be shown with the Society's optical lantern on Monday evenings during the Exhibition. Slides (which must not exceed 3¼ inches in height) must be sent in either on or before Thursday, September 25th (to come with other exhibits before the judges of awards), and will only be eligible for award when both the negatives and slides are the work of the exhibitor. Each exhibitor must send a letter of advice containing a description of each picture, as also a statement of process and any further detail, to be inserted in the catalogue (and it is suggested that when the work shown is taken by a special process, prepared and made by the exhibitor, information as to particulars should be communicated), addressed to the "Hon. Secretary," Photographic Society of Great Britain, 5A, Pall Mall East, London, S.W.

By Order of the Council.—The rules and regulations respecting the Exhibition are to be strictly adhered to, therefore no picture will be received after nine o'clock p.m., on Thursday, September 25th.

Medals will be placed at the disposal of the judges for artistic, scientific, and technical excellence, and the judges are instructed to reserve three medals for portrait or figure subjects, and one for lantern transparencies (if they find them worthy of awards).

The judges will consist of the following gentlemen:—The President of the Society—James Glaisher, F.R.S., F.R.A.S., &c.; three members of the Council—William Bedford, William F. Donkin, M.A., F.C.S., F.I.C., William England; three members of the Society—John E. Mayall, F.C.S., F.R.M.S., William Mayland, Andrew Pringle.

Any further information respecting the Exhibition and *lantern slides* can be obtained from the Assistant Secretary, Mr. Edwin Cocking, 57, Queen's-road, Peckham, S.E.

ROYAL CORNWALL POLYTECHNIC SOCIETY.

The fifty-first annual report of this Society is before us, and contains the usual mass of technical information in the shape of judges' reports on the exhibits in the different departments at the last exhibition.

The exhibition of the current year will be opened at the Polytechnic Hall, Falmouth, on Tuesday, August 12th, and all pictures for exhibition must be delivered at the Hall not later than Tuesday, August 5th. The following is the list of prizes offered:—

Professional Photographers.—Medals are offered by the Society for meritorious productions in the following subjects:—1, Landscapes; 2, Portraits; 3, Composition Pictures; 4, Instantaneous Pictures; 5, Interiors; 6, Transparencies for Lantern or Window Decoration; 7, Pictures by Improved Processes; 8, Enlargements. All enlargements for competition must be the work of the exhibitor.

Amateurs.—Medals are offered for meritorious productions in this department.

Photographic Appliances.—Medals are offered for improved apparatus and appliances, including magic lantern apparatus, &c. All exhibits in this department must be accompanied by a written explanation of their specialities.

Further particulars may, as usual, be obtained from Mr. William Brooks, Laurel Villa, Wray Park, Reigate.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 9,792.—"Propelling and Repelling and Self-Centering of Photo-Transparencies and Views." R. R. Beard.—*Dated July* 5, 1884.

No. 9,899.—"Photograph Stand." (Complete specification.) L. A. Groth; communicated by T. Münch.—*Dated July* 8, 1884.

No. 9,914.—"Vignetting Apparatus for Photographic Printing-Frames." E. D. Adcock.—*Dated July* 8, 1884.

PATENT SEALED, July 1, 1884.

No. 5,353.—"Improvements in Photographic Exchange Boxes, with Sleeve for Preventing the Penetration of Light to the Plates." Heinrich Kayser, Ph.D., Berlin.—*Dated March* 24, 1884.

Putting Designs Upon Glass, &c.

Specification by William Henry Warren, Artist, 5, Suffolk-place, Pall Mall, London.

My invention relates to a method of repeating or duplicating designs upon glass or other material, whereby I am enabled to make exact copies at comparatively small cost.

I take a design etched upon the flat surface of glass in the ordinary way with acid, the etched portions being filled up (say) with lampblack ground in light furniture varnish to a thin paste, in the proportion of about one-third of lampblack to two-thirds of the varnish; or I may use any suitable colouring material for filling up; or I take a design in open work upon a flat surface of any material through parts of which the light cannot penetrate; or I take a plate of glass upon which a design is simply traced in any colour.

This design, hereinafter termed the original, I place against a plate of glass preferably white; but in some cases I use coloured plates, or against any other flat surface previously coated with a preparation such as that hereinafter described, and I expose them to light during (say) about two hours, taking care to place the plates at such an angle that the strongest light obtainable is thrown upon them. I prefer exposing the plain side of the original to the light.

I find that ordinary daylight will give me the desired result; but electric or any suitable artificial light may be used.

After being thus exposed I remove the original and immediately place the plate of glass or other material, hereinafter termed the duplicate, in a darkened room, where it may be kept until required for further operations.

When the duplicate prepared as above described has remained sufficiently long in the darkened room (I have found half-an-hour suffice in most cases, but this will be varied as experience may suggest), I remove it and brush over lightly with turpentine, benzine, or kerosine or coal oil, together or combined, or any equivalent which will remove such portions of the coating with which this duplicate was prepared as have not been acted upon by the light; while the parts which have been exposed to the light remaining hard will not be removed by this brushing, but will form a duplicate design or copy.

I then wash the duplicate thoroughly clean with soapy water, dry it with fine sawdust, and dust it lightly with a feather duster.

Any indentations or slight recesses which have been formed in the duplicate by this brushing, or otherwise, I now fill up with ordinary asphaltum or tracing colour, as is well known to embossers upon glass.

The design being now duplicated upon the glass with even greater exactness than if it had been traced by hand in the ordinary way, but in a comparatively very short time and at immeasurably less cost, it may be simply painted, gilt, silvered, or otherwise prepared; or it may be embossed by etching with acid in the ordinary manner.

That is to say, I build around the duplicate a wall of wax, or I simply coat the back of this plate or sheet with wax, and place in a tank containing an acid—say fluoric acid—of the strength usually employed by embossers in sufficient quantity to cover it sufficiently to permit the acid to eat clean into the plate or sheet to the depth desired. I then pour the acid off and wash clean in cold water, and the plate or sheet is ready for placing in a window sash or for any other application.

I would here observe that in preparing an original design upon ordinary sheet glass I prefer to trace upon what is known as the round or convex side of the sheet; also that I preferably coat the convex side of the sheet on to which I am going to repeat the design with my novel preparation, so that there may be no space between the sheets when placed against each other into which light might penetrate. Where plate glass is used it is obvious that either surface may be employed.

It will be understood that by my process I am enabled to repeat the design any number of times, taking it either from the original traced design or from the copy already produced.

In some cases I take a design, not etched but simply traced in colour upon the glass, and duplicate it by the same method; or I take any open-work pattern—say a piece of lace—and copy it upon glass or other material by coating this glass or other material with a preparation or composition such as is hereinafter described, and by exposing the two together to light and operating as above described.

The novel preparation, which I find may be advantageously used for coating the plate upon which the duplicate design is to be produced before exposing it to the light, hereinafter called Mixture III., I compose in the following manner:—

I take, firstly, asphaltum (I have found what is known as dry Egyptian asphaltum to answer best), say twenty pounds in weight, and place it in any suitable cooking vessel—preferably heated by steam. I then mix it with turpentine until it forms a thick paste, and boil it for about five hours at a moderate heat. I then remove the vessel and allow the mixture to cool sufficiently to permit me to thin it down with turpentine to the consistency of ordinary paint, and, finally, I strain it through a fine sieve into a clean can or receptacle.

I then take (say) two pounds of dry pulverised bichromate of potash and about a-quarter of a pound of tartaric acid, grind the two together fine in spirits of turpentine, and put this into a can, bottle, or other vessel, which I close as hermetically as I conveniently can and set aside in a dark place until I require a portion of it.

I then prepare the following mixtures:—

Mixture No. I.

Alcohol	1 quart.
Tartaric acid	1½ pound.
Crude bichromate of potash	½ ounce.

The whole to be well shaken together.

Mixture No. II.

Alcohol	1 quart.
Tartaric acid	¾ pound.
Mixture No. I.	⅔ gill.

The whole to be well shaken together.

Mixture No. III.

Varnish, such as light furniture varnish	⅛ pint.
Asphaltum, prepared as above described	2/8 ,,
Dry bichromate of potash, previously ground fine in turpentine to form a paste as above described	1 gill.
Lampblack, dissolved in one ounce of the mixture No. II.	1 tablespoonful.

This mixture No. III., having been well stirred and thoroughly combined, should be covered up and placed away in a dark room for about five hours to permit it to settle. The liquid may then be poured into another vessel and is now ready for application with a brush upon the plate upon which the design is to be duplicated as hereinbefore described.

The relative proportions above given are not absolute, but such as I have found to answer well in practice, and, as is obvious, the mixtures and their ingredients may be prepared in any quantity required. Again: for some of the ingredients equivalents may be employed, but those specified will be found successful in practice.

All my preparations should be kept in the dark, and protected from air and light as much as possible.

Having now described the nature of my said invention, and in what manner the same is or may be performed, what I claim and desire to secure by letters patent is:—

1. The method of duplicating or copying designs upon flat surfaces of glass from a design previously etched upon glass, substantially as described.

2. The manufacture of ornamental plates of glass by applying to their surfaces duplicates or copies of previously-prepared or existing designs, substantially as described.

3. The within-described preparation or composition used for coating the surface upon which the design is to be put, compounded of ingredients such as hereinbefore described in about the relative proportions, quantities, and manner set forth and specified.

Improvements in Colouring Photographic Prints.

The specification of William Blair Anderson, photographer, Union-terrace, Aberdeen.

I take an unmounted print (which has been previously toned, fixed, and washed in the usual manner) and mount it on a plate of opal glass or other prepared surface. After pressing out all air-bells it is allowed to dry. Thereafter the plate is heated, and bees'-wax, paraffine, naphtha, or other substance applied till the print is perfectly transparent. The superfluous wax or other substance is then wiped off with a cloth, and when cool the print is gently polished with a silk handkerchief or other suitable soft material, when it is ready for being coloured or painted in monochrome, which is done by the application of oil colours according to the effect desired.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—The absolute and exclusive right to take an unmounted print (which has been previously toned and fixed in the usual manner) and to mount it on a plate of opal glass or other suitable or prepared surface, and, after pressing out all air-bells and allowing the same to dry, to heat the plate and apply bees'-wax, paraffine, naphtha, or other substance until the print is perfectly transparent. Then to wipe off the superfluous wax or other substance; and, when cool and gently polished, to colour according to the effect desired by the application of oil colours.

Illuminating by Means of the Incandescence of Refractory Substances.

By Otto Fahnehjelm, Stockholm, Sweden.

The object of this invention is the production of light of superior quality by convenient and economical means.

And this invention relates first to the manufacture of suitable refractory substances in the form of small wire pins or lamellœ, these being fixed in suitable holders that they may be capable of the necessary adjustment; and, secondly, to a method of causing the incandescence of these refractory substances so prepared and arranged by the action of the heat caused by the combustion of the mixture of gases, commonly known as "water gas" in air, at the ordinary pressure and under the ordinary conditions of the atmosphere.

Having thus stated the nature of the said invention, I proceed to describe the manner of carrying it into effect.

The substances out of which the small wire, pins, or lamellœ are constructed are refractory oxides, such as those of magnesium, calcium, zirconium, or silicon, either singly or mixed together in suitable proportions; magnesia has been found to be generally preferable.

A convenient method of manufacturing the small wires, pins, or lamellœ is by well mixing the finely-powdered oxide with a solution of starch, gum, or other gelatinous substance, in such proportions as to obtain a plastic mass. By pressing this through a small hole or die, or by other suitable means, a thread may be obtained of a thickness corresponding with that of the desired wires, pins, or lamellœ. This thread while still soft may be cut into pieces of the required length, and these may be made straight or bent into any suitable form.

This should then be dried and afterwards burnt at a high temperature. If the burning be omitted the said wires, pins, or lamellœ are liable to twist and bend when exposed to the heat of the "water gas" flame.

A number of these small wires, pins, or lamellœ are fixed in rows or rings in a socket or other suitable arrangement, so as to be capable of accurate adjustment in order to obtain the full effect of the heat. Such an aggregation of wires, pins, or lamellœ is termed a "comb."

The socket is preferably constructed of iron, brass, or other suitable metal, and may be in section of a shape of a U. It is filled with a plastic mass, such as damp clay or magnesia, and the wires, pins, or lamellœ are fixed in such a manner as may be desirable by inserting one end in the soft mass, which is afterwards well dried.

These sockets may be straight, curved, or circular, according to the kind of flame to the action of which it is intended to subject the wires, pins, or lamellœ; and they should be provided with ears, loops, or other suitable arrangements for fixing them to a support, by which they are suspended in the flame. This support must be capable of being moved at will in every direction, in order that the necessary adjustments of the comb may be thereby obtained.

If the wires, pins, or lamellœ are bent into the form of loops, a comb may be formed by arranging them on a metal wire or hook. In any case the wires, pins, lamellœ, or combs must be so arranged on the supports that they may be easily replaced, because at the high temperature of the "water gas" flame all the refractory substances of which they are composed are more or less volatile.

The modes of producing "water gas" are well known, and have been made the subjects of several patents. A convenient method of production is by passing steam over coal or coke at a high temperature; the mixture of gases thereby produced consists principally of hydrogen and carbonic oxide.

This "water gas" may be conveniently burnt in gas burners of the form generally used for the combustion of ordinary illuminating coal gas; the description of burner which has been found preferable is that known as a fish-tail burner.

Certain drawings show convenient arrangements of the apparatus. One of these represents a frame made of iron, brass, or other suitable metal. In section it has the form of U. It is filled with a plastic mass, such as moist clay or magnesia, and straight pins are arranged in one or more rows by inserting one end in the soft mass, which is afterwards dried. These frames may be straight or curved. They are provided with means of attachment to a support. These are ears or loops, or a clip. The pins are arranged vertically or horizontally.

In the latter case, when the pins are exposed to the heat of the "water-gas" flame, they bend and assume a vertical position.

A different arrangement is shown, in which loops or hair pins of refractory material are suspended on a hook.

The supports to which the refractory substances are attached can be made capable of the necessary adjustment by means of some such convenient arrangement of screws as shown in the drawings.

The claim is as follows:—First. The manufacture of wires, pins, or lamellœ composed of magnesia, lime, zirconia, silica, or other suitable refractory or fireproof oxide, either singly or mixed together in forms suitable for incandescence when exposed to the heat of a "water gas" flame substantially as described. And, secondly. The use for the production of light by incandescence of oxides of magnesium, calcium, zirconium, silicon, or other similar refractory or fireproof oxides, either singly or mixed together, when such oxides are formed into wires, pins, lamellœ, or other similar shapes, the oxides being acted on by the heat of the flame of "water gas" burning in the air at the ordinary pressure and under the ordinary conditions of the atmosphere substantially as described.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK

Date of Meeting.	Name of Society.	Place of Meeting.
July 15	Bolton Club	The Studio, Chancery-lane.
„ 16	Photographic Club	Anderton's Hotel, Fleet-street.
„ 17	London and Provincial	Masons' Hall, Basinghall-street.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society, held on the 3rd instant, Mr. W. K. Burton occupied the chair.

The Secretary read a letter received from Mr. Beach, of the *Scientific American*, and secretary of the newly-formed Amateur Photographic Society of New York. In addition to referring to the proposed exchanges of minutes, and to a cordial invitation to any of the members of the Society who might be visiting New York, Mr. Beach described particularly some experiments with a modified developer, by Mr. H. J. Newton, the formula for which is as follows:—

No. 1.

Water	12 ounces.
Formic acid	12 minims.
Pyro	48 grains.

No. 2.

Dry carbonate of soda	3 ounces.
Carbonate of potash	3 „
Sulphite of soda	3 „
Water	40 „

To develope: take three-quarters of an ounce of water, a-quarter of an ounce of the alkali solution No. 2, and one ounce of No. 1. It was stated that great latitude was allowable with this developer, and that of two negatives—one of which had received thirty seconds' exposure, and the other only two seconds on the same subject—it was impossible to tell which had had the longer exposure, and that both were perfect negatives.

Mr. W. M. Ashman inquired whether any of the members present had experimented with formic acid in the developer.

Mr. A. L. Henderson had tried some years ago formic acid both in emulsion and developer without finding any advantage.

Mr. Ashman understood from Mr. Beach's letter that it was claimed that formic acid was a developer in itself.

Mr. Henderson believed that formic acid was not a developer but a restrainer, though it did not restrain so powerfully as other acids. About twenty years ago M. Claudet had introduced the use of formic acid in the developer for the purpose of obtaining more rapid exposures.

Mr. W. E. Debenham said that Mr. Maxwell-Lyte had recommended the use of formic acid in the developer some ten years earlier—about the year 1853.

Mr. Henderson thought that glycerine or sugar would answer just as well.

Mr. W. Coles remarked that in American formulæ it should be borne in mind that sixteen ounces, and not twenty ounces, to the pint were intended.

Mr. Debenham said that some time since a member had mentioned that during the hot weather a plate, having been left in the hypo. bath all night, was found in the morning to have the film dissolved away. A similar experience had recently happened to himself. Two plates of the same make were accidently left in the hypo. baths. In one of them (produced) the image had not been affected; from the other (also produced) the film had been almost entirely removed. On examining the baths it was found that the one which had not affected the film was fresh and strong, having a specific gravity of 1,145, whilst the other which had dissolved away the gelatine was, although not what would be considered old, yet somewhat discoloured by use and of specific gravity 1,090.

Mr. HENDERSON suggested that the solvent power of the bath might have been acquired by the small quantities of ammonia carried into it by plates slightly washed after development. He then inquired whether any of the members had noticed an apparent increase in the rapidity of the plates during the recent hot weather. He had done so, and he attributed it to the warmth of the water used in making up the developing solution.

The CHAIRMAN said that according to Captain Abney an increase of the temperature of the plate during exposure conferred increased sensitiveness.

Mr. HENDERSON said that the best of plates, if heated and used when cold again, had become much more rapid.

The CHAIRMAN observed that Captain Abney had stated that complete drying of the plates diminished their sensitiveness two or three times.

Mr. HENDERSON asked whether some one would define what was a hard gelatine—whether it was one that took up a large quantity of water, or what.

Mr. A. COWAN considered it to be a gelatine that made the stiffest jelly with a given quantity of water.

Mr. ASHMAN inquired whether any of the members had tried Mr. Farmer's method of reducing the intensity of gelatine negatives with ferridcyanide of potash and hypo., as recommended by Mr. Coles in his recent lecture. He (Mr. Ashman) considered it the most perfect reducer he had met.

Mr. COWAN also spoke highly of the method.

Mr. COLES said that he preferred to use rather more of the ferridcyanide solution than recommended by Mr. Farmer, so as to get more rapid action.

A MEMBER used the solutions separately, applying the ferridcyanide with a brush and the hypo. afterwards. He also asked what were the conditions by which to get relief in negatives. Sometimes the surface appeared quite flat, and at others with almost as much relief as a Woodburytype film.

The CHAIRMAN suggested partially drying the film with alcohol and then finishing the drying by heat, in order to obtain relief.

Mr. HENDERSON said that pressure on the surface of a gelatine plate, which had been called "shearing stress," produced a mark that had developed opaque. He thought that this effect was continued laterally in the film for a considerable distance from the point of pressure, becoming less by degrees as the distance was greater from the pressure. He had plates which had been packed some time, and he noticed that where the edge of the card had been there was a mark. Under the card itself was clear, and the mark being at the edge he attributed it to a burr having been raised on the card in cutting, thus causing extra pressure there. The mark extended for some distance on the surface of the plate, fading away by degrees.

Mr. DEBENHAM said that such an appearance as Mr. Henderson had described was common on plates that had been kept for some time in an impure atmosphere, and was, he believed, due to the action of sulphuretted hydrogen on the silver compound. The card protected the part of the plate in contact with it, and the film was acted upon nearest to its edges where the circulation of air was greatest.

Mr. W. M. AYRES thought it would be best to make plate-boxes airtight.

DERBY PHOTOGRAPHIC SOCIETY.

A MEETING of this Society was held at the London Restaurant, Irongate, Derby, on Wednesday, the 2nd instant,—Mr. H. Arnold Bemrose in the chair.

The minutes of the previous meeting were read and confirmed. Mr. Male was elected a member of the Society.

Mr. Richard Keene then read his paper *On Landscape Photography*. [See page 440.]

A short conversation followed; and, after a vote of thanks to Mr. Keene, the meeting terminated.

BERLIN ASSOCIATION FOR THE CULTIVATION OF PHOTOGRAPHY.

THE Association met on the 16th May,—Professor H. W. Vogel in the chair. Several new members having been admitted,

Herr BERLIN announced the death, at the age of 70, of Fraulein Bieber, of Hamburg, one of the original members of the Society.

The CHAIRMAN then announced the death of Mr. H. Baden Pritchard, in a few feeling and appropriate words, and the assembly honoured the memory of the deceased in the usual manner, by rising from their seats. He (the Chairman) then made a few remarks regarding a new American weekly journal partly devoted to photography, entitled the *Eye*.

Dr. KAYSER showed a Woodbury gelatine relief and alongside it a lead printing-plate pressed from it, and also a print from the same.

Herr Anders, of Dresden, sent some gelatine negatives intensified blue, agreeably with the process for which he has applied for a patent. There was no accompanying print, and the question whether or not the blue is sensitive to light remains unanswered.

Herr HABERLANDT referred to the fact, observed by himself and others, that under certain conditions alcohol intensifies gelatine negatives. Quite lately he desired to try that method, and laid a finished gelatine plate, while still wet, in alcohol, but after it had dried he found it had not been intensified at all. Consequently he modified the experiment, so as to make it more like what he formerly accidentally observed. He laid the washed plate in alcohol and left it in a current of air until the alcohol dried up by evaporation, and then laid it in some more alcohol. He then got some intensification. He (Herr Haberlandt) called attention to the importance of always preparing the *concave* side of the plate, both in the wet and the dry processes. If the convex side of dry plates were prepared it was very much more liable to injury in packing than the concave side. The concave side was also in several ways the better adapted for exposure.

Herr QUIDDE referred again to the matt streaks he had spoken about at the previous meeting. He had followed the advice then received, and laid the prints separately between sheets of blotting-paper to dry. In order to hasten the drying he had changed the blotting-paper several times, and found that he was no longer troubled by that fault. The same blotting-paper should not, however, be too often used, otherwise it would be apt to cause light yellow specks on the prints.

The CHAIRMAN showed two photographic reproductions of a chromolithograph copied in the usual way, and the other one by his stained collodion process. There was the same difference between them as between the two that were previously described. The grain of the paper on which the chromolithograph was printed was very plainly reproduced in the ordinary copy, but not in the stained collodion copy. The reason given for this was that the shadows cast by the inequalities of the paper of the original were caused by reflected light and were yellowish in tone—a tint to which ordinary collodion is very sensitive, but the stained collodion very much less so; hence these shadows are not strongly reproduced on the latter.

Herr SCHULTZ-HENCKE demonstrated and the CHAIRMAN explained the dusting-on process *(Pizzighelli's Anthracotypie and Cyanotypie)*. The speaker showed a number of finished pictures and a reproduction of a sheet of letterpress printing produced by means of a glass transparency; also some sheets of paper coated with chromated gelatine, which were exposed under a woodcut printed upon ordinary paper, washed in cold water in order to remove the soluble chromate, and then dried. The paper remained white, with slight indications of a design. They were then left for some time in water of 30° R., until the design stood out in relief, dried with blotting-paper, and then rubbed with a brush dipped in dry lampblack. They were then dried, heat being used. The gelatine which had remained soluble, and which formed the drawing became softened and adhered all the more firmly to the lampblack. When all dry the superfluous lampblack was washed off the paper by means of a sponge dipped in cold water, so that the paper reassumed its original white colour, while the lines of the drawing stood out sharp and black. A positive was obtained from a positive, and, being composed of pure carbon, should be quite permanent.

The experiments were followed with great interest.

The CHAIRMAN suggested that Mandel's American lichtpaus pictures, shown at the previous meeting, had been produced similarly.

The meeting was then adjourned.

PHOTOGRAPHIC SOCIETY OF VIENNA.

THIS Society met on the 6th May,—Dr. E. Hornig in the chair. The minutes of the previous meeting having been approved, five new members were admitted.

The CHAIRMAN said he had the pleasure of informing the members that the wish which the Society had long entertained for a photographic experimental studio seemed likely to be realised, for the Minister of Education was inclined to have such a studio built as an adjunct to some new buildings in connection with the Technical Institute. He (the Chairman) then said he was sorry that, owing to the illness of Dr. Eder, that gentleman would not be able to give the lecture for which his name was entered in the programme, *On Experiments with the Relative Values of Light*. He had, however, forwarded the specimens sent by Dr. Vogel to Dr. Eder. The Chairman then spoke at some length regarding Dr. Eder's own researches in the same direction. Some time ago the Society resolved to devote part of the subvention they received from the State to the purchase of a photo-spectrograph, and one was ordered to be made by Steinheil according to Dr. Eder's directions, which it was intended to have been used for testing different lights at the late International Electric Exhibition, but, unfortunately, the instrument was not delivered until after the close of that exhibition. With regard to Dr. Eder's recent labours in the direction of increasing the sensitiveness of gelatino-iodo-chloride of silver plates to yellow, the Chairman thought he could not do better than quote what Dr. Eder himself said in a memorandum in the speaker's possession:—"Experiments with gelatine emulsions containing chloride of silver, chloro-iodide of silver, and chloro-bromide of silver showed that these can be rendered relatively more sensitive to yellow and yellowish-green than bromide of silver can whenever a suitable dyestuff (especially ammoniacal eosine) is added. The sensitiveness to yellow can thereby be enormously increased, and the sensitiveness is, on the whole greater than that of the wet collodion process. On photographing the colour scales I obtained, without the interposition of a sheet of yellow glass—which still further increases the action of yellow pigments—a more powerful action of yellow than of blue. I therefore claim, hereby, the priority of discovery in this matter in so far as that I have recommended that under these conditions chloride of silver, chloro-iodide of silver, and chloro-bromide of silver in the form of gelatine emulsion are relatively more sensitive to yellow than gelatino-bromide of silver, and that I have also published the observation."

Lieut. DAVID demonstrated the use of a squeezing-press, which he had constructed for large quantities of gelatine emulsion. It consisted of a wooden frame and a glass cylinder with a club-shaped stopper affixed to a long screw. At the bottom a sieve made of well-silvered brass is placed. It was difficult to obtain a glass cylinder of sufficient dimensions. Lieut. David also showed an instantaneous shutter, constructed by M. E. Français, and which was applied to the optical centre of the lens.

A number of other articles were exhibited, and some small lichtdrucks by Herr Böttinger were handed round for inspection.

Several publications were laid on the table, amongst others the first numbers of a new French monthly paper *Le Progrès Photographique* (edited by M. Leon Wulff, who published the *Revue Photographique* from 1853 to 1865) and a copy of the second edition of Herr J. Schippany's *Introduction to Dry-Plate Photography for Amateurs, Scientific Men, and Artists.*

The ventilation and cooling of glass houses was discussed in consequence of a query in the question-box. Other questions were asked about antiseptics, Herr Josz's photolithographic process, a new mountant called "alligin" (which none seemed to have tried), and a doubtful point in the regulations respecting the Voigtländer prize competition.

These having been duly dealt with, and some other business transacted, the meeting was adjourned.

Correspondence.

JULY MEETING OF THE PHOTOGRAPHIC SOCIETY OF FRANCE.—"L'EXPOSITION DE L'UNION CENTRALE DES ARTS DÉCORATIFS."—GOLDEN FABRIC.—A CLAIM OF PRIORITY BY M. TAILFER.—A NEW RAPID SHUTTER.—A NEW DARK SLIDE.—M. BORG'S SYSTEM OF DETACHING ALL KINDS OF NEGATIVES FROM THEIR GLASS SUPPORT.—A GOOD FORMULA FOR DIMINISHING INTENSITY.—M. FRANCK DE VILLECHOLLE ON INTENSIFYING GELATINO-BROMIDE PLATES.—PROFESSOR STEBBINO'S INSTANTANEOUS SHUTTER.

THE usual monthly meeting of the Photographic Society of France was held on Friday last, the 4th instant,—M. Davanne in the chair.

The Society was informed that the "Union Centrale des Arts Décoratifs" would shortly open their eighth exhibition, to which photography would be admitted.

The employment of a bath of sulphite of soda was recommended after a negative had been intensified in a solution of bichloride of mercury.

A piece of "golden fabric" was exhibited, which gave rise to some discussion. It may be said that no new light was thrown upon the subject.

M. Attout Tailfer, the maker of the isochromatic gelatino-bromide of silver plates, made a protest against the tendency of the Germans to pirate his patented process, and to publish as their own his mode of working. He drew the attention of the Society to the publications of Vogel, and of Lohse, of Potsdam. The latter had taken his formula to the letter, and was reported as follows in the *Photographisches Archives*:—

"M. Lohse, of Potsdam, has indicated a simple means of preparing isochromatic plates similar to those presented to the Society in 1883 by Messrs. Tailfer and Clayton.

"He (M. Lohse) takes an ordinary gelatino-bromide of silver plate and plunges it into a bath of eosine rendered alkaline by ammonia. The effect obtained depends upon the concentration of the solution of eosine. If the maximum of sensitiveness for the yellow be required it is obtained in mixing—

Water	100 parts.
Eosine	3 ,,
Ammonia	10 ,,

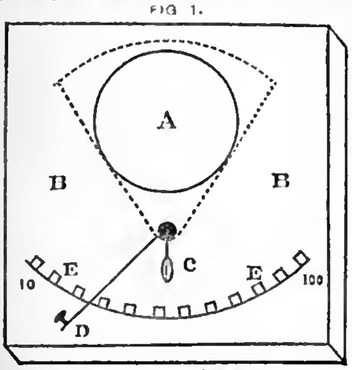
The quantity of eosine which the gelatine absorbs is very small, nevertheless its action is very powerful.

"By employing curcuma instead of eosine better results can be obtained, as the plates are not only sensible to the yellow rays, but all the rays of the spectrum, from the violet to the yellow, have an influence upon the plate. If it be necessary that the yellow should have a predominant action upon the prepared surface it would be probably better to employ a mixture of eosine and curcuma in the solutions."

A long discussion took place, in which it was proved that Major Waterhouse, of Calcutta, was the first to propose colouring the film to obtain different results; then Ducos du Hauron. But the Secretary said that he supposed that the latter gentleman only employed the eosine in collodion emulsions, and not in those of gelatine. I answered that I had prepared plates by staining the gelatine emulsion with eosine for Ducos du Hauron, and for many of his pupils, years ago. A further discussion would have degenerated into the question of commercial rights, &c., so M. Tailfer was requested to address a letter to the Society stating his grievance.

M. Londe presented a new instantaneous shutter made upon the principle of a circular disc. A convenient handle is attached to this disc, by means of which it can be opened and closed. When the handle is moved from left to right it winds up a spring at the same time as the instrument is being got ready for use. This winding up is very little, and therefore gives comparatively slow exposures. M. Londe has made another handle which, moved from left to right, winds up the spring and accelerates the exposure. He drew the attention of the members to the fact that by his system he can change the rapidity at will, and gave the following description: Suppose (said he) that a horse in full gallop is to be taken: the handle is in the cog which gives the most rapid exposure, and all is ready to let fly. By some accident the horse was not taken, and the next object which came in sight was a goat. I have only (said he) to turn the handle to the left; the spring is weakened, and the goat is taken. And so on for every object which passes. I can change immediately the rapidity, which cannot be done by the greater number of shutters in the market.

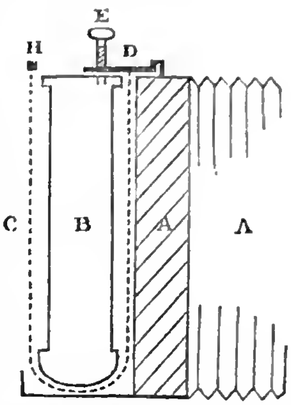
FIG 1.



A, lens. B, square box in wood. C, handle to move disc to set for exposure. D, handle to wind up spring more or less. E, brass cogs to hold handle.

M. Mackenstein presented a curtain dark slide, by means of which one curtain will do for two plates. The slide is very light and well made; its action can be easily understood by looking at *fig.* 2, which represents the dark slide in the camera ready for exposure. In pulling up the curtain C at H the glass is uncovered in the camera. The flange D stops all light from entering. When the first plate is exposed the curtain is pushed into its place and the dark slide turned; the other plate is then ready to be exposed.

FIG. 2.



A, part of camera. B, dark slide (double). C, curtain. D, flange from camera to dark slide. E, screw to fix flange firmly.

At the last meeting of the Society M. Borg, of Bordeaux, had desired M. Audra to communicate to the Society a method by which any gelatino-bromide negative can be detached from its glass support as a film, so that it can be printed from either side. At the eleventh hour that gentleman requested M. Audra not to divulge the secret. It appears that during the month he has had time to change his mind, as M. Audra, in his name, gave a description of the method employed. The negative is plunged into the following solution:—

Water	250 parts.
Hydrofluoric acid	1 part.

The film leaves the glass support with ease, and sometimes stretches out very much. This is very good when the image is extremely dense and an enlargement is wanted. If the film must not stretch the negative is previously dipped in a chrome alum solution.

M. Audra informed the members that the formula given in THE BRITISH JOURNAL OF PHOTOGRAPHY for diminishing the intensity of gelatino-bromide of silver negatives by means of a solution of red prussiate of potash was excellent. This gentleman then made some experiments before the members.

M. Franck de Villecholle made a communication on the intensification of gelatino-bromide plates by means of the mercurial salts. He proposes a second immersion in the hyposulphite of soda bath. If this be done, and followed by plenty of water, the negative will not turn yellow nor be destroyed by time. He proposes the following method. Make three solutions:—

No. 1.	
Water	100 parts.
Bichloride of mercury	2 ,,
No. 2.	
Water	30 parts.
Iodide of potassium	3 ,,
No. 3.	
Water	50 parts.
Hyposulphite of soda	$4\frac{1}{2}$,,

Mix the solutions as usual and plunge in the plate, which will soon attain the required density.

I had the honour to present my instantaneous shutter, which is described in this Journal at page 126, 1881. A modification has been introduced by M. Redier. The pump has been abandoned, and a greater rapidity has been secured. Negatives of children on flying horses and swings were shown as a proof of extreme rapidity.

25, *Rue des Apennins, Paris, July* 7, 1884. E. STEBBING, *Prof.*

CYLINDERS FOR COMPRESSED GAS *VERSUS* GAS BAGS.

To the EDITORS.

GENTLEMEN,—I am not much of a controversialist who prefers to lay down a dictum which shall be accepted as correct; but I do not think a few words, in reply to Mr. Lewis Wright's communication in your last issue, will be out of place.

In the United States cylinders have been in use for years for the production of the lime light. Those made of iron are being displaced by steel, the latter being found tougher and lighter. For medical purposes, and where extreme lightness is a *sine quâ non*, copper ones are used. The pressure employed is fifteen atmospheres, and the vessels contain from ten to one hundred cubic feet.

In England (where strength is universally sacrificed to weight) a small garden roller, called a "bottle," has gas forced into it to forty atmospheres, and is provided with an elegant valve, which generally leaks. My experience is that poisoning the atmosphere is as much thought of as getting a light.

The fact of an explosion at the Royal Institution shows neither want of skill or care. There have been some very ugly accidents there ere now—Sir Humphrey Davy's experience of chloride of nitrogen, for instance.

But at the head and front of all the learned institutions of the world science is considered before danger, and the liquefaction of oxygen (probably the job in hand) is a terrible task—somewhat different to fifteen atmospheres. With regard to the "burning of the iron," also: was it local, or did the "bottle" go off in the shower of sparks, as in the familiar experiment of nails vapourised by the oxyhydrogen blowpipe? There is no danger in anyone pumping their own gas when provision is made for keeping the barrel of the pump cool with water.

The cost of compressed gas and its regulation I will only touch on, as I hope in a very short time to show the latter practically, and to give the name of a manufacturer who is satisfied with a fair profit.

Explosions in the States are very few and far between. The last one was caused by deliberate mixing in the cylinders; and, though the error was pointed out, the mixer preferred sacrificing his life at the shrine of "I know best."

I am not aware what Mr. R. A. Proctor's experiences may be; but, for myself, give me cylinders. They can be used to zero if gas run short—varying pressure does no damage. I have used 50 lbs. in the H vessel, 200 lbs. in the O, with safety—registered by gauge.

All valves or media for preventing pass-backs are worthless. They impede the flow of the gas, choke tubes, interfere with the brilliancy of the light, and are such a cause of annoyance that if Shakspeare had been a lantern manipulator I am certain something else besides physic would have been thrown to the dogs.

On the ground of neatness, saving of room, dispensing with weights, expense, absence of leaks, ease of carriage, and the certainty that no pin will perforate and no guard will cut their tender skin with an iron-bound box, I say the cylinder or "bottle" is *the* thing, and its general adoption is only a matter of time.—I am, yours, &c., JAMES BOWIE.

London, July 7, 1884.

DARK-ROOM ILLUMINATION.

To the EDITORS.

GENTLEMEN,—I am sorry that the wording of my letter to you should appear to attribute want of courtesy to Mr. Debenham, and I beg Mr. Debenham to accept my assurance that my error was not deliberate. I was surprised that the medical evidence I adduced—not my own evidence, which I admit to be of no weight on such matters—should not have some notice taken of it by those who were working to find a light less hurtful to the eyes and to the sensitive plate than ruby. I know some photographers who are pleased with the yellow lights; but I know many more who have tried the yellow and have gone back to the ruby.

I would also submit that what we like best is not always best for us, and those who have long used the ruby and found it harmed their eyes may find the yellow lights produce the same effect in a shorter time. However, I have already placed on record the result of my appeal to medical authority, and shall wait till I see my authority disproved before I put up once more any yellow in my dark room. All I write for at present is to make my apology to Mr. Debenham for my use of the phrase, "want of courtesy."

Mr. Debenham hints at "want of logic" on my part. I leave it to himself whether or not it is logical to expect some kind of contradiction to an argument advanced in good faith and supported by adequate authority, which, if true, would take away the very foundation stone of all his edifice. —I am, yours, &c., ANDREW PRINGLE.

Craigcleugh, Langholm, July 8, 1884.

To the EDITORS.

GENTLEMEN,—I entirely agree with your correspondent, Mr. F. R. Fisher, that the question as to the luminosity and non-actinism of the respective medii of greenish-yellow and ruby is a vexed one.

Mr. A. Pringle, who generally gives the public through your columns so much interesting and, I must add, instructive matter, has, I venture to contend, in this controversy fallen short of his usual "luminosity." He has taken an idea into his head and, Scotchman-like, will accept no compromise, but rides it mercilessly and blindly to the death.

I cannot see what use Mr. Pringle's splendid array of medical testimony may subserve if human nature is so constituted as it is—eyes of so many varied powers, and characters of so many pronounced eccentricities. Physiological tests and professional testimonies go for nothing in a matter of this kind.

As an illustration of what I state let me cite my own experience. Ever since the colour controversy has been started by Mr. W. E. Debenham I have given great attention to the different testimonies, adverse and otherwise, which have appeared on the subject; and I must say—now that they are ended, I hope—I feel perfectly convinced that a great boon has been conferred upon the amateur and professional worker by the happy discovery of a medium which combines the maximum of luminosity with the minimum of actinity. I for one take this opportunity of tendering to Mr. Debenham my most grateful thanks.—I am, yours, &c.,

The Vicarage, Cheadle Hulme, July 8, 1814. H. V. MACDONA, M.A.

TRANSPARENT MARKINGS ON NEGATIVES.

To the EDITORS.

GENTLEMEN,—In your last number Mr. A. Pringle mentions having had several negatives spoiled by a transparent bar at one end, and which he attributes to the emulsion. I think it right to give my experience.

I have had the same on two occasions—spoiling some dozen otherwise very good plates—and on each occasion I was using a new camera by one of the best makers. At first I thought it was the plate; but, as it was always at the same end of the negative, that was impossible. I then noticed it exactly corresponded with the hinges, and in some cases showed the divisions; and, on referring to my notes, found the plates had all been exposed or retained in the slides in very hot weather. So there can be no doubt the india-rubber American cloth used was the cause—possibly not being sufficiently seasoned.

With some makers' plates the reverse effect was produced. In cool weather I have not noticed any mark.—I am, yours, &c., D. W. HILL.

London, July 5, 1884.

PRINTING-INK MARKINGS ON NEGATIVES.

To the EDITORS.

GENTLEMEN,—In packing some exposed gelatine plates recently I was foolish enough to place slips of *newspaper* between each. As might have been expected, the film appears to have absorbed a portion of the printing ink, with the result that on development the marks of the print appear more or less clearly in all the negatives. Will you kindly say in your *Notes and Queries'* column whether there is any method by which the marks in question can be removed?

As an experiment I have soaked a plate in benzole, and after half-an-hour's immersion the marks certainly appear to be fainter, although they were not nearly eradicated. Thanking you by anticipation,—I am, yours, &c., S. CASBOURNE.

Companies' Registration Office, Somerset House, W.C., July 8, 1884.

[We cannot suggest any better course than that adopted, unless it might be to preface it with ammonia treatment.—EDS.]

TONE IN SILVER PRINTS.

To the EDITORS.

GENTLEMEN,—On the subject of "tone" in silver prints, I have not noticed that attention has been directed to the subject of that important factor, namely, gold.

The cutting tendencies of the times may, alas! have endangered the purity of the "noble metals," and it behoves all to be certain that the salts of the metal they use are of guaranteed purity. There is a good opening for a public-spirited individual to make an analysis of the various advertising samples of gold, and report the result of his researches through the medium of your columns.

I always purchase those of the best makers, leaving it to those fortunate individuals to experiment in the direction of economy who possess more profound chemical knowledge than does—Yours, &c.,

28, *Rockley-road, West Kensington Park, July* 7, 1884. C. J. LAMBE EAMES.

THE PHOTOGRAPHIC SOCIETY: ITS REPORTS AND THE PHOTOGRAPHIC PRESS.—A REPLY.

To the EDITORS.

GENTLEMEN,—The storm of righteous indignation which my luckless suggestions, published in the *Photographic Journal*, raised in these columns having now apparently abated, I raise my head again and look with awe after the departing anonymous ones who arrayed themselves in column against me and "came down" on me "like a load of bricks." No doubt these gentlemen did not forget to let the Editors into the secret of the appellations by which, on occasions demanding less righteous indignation, they are generally known. By the way, would not remarks upon such subjects as those of my letter carry more weight were writers of them to append their names thereto? Publishers of new processes and humble inquirers after information may well adopt the *nom de plume* if their modesty urge them to do so; but remarks bearing upon the action or statements of an individual, to my mind, should always be signed by the writer of them. Modesty is here out of place. But, stay; why make suggestions?

Really, if these modest writers peruse the reports in the same inaccurate manner in which they have read my remarks I can well understand how it is that they pass over unnoticed mistakes and omissions in the former. For they seek to make me responsible not so much for my own opinions as for those of others, or for projects existing only in their own imaginations.

I propose to give answers to several of the statements which these and other writers, as well as yourselves, have made; but, before doing so, I must point out that my suggestions were made, not so much with a view to the interests of the weekly photographic periodicals, with which I have only the ordinary connection of a reader, but with the object of furthering, as I think, the wellbeing and status, as a scientific body, of the society of which I am a member, and in which, as such, I am bound ("logically," Mr. "Free Lance," though some do not seem to be of this way of thinking) to take an interest. Accuracy is essential in the *Transactions* of a society; no statements made in a formal manner during the sittings of such a society should be lightly omitted. That which one man may take to be "bosh" another will think highly of; and who is to judge whether So-and so's remarks are to be "put in" or "left out?"

Now, I have been accused of not being logical in my advice, and one of the anonymous thanks me for helping him to the term "corrected (presumably) report." Well, as I have said, I wrote to and for the *Photographic Journal*, or *Transactions* of the Photographic Society of Great Britain, and not for any other, though I suggested that my plan, if carried out, would not be to the detriment of the weekly press. I wrote in favour of the welfare of the Society as a society, and not for such individuals as do not mind with the one hand subscribing their guinea and with the other doing all they can to decry its operations. "Where is the logic here?" This being so, and to be fair and, indeed, "logical," I had to interpolate "presumably" between the above words for the reason that, while I was suggesting the advisability of the reports being made so perfect that they could with certain advantage be copied by the weekly press, the *current* reports of which I complained did not warrant my assuming the marked superiority for them my suggestions would infer. But, seeing that the arrangements and opportunity which the Society possesses are so easily brought to bear, I could see no reason why the reports in the future should not be accurate—not necessarily in *word*, Messrs. Editors, but in *substance*—and thus well worthy the attention of the weekly press.

A general report might well be given in the weekly press as soon after meetings as the Editors may find possible; but I think it would be well that such report should not pass as, be confounded with, or be in place of, the official report, which might be extracted with the papers from the Society's *Transactions*. Such a course would be one of courtesy and justice to the leading photographic society in this country. I am sure I am not inclined to be behindhand in regretting the tardy appearance of the Society's *Journal*. Perhaps under some conditions—not aided, however, by "heaving half a brick"—an earlier appearance might be possible; but, in mooting this, I have no intention of "looking a gift horse in the mouth." Those who think they have an infallible cure for the delay will perhaps not "hide their light under a bushel," neither their names under *noms de plume*. I suspect any good offer on this score would be jumped at by the present editor. Now, please, don't all apply at once.

In regard to Mr. W. E. Debenham's objections to the "slip system:" may I suggest that it would be more complimentary to his fellow-members were he to give them credit for not seizing opportunities for "cooking" the reports in order to suit their own views or to damage the value of the remarks of others. My opinion of men is higher than that of Mr. Debenham; and though I think a slight polishing of the words might take place (mind, the present reports in no publication are by any means verbal, the actual words of the speaker being seldom given), yet the meaning and sequence would remain. And even if this were not always the case, such reports, if passed over by the editor, would be open to correction in the subsequent *Transactions* of the Society. Anyone who may be wronged or misrepresented may make his statement in the Society's *Journal*, as at present under other circumstances. But how often would such a protest be required? Seldom, I venture to say.

In regard to the circulation of the Society's *Journal*: I take it that the whole object of the existence of a Society's *Transactions* is gained when they have placed on record correctly and officially the business of the Society which issues them. Should the *Journal* circulate outside the body of members, so much the better for the outside as well as for the coffers of the Society. But no circulation at all (that among members, of course, not being referred to, seeing that each member is bound to receive copies in virtue of his membership) is no sufficient reason for urging the uselessness of such an organ. Every scientific body of any importance has an official organ, in which its transactions are recorded; and why is the Photographic Society of Great Britain to be niggardly in this respect? A society no more than an individual should not rely totally upon the efforts and goodwill of others, but keep its own house and its own books, so to speak. This, also, in answer to Mr. Andrew Pringle.

The gentleman just mentioned is not the only writer who has misrepresented, or misread, my letter. I do not suppose I can go into the whole of the points where my views differ, or are made to differ, from those of the writers; but I shall indicate several of them.

Mr. Pringle, after writing to say that he "had to read repeatedly and carefully" before he arrived at my meaning, proceeds to indict me on a twofold accusation, neither part of which can justly be brought against me. Plainly, then, this time:—I did *not* write that "the papers to be read at meetings of societies should be printed before the meetings" (though one of the anonymous did so). I wrote "that the paper read requires *publication* rather before the remarks made upon it than after them." This must be patent to anyone who will think. The present plan is like "putting the cart before the horse." It is the paper which calls forth the discussion, and for precisely similar reasons the reader should peruse the paper before he can understand the full meaning of the remarks bearing upon it. On this there can be no two opinions. I did not refer to the printing of the papers before the reading of them. (By-the-bye, Mr. Pringle's objections to this would have more weight were it not possible in such case to allow the readers of such printed papers to add subsequently to the reading any remarks which they added and spoke during the reading of their papers. But I do not propose to go into this subject, which I did not touch upon.)

Then, for the second accusation: Mr. Pringle is again mistaken. I do not say that "the public periodicals should not be allowed to publish remarks until they are issued in the Society's *Journal*." On the contrary, so long as it is found impossible to publish the *Transactions* earlier I place considerable value upon the reports we now find in the "public periodicals" (though the papers do not accompany them). I really only find fault with the "public periodicals" in so far as, while they are glad to avail themselves of the Society's papers, they refuse to publish the full and official reports at the same time. Having stated this I will acknowledge that the independent reports of the weekly press have a value of their own. I contend that the publication of both paper and report in the same issue would be valuable to those readers whom the Society does not number among its members. Mr. Pringle's postscript "cuts two ways." Anyone paying a guinea a year subscription for membership has a right to expect that the necessarily small ways of minor and poorer societies may be dispensed with.

Now, in regard to the Editors' remarks. Like the other writers, the Editors totally misrepresent my meaning. The words I used are "errors and omissions;" I wrote nothing of condemning "condensation, while retaining" the "sense." As I have stated, I think the outlines of the business of the Society given in the weekly press answer admirably generally as far as they go; I only say that *as reports of the transactions of the Society* (for this they really are to the non-member reader) they might be more perfect with advantage, and this not merely *verbally* but *substantially*. The Editors cannot have failed to see that I have proved even the official reports to be not perfect. How, then, are they likely to exceed these in accuracy? The members of the Photographic Society of Great Britain should feel highly gratified to learn that the reports of their meetings "occupy at least as much space and are quite as accurate as those of any of the numerous other societies whose proceedings" are recorded. The wording of this passage is rather suggestive of occasional slips in the reports of the meetings of "other societies." Now, no doubt the secretaries of the "other societies" do their best to furnish correct reports, and the editors do their part in inserting these in their papers, and all is done as well as circumstances permit; but in the case which we are now discussing there are facilities—provided the "slip system" is properly carried out—for obtaining correct and full reports by extracting them from the *Journal* of the Society. But, of course, if the editors and their general readers place no value upon these, probably the Society will not suffer much, and I have nothing more to write on that point.

I do not know how the Editors would defend the system of publishing the "reports" *only* weeks before the papers appear in their columns. How much better that they should also appear together! Photography is not like the "latest news" in a daily paper; if what is said is of any value, it will not be the worse for keeping, and will not lose its point by appearing with the context, but, on the contrary, gain in force of meaning.

One more point and I shall have done with the Editors. Whether "the speaker himself is the best judge" on all occasions of the *exact words* he used may be a moot question; but there can be no doubt that a speaker knows best what he intended to convey, and—*pace*, Mr. Debenham—I contend that there can be no harm in his making an honest alteration of verbiage (the reporters do not take down the words as uttered) so as to set forth what he thinks he said. One does not like to see one's remarks made a complete hash; and it is one duty of a reporter to present a speaker's meaning without any incoherences of expression. If, therefore, a member receiving his "slip" do not recognise either his words or his meaning thereon, he is entitled to make the necessary corrections to convey that meaning. But how shall it be when a speaker is omitted from the report altogether? Truly there will have been a *slip* in sending him no "slip!"

"One Who Seldom Misses a Meeting" informs us that "few of the members besides Mr. Berkeley would object to the publication of the papers a day or two after they are read," &c. If this gentleman who does not miss meetings will refer to my letter again he will find that he *will* "miss" any statement of mine to that effect. Again, why don't people *read!*

Why does not "Looker-On" and "Listener" favour the Society with some of their "luminous ideas"—by the way, are they upon "light in the dark-room?"—during the formal proceedings now so stale and unprofitable, and not keep hidden so valuable matter as he and his friends barter over the "attractions of the refreshment table?" (It is really comforting to hear that the Society possesses at least *one* "attraction.") If he do not see his way to conferring this inestimable benefit, let him not poke fun (as does also "One Who Seldom Misses," &c.) at those on whose shoulders the real work falls. This writer also falls into the error (why, I cannot say) of making it appear that I am moving for a report of proceedings *as delivered*. I did nothing of the kind. Let him also re-read my letter.

Now for "Free Lance." He is nothing if not sarcastic. *That* is the "logical" sequence of his poke at me. It is "Free Lance's" *point* to find a *butt* wherever he is able. I did not infer in my letter that errors must occur in "all summaries" or reports, as "Free Lance" seeks to make it appear. I merely wrote that "such errors must remain inevitable"—of course, as at present appearing, with more or less frequency, and not in "all summaries." I do not know what "Free Lance's" experience may be, but my own is that if I know much of such and such a subject, or of such and such a history, or incident, or series of incidents, often as not I find errors and omissions of a most misleading character, and these totally due to the writer of the report. And, what is more, Messrs. Editors and "Free Lance," I do not find this so only in the pages of the photographic press, but also in almost all journals I may take up; but, of course, some papers are greater sinners than others in this respect. "Where is the logic here?" It is logical to suppose that the editors of these papers have no means for ascertaining the correctness of reports furnished to them by their reporters, and for obtaining the correct versions when the former ones have been proved to be faulty. But I take the view that the editor of the *Journal* of the Society has exceptional facilities for obtaining by the "slip system" what are substantially true reports of the transactions; and, granted that these facilities are taken advantage of, the apparently much-piqued Editors have every opportunity for doing complete justice to the principal photographic society in this country, while, at the same time, the papers published are more fully elucidated for the benefit of the entire photographic community.

I believe that most (if not all) of the provincial societies furnish to the photographic press what may be termed "official reports," these being drawn up by the respective secretaries of the societies. In the name of all that is "logical," why is the Photographic Society of Great Britain to be stinted of its official report, while the newest and smallest society in the kingdom may furnish such reports as it thinks fit and see them appear *in toto* in the weekly press? Merely because the Editors in the former case see fit to present their readers with an early skeleton sketch — praiseworthy enough *as a sketch*—of the proceedings, making, as they allege, the full and official and correct report superfluous. But, as I have said before, is this action complimentary to the Society? The object should be not to supplant the official report, but to give as early an account as possible of what will appear more fully in that report.

But, of course, much hangs on the question whether the Photographic Society is rather to be made much of on the one hand, or to be snubbed considerably on the other. Surely the editors of the photographic press have the interests of the Society—on whose Council some of them are—entirely at heart. I do not think otherwise. But do they do their best to show it? There are many other points on which I could touch, but space does not permit.—I am, yours, &c., HERBERT B. BERKELEY.

July 5, 1884.

Notes and Queries.

A. B. inquires:—"How can I make a white varnish to apply to a ferrotype plate which will dry quickly and smoothly?"——In reply: Mix a white pigment, such as oxide of zinc, with collodion, and a varnish possessing the two properties named will have been obtained. We cannot offer any further suggestion unless we are informed of the purpose for which the varnish is required.

George Rossiter has heard of something other than acetic acid which, when mixed with the iron developer, renders it especially useful in giving intense, clean lines when copying engravings. He wishes information respecting this.——In reply: Certain preparations of gelatine will confer this quality. Dissolve this substance in sulphuric or acetic acid, and add a few drops to the developer.

Rev. B. Fraser inquires—"Is it safe for me to employ gutta-percha pipes through which to convey water for photographic purposes? The pipes are new and clean, and I have been assured by the dealer from whom I purchased them that water has no action on them. What is your opinion?"——We reply that gutta-percha tubing has a good reputation as not having any deleterious effect or action upon distilled water.

J. Rayner says:—"I have a single landscape lens which, when used with the largest stop, does not quite cover the corners of the plate, and if I use a smaller stop still less of the plate is covered. I only use the lens for half-plates, for which size it was made. Am I right in supposing that the fault is caused by the stops being placed too far from the glass? And, if so, could it easily be altered?"——In reply: Our correspondent is quite right concerning the cause of the dark corners. The facility with which it can be remedied depends upon the construction of the brasswork.

"Do you know of any place in this country where I can procure photographs of Mexico and Central America? I have made application at the establishments of several dealers in photographs in London without having been successful.—Yours, &c., T. S. Boyd."——In reply: If any reader can afford the information we shall be glad. We are aware of Mr. Muybridge having several years ago published a catalogue of such views, but we are unaware of his having an agent in this country. Probably they may be obtained by ordering through any American bookseller or photographic warehouseman.

G. T. Scott writes:—"I am troubled by the foregrounds of my landscapes being much darker than they ought to be, this being quite irrespective of exposure. By being darker I, of course, mean by contrast with the distance. Can you give me a hint by which this can be prevented?"——In reply: The most obvious method of preventing the fault complained of is to place the diaphragm at an angle, so as to face the foreground. In this way a larger beam of light will be transmitted from it to the plate than comes from the distance, thus correcting in some degree, if not entirely, the evil complained of by our correspondent.

J. T. Watson wishes to know "which is the best book on photography."——To this we reply that if The British Journal of Photography and its accompanying Almanacs do not fulfil this description it is not for want of effort on the part of all connected with them that they do not do so. But perhaps Mr. Watson refers more particularly to the numerous manuals that have been published on the subject. To indicate a preference for any of these would be invidious. A few shillings spent in this class of literature will place our correspondent in a position to decide for himself, and the investment will be a sound one.

P. D. T.—Our correspondent desires to receive some information respecting the action of a lead salt in printing. He has seen reference made to it, but has failed to discover any article treating practically on this subject.——In reply: We presume that what is meant is the employment of an acetate or nitrate of lead bath in which to place the prints after their removal from the hyposulphite of soda, and having been subjected to a slight washing. The following directions will suffice:—Dissolve two ounces of the salt in a pint of hot water. This forms a stock solution. The prints, after removal from the fixing bath, are rinsed in several changes of water and transferred to a vessel containing four quarts of water and two ounces of the stock lead solution. After a few minutes the prints are again well rinsed.

Exchange Column.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

Photographs Registered.—

Joseph Stephen Brown, High-street, Bridgewater.—*Three Group Photographs of Clergymen.*

William Pankhurst Marsh, Norfolk Cottage, Bognor.—*Two Photographs of the Merchant Taylors' Convalescent Home, Bognor;* also *Photograph of St. Michael's School, Upper Bognor.*

Z. X. Y.—The best plan is to place a wet cloth at the bottom of the camera during the exposure. This will greatly retard the drying of the plate.

E. A.—You cannot do better than make your requirements known through the advertisement columns of the Journal. They will then, doubtless, be easily met.

W. J.—The transparency sent is not an albumen one, but, apparently, has been produced by the wet-collodion process, and then toned with mercury followed by ammonia.

J. J. J.—In former times it was by no means unusual to glaze the studio with blue glass, but it is very seldom done now. Our advice is to use ordinary sheet glass, and then subdue the light with suitable blinds.

A. Newman.—The thin sheets of gelatine, such as are employed by fancy box-makers, are produced by pouring a solution of gelatine on to sheets of tin which have previously been treated with ox-gall to prevent its sticking. When the gelatine becomes dry the film is removed.

S. E. W.—We do not see that any advantage would accrue from your using arrowroot instead of starch for mounting your prints. Because the former is more expensive it does not follow that it is a better mountant, or that it would confer greater permanence on the prints.

A. H.—Your query shows that you are not, as you say you are, a constant reader of this Journal, otherwise you would not ask the question. Several articles have appeared on the subject very recently. We cannot do better than refer you to the back numbers for the past two or three months.

G. Wiltshire.—Decidedly the fault of the paper. Some drawing-paper can be used for photographic purposes, but not all. We advise you to procure several samples of different makes, and then by experiment determine which is the most suitable for your purpose. It is the only practical method to pursue.

T. Edge.—The most suitable paper for your purpose is that known as "*papier mineral.*" It is far freer from granularity than the sample you enclose. We are not quite sure where it is to be obtained, but we believe the Autotype Company supply it. Probably it may also be obtained at Messrs. Marion and Co.'s.

J. Burrell.—You will experience no difficulty in getting brown paper about five feet wide and any length you may require if you apply in the proper quarter. It is sold at carpet warehouses under the name of "carpet paper." We are not surprised that it is not kept in stock at ordinary stationery establishments.

E. Beveridge.—Any of the photomechanical processes will answer your purpose. If you elect to have either Woodburytype or stannotype it will require to be mounted like silver prints. But collotypes, or the "ink-photos," can be printed with a margin ready for binding up with the book. Your best plan will be to write for quotations to the different firms who supply such prints, stating exactly what you require, and, if possible, send a silver print as a further guide.

Experimentalist.—This correspondent complains that he cannot get the gelatinous ink to set in his stannotype moulds during the present hot weather. Our correspondent's experience is by no means exceptional, as the chief difficulty in working either the stannotype or Woodburytype process is experienced when the temperature is very high. The best advice we can offer is to work in the coolest part of the house, and to use a very strong gelatine for the ink. That which you have been using is quite unsuitable for the purpose at any part of the year, as it is far too soluble. Get a more insoluble kind and one that sets quickly, such as some of those of foreign make. Also, do not dissolve a large quantity of ink at a time, for you must bear in mind that the longer a solution of gelatine is kept melted the more its setting properties become destroyed.

Received.—"W.;" "S. R." In our next.

In Type.—Second portion of article on *Photomicrography at the Health Exhibition;* Mr. E. Dunmore's paper on *Silver Prints,* read at the last meeting of the Photographic Society of Great Britain; *Miscellaneous Subjects,* by Mr. W. H. Harrison; *On Choosing a Size for Carte and Cabinet Negatives,* by Mr. G. W. Webster; Lecture at the Royal Institution, &c., &c.

Photographic Club.—At the forthcoming meeting of this Club, at Anderton's Hotel, Fleet-street, on Wednesday next, the 16th inst., the subject for discussion will be the adjourned discussion—*On Focussing.* The Saturday afternoon outing will be held at Hadley Woods; train to Barnet Main Line Railway Station. Meeting afterwards at "Old Salisbury Arms," High Barnet.

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1263. Vol. XXXI.—JULY 18, 1884.

EMULSIONS IN GELATINE AND ALBUMEN.

The production of an albumen emulsion, for negative or positive purposes, has been one of the dreams of the experimentalist for years past, owing to the recognised beauty of the results attainable with albumen films. But, unfortunately, there are many serious obstacles in the way of the production of such an emulsion—that is, one in which albumen is the sole vehicle employed; and attention has, therefore, been turned more recently to the combination of albumen with some other substance—preferably gelatine. As a matter of course the results thus obtained differ very much from those we might expect from a pure albumen emulsion, in which the sensitive silver salt is *formed* in the presence of the albumen; but this latter condition forms the greatest and, we fear, an insuperable difficulty in the way of success.

When a film of dried, salted albumen is submitted to the action of a solution of silver nitrate, or other soluble silver salt, two chemical changes occur, in addition to that arising from the presence of the soluble chloride, bromide, and iodide. A portion of the albumen enters into combination with the silver, forming a complex substance to which the name of "albumenate of silver" has been given; and, secondly, the albumen film is coagulated and rendered insoluble, the result being a layer of extreme fineness and beauty, and capable of giving images of the most exquisite delicacy, possessing also, as well, great vigour and beauty of tone. The delicacy is due to the extremely-fine and structureless character of the coagulated albumen film, while the vigour and tone result from the presence of the organic silver compound.

Now, if to a salted albumen solution a solution of silver nitrate be added the same chemical changes occur, but with a widely-different mechanical result. The action of the silver is to entirely destroy the viscous nature of the solution by converting the soluble albumen into the insoluble form and into albumenate, both of which separates in a flocculent state from the watery portion of the mixture, and, together with inorganic silver salts, subside to the bottom of the vessel. To re-emulsify this flocculent mass comprises the problem which has hitherto baffled successful solution.

Again: if the albumen be mixed with some other viscous material, such as gelatine, it might be supposed that the latter would supply the place of the coagulated albumen, and retain it and the silver compounds in suspension in a sufficiently-fine state of division to form an emulsion. Such, however, is not the case; for so great is the tendency of albumen to "clot" that an extremely minute proportion of it, added to bromised gelatine, suffices to cause the formation of a curdy, granular deposit on the addition of silver nitrate, the silver bromide being entangled with the albumenous compound in the precipitate.

It is plain, then, if we desire to utilise albumen for emulsion purposes we must proceed in such a manner that it will never be brought into contact in solution with silver nitrate or any other substance capable of causing its coagulation; that, in fact, the silver haloids must be formed separately, and then added to the albumen solution Here some of the precipitation methods recommend themselves; and by their means, and with the expenditure of a considerable amount of care, beautifully fine emulsions can be made. But these do not answer our expectations on the score either of quality or convenience.

In the first place, the albumenate of silver is entirely absent, and, therefore, any advantage in colour or in brilliancy of image is lost. In the second, the emulsion is frequently difficult of application, the spreading and drying in a perfectly-even layer being next to impossible in our modern dark rooms. Lastly: without some special treatment after drying the film is soluble in cold water, more particularly when an alkali is present, as in the pyro.-ammonia developer. The latter defect might, however, be remedied without much trouble if the other two could be surmounted.

The presence of the necessary proportion of the albumenate might possibly be secured by its separate addition in solution in some suitable solvent; but it is extremely questionable whether the result would equal that obtained when it is formed in the ordinary way, as in a bath film. The coating of the plates, too, might be simplified by the introduction of suitable mechanical means; but we doubt, after all, whether the game would be considered worth the candle. It will be remembered by many of our readers that in the collodio-albumen process, in order to secure a film of perfect uniformity, the plate, after being coated with the iodised albumen, was placed upon a holder, which enabled it to be rotated before a clear, brisk fire until it became dry. If this were an operation requiring the greatest care when an *insensitive* material was employed and it could be performed in a full light, how much greater care would be required and how many fresh difficulties would be introduced into its practice in the dark room, and with an extremely sensitive emulsion!

If, however, the perfection of quality of the old collodio-albumen plate be not aimed at, but merely a finer and more delicate film with a moderate degree of sensitiveness, for such purposes we do not think our readers need despair of gaining their requirements. But it will have to be, as the title of this article suggests, by the employment of a combined gelatine and albumen emulsion. Plates of such a character are in the market, and give very fine results for transparency work, but we are not aware how they are prepared. Indeed, for all we know, they may be the result of sensitising a dried gelatino-albumen film in the bath, under which conditions the albumen would confer all its advantages.

For a gelatino-albumen emulsion which we have found to work very well in the few trials we have given it we may give the following brief sketch, reserving until next week the details and quantities. The silver bromide (or chloride) is formed by any of the methods of precipitation which enable it to be obtained in a state of sufficient fineness and free from all foreign matter. Burton's method is the one we prefer. The precipitate thus obtained is incorporated with a solution of gelatine at a temperature not exceeding 120° Fahr., and to this is then added a suitable quantity of liquid albumen, previously well beaten to a froth and allowed to subside.

When thoroughly mixed the emulsion may be filtered and treated in the ordinary manner, except that no alcohol must on any account be added, nor must it be raised to a higher temperature than 120° for fear of coagulation. Albumen does not commence to coagulate until about 150°, but it is well to keep on the safe side. Just sufficient gelatine is used to cause the films to set in reasonable time, the bulk of the vehicle being albumen, and the resulting films bright, fine, and hard to a degreee.

In our next issue we shall endeavour to give full details as to the working quantities, and hints on the mixing of the emulsion.

RELATION OF COLOURS IN PHOTOGRAPHS.

Whatever may be the advantage or otherwise of the addition of eosine or other colouring matter to the photographic film for the purpose of securing a truer transcript of colours into monochrome, it is clear that the subject is receiving considerably more attention on the continent than it is at home. This is evident from the fact that already there are several different claimants in the field for the invention. This, at least, should indicate that it is of some value in practice.

As will be seen from our last issue the subject has again been brought before the Berlin Association for the Cultivation of Photography and also the Photographic Society of Vienna; and, at the last meeting of the Photographic Society of France, M. A. Tailfer strongly protested against some of the Germans appropriating his invention "to the letter" and calling it their own. During the discussion which followed this protest it was proved that the credit of first introducing colouring matter into the sensitive film, for the purpose of obtaining a better translation of the colours of a picture in a photograph, is due to our own countryman, Major Waterhouse, Assistant-Surveyor-General of India. Surely all this interest would not be bestowed upon a subject if it were of no value.

That the matter receives but little attention in England is scarcely to be wondered at, seeing that the copying of works of art is practised here to such a limited extent compared with what it is throughout the continent generally. Indeed, we are told that many of the published copies of paintings in English galleries are really the production of continental photographers, who obtain permission, come over here, and do the work. We may here mention that an impression appears to prevail amongst certain English artists that works of art can be copied much better on the continent than at home, "because there they have a clearer light," and therefore a better result is obtained. In consequence of this idea many artists have actually sent their works abroad to be photographed, imagining (erroneously or otherwise) that they have obtained better results from so doing. Some artists, we know, positively refuse to have their works photographed under any circumstances whatever, owing to the way photography represents colours. On one occasion a Royal Academician remarked in our presence that he should be very sorry to have any of his pictures "libelled by photography."

Another reason why the addition of colouring matters to the film has received but little public attention here, compared with that it has had abroad, is that the copying of paintings in England is chiefly confined to a few professional photographers, who very rarely reveal the results of their experiments; while amateurs, as a rule, take no interest whatever in the matter. If they did, there is little doubt that considerable light would soon be thrown upon the subject.

From the manner in which photography, pure and simple, renders the colours of a painting it is not to be wondered at that artists do occasionally refuse to permit their work to be transcribed by its aid; hence the art-appreciating portion of the public are frequently debarred from obtaining copies of many pictures they would otherwise possess, simply because it would not prove sufficiently remunerative to have them engraved for publication. It is true there are several photographic engraving processes by which printing plates can be expeditiously and cheaply produced; but with them remains the unfortunate fact that, when they are obtained, they are but an ordinary *photographic* transcript of the original, and, unless such plates are elaborately re-worked by a skilled engraver, they possess but little value as pictures.

Much of the engraver's time, we happen to know, is sometimes saved by those who do this class of work employing a staff of skilful retouchers, who expend a considerable amount of work upon the negative in the first instance. Of course all this extra work adds naturally to the cost of production, and consequently enhances the price of the work when published. But if the simple expedient of adding eosine or similar colouring matter to the sensitive film will enable the difficulty of photographing colours in something like the proper relation to be overcome, we can, as we have on a former occasion said, foresee that an immense stride will have been made, and there is no question that the plan must prove of great value commercially. Hitherto there has always been a steady demand for good photographs of fine works of art, notwithstanding their shortcomings, as witness the large number imported from abroad and the prices they realise. This demand will, no doubt, increase considerably with improved quality, still further as the public become more assured that the copies they purchase are permanent; and most of the better class of copies of pictures are now printed by permanent processes.

If all that is claimed for eosine and similar colouring materials be borne out in practice, there will be no difficulty whatever in producing photo.-engraved plates that will require but little or no skilled work from the hand of the engraver. Hence copies of paintings may be issued as engravings and at the same time ensure a very liberal remuneration to the publisher, and that, too, from pictures which it would certainly not pay to have engraved by hand. One great advantage of photography and photo.-engraving is that the reproductions can be so quickly produced, while engraving by hand is a slow and tedious operation. The chief interest in a picture is frequently lost long before the prints can be issued, as several years are frequently necessary to engrave a plate from an elaborate picture; whereas, by some of the photo.-engraving processes, it can be done in little more than as many days.

Since the publication of Dr. Vogel's process (see pp. 344 and 360, *ante*) we have heard several photographers remark that it is not a practical one. With them we cannot agree. There are, it is true, some difficulties in the way of working, as we pointed out in our issue of the 6th ult., but they are by no means insurmountable. A considerable amount of time and money may profitably be expended upon the production of a perfect negative, from which, perhaps, hundreds of copies—at a publishing price of (say) half-a-guinea—may eventually be required.

Whatever may be the inconvenience attending the working of the process published by Dr. Vogel, they do not apply to that given by Herr Lohse—the one claimed by M. Tailfer as his. This simply consists of immersing an ordinary gelatino-bromide plate in a bath composed of water one hundred parts, eosine three parts, and ammonia ten parts. Whether plates thus simply treated will compare favourably with what is claimed for those by Dr. Vogel's more troublesome method can, of course, only be determined by actual experiment with the two processes. If they do, then the translation of colour into monochrome by photography will become very much simplified.

DETERIORATION OF GELATINE PLATES.

It is a well-recognised fact that under certain circumstances gelatino-bromide plates will retain their good qualities for several years; but it is, unfortunately, equally well acknowledged that some show indications of deterioration before they are many months old. One experienced maker has said in our hearing that he has recently had to destroy some hundreds of dozens of plates which, when freshly prepared, were all that could be desired as regards sensitiveness and cleanness of image, but, after having been packed in dozens and allowed to remain for a few months, they showed indubitable evidence of defects.

In recognition of this fact the subject was formally brought forward for discussion at the meeting of the London and Provincial Photographic Association last week, when several manufacturers were present and gave their experience on the subject. One speaker advanced the opinion that pressure, or "shearing stress," was the cause of a certain class of fogging; and in proof of this he submitted several plates which had been packed with a marginal or skeleton frame of thin card placed between each pair. Upon applying a developer to these plates, without any exposure to light having been given, a reduction of the silver took place all along the line of contact with the marginal mask, this reduction being most pronounced along the line corresponding with that edge of the card which was, by the action of the guillotine by which the cutting was effected, slightly the more raised of the two, and therefore more likely to exert a greater pressure.

Corroborative proof of this theory was adduced by the exhibition of plates upon which writing had been made by a blunt *stylus* upon the surface, precaution having been first taken to protect the gelatine film by interposing a sheet of paper between it and the writing instrument, in order to prevent any scratching, which, it was stated, would cause a reduction on the application of a developer. In the case adduced the writing upon the plate was quite visible.

All this was very plain as far as we have described it, but the evil did not stop there; for, extending inwards on the surface of the plate from the well-defined line of contact with the inner edges of the cardboard slip, could be plainly perceived a tolerably-broad line of fog which, from its greater density nearest the marginal slip, appeared to have its origin there, being vignetted inwards to the point of disappearance. Physical contact, *per se*, therefore, does not wholly account for the phenomenon described.

That the quality of the paper in which plates are packed, or which is interposed between each, had an important influence in preserving them was on the occasion referred to freely admitted by all. A well-known manufacturer present said that at one time he employed a specially-fine quality of cartridge-paper for this purpose, but was afterwards led to supersede it by a softer paper. Since that period he had never perceived any deterioration. But, on the otherhand, that chemical action induced by damp, rather than "shearing stress," was the cause of the deterioration seemed to be the opinion of others of the manufacturers present, including Mr. William Cobb and Mr. A. Cowan, the former of whom submitted for examination a sample of paper he had specially selected or prepared for the purposes of packing. It is a thin, crisp paper which looks as if it had to some very slight extent been impregnated with paraffine, wax, or their congeners. Another gentleman observed that the firm he represented had adopted a thin class of yellow paper—coloured, as was understood, by a chromium dye—for packing their plates, and it was believed to be a preventive of deterioration, for they had heard no complaints.

Whatever be the cause—whether "shearing stress" or moisture, even in a homœopathic degree, in the gelatine film itself or in the packing paper—the matter is a serious one; but the photographic public have the satisfaction of knowing that the makers of plates are fully alive to the necessities of the case. In due recognition of the moisture of the climate in England, they will omit no precautions not only to have both plates and packing-paper thoroughly desiccated, but to have them wrapped up in such a manner as to ensure their being retained in that essential condition.

SALEABLE PHOTOGRAPHS.

No one can pass along a street of shops without quickly noticing the important part that attractive photographs play in the wares vended in some, more particularly the stationers', establishments. The aggregate annual sales must form an immense sum. It is a matter of common knowledge how some particular photographs have, from no very explicable cause, seized the popular fancy, and rendered the fortunate possessor of the original negative or copyright a return upon his outlay thousandsfold. Although, however, it is not everyone who, by paying a hundred pounds, can count his gains by thousands, as did the purchaser of the copyright of the *Dirty Boy* statue, nor every one who possesses the judgment that guided the proprietors of a well-known company to expend a couple of thousand pounds to secure the sole right to photograph in the first International Exhibition, there can be no doubt that very much more money might be made than now is by utilising in a businesslike manner some of the stores of negatives of interesting, rare, beautiful, or otherwise attractive subjects that at present lie useless upon the shelves of the photographer.

To make a popular picture of a single negative or subject will be difficult—the more so that the wholesale channels for putting such works before the public are very restricted in character, and there may be an unwillingness to take up anything from a hitherto unknown artist; but, given a really attractive photograph—out of the common, well-executed, and likely to be admired by the public—and it is generally sure of ultimately working its way successfully.

One thing we may remind those of our readers who are unaccustomed to business of this kind: they must not expect to reap all the profit. When a picture has to be sold to a wholesale dealer, who again sells to the shopkeeper, each having to make his profit out of the article sold, it is evident that the producer of that picture must in the first instance receive a price very much less than that paid by the public; and if this fact be well borne in mind by an intending producer not accustomed to wholesale selling it will prevent considerable friction. The making and selling of the most artistic photograph possible to produce become, where quantities are in question, a mere matter of commerce, in which art takes no part. It may here be observed that in practice it would be found next to impossible to deal with the shopkeeper direct; a middleman must be employed.

One of the largest fields for the sale of these pictures is connected with the "Christmas card trade," which of late years has assumed such large proportions. Anyone owning negatives which he contemplates making use of in this way must be in the field long before the end of the year; indeed, we have no doubt that most of the wholesale orders for cards for next Christmas are already placed, and the bulk of them now ready for first delivery. This being so, we may be thought to be raising hopes that could not be fulfilled. We do not, however, think that it will be found so, and those photographers who feel inclined to look up their negatives need not be afraid of offering them even now, though we should make the suggestion not to offer, except at a likely period for a quick demand, subjects that could be readily imitated.

Besides the question of photographs sold in large quantity to the dealers, instances of which must be of comparatively infrequent occurrence, there are very many small circles which the photographer could find an interest in supplying. We do not refer to the sale of local views; that is a class of trade too well known and worked to need mention here. We speak more particularly of photographs specially interesting as studies, or likely to be attractive from some innate quality which might appeal to a local, though not important enough to put before a general, public. Every photographer must be his own judge as to what is likely to "take" in his neighbourhood. Our work ends in bringing the idea—possibly afresh—before him, and pointing out a novel field for enterprise; for in these days, when complaints of the unprofitable state of business are so rife, advantage should be taken of every available opening likely to lead to its increase.

One of our contributors has hit upon a happy idea which, summer time though it be, might, as we shall show, readily be imitated by numerous photographers.

One of the prettiest effects of which photography is capable is the reproduction of the marvellously-delicate and beautiful incrustations so commonly seen in winter time on the window-panes, when the frost has seized them and printed its delicate feathers in fleeting materials upon their surfaces. They are not all beautiful alike, and we have frequently noticed that the most attractive arrangements of the feathery scrolls are in such positions as offer the greatest difficulty to photographic attempts at reproducing them. The gentleman we alluded to [illegible], however, a very beautiful example by pointing his camera to the roof of his printing-room on an occasion when he was particularly struck by the appearance presented. The negative was put aside and forgotten, but some years afterwards he brought it out, printed a number of them and used them as Christmas cards, affixing a suitable motto. So attractive were they, he informs us, that if he had put them before the public in a commercial way he is sure he could have sold a very large number.

Now, with a backing of this sort, and a very pretty little scene or subject carefully printed in, somewhat after the fashion of the engravings, similarly executed, now so common in the illustrated serials, or treated in various other ways that will suggest themselves to the artistic mind, we make no doubt that a series of cards could be produced which would have a considerable sale.

We do not suggest to our readers who are not in the possession of such frost negatives to wait till winter comes; the time would be gone by for making a saleable quantity of pictures for the season. We would suggest that similar effects should be attempted by other means. It is stated that glass can be prepared for etching or for burning-in a pattern of water crystals by the following simple means:—Powder colour, such as is used for burning-in a white upon glass, is made into a thin, milky-looking liquid by mixing with a weak solution of gum arabic and painted upon a sheet of glass placed horizontally. The plate is then exposed to a freezing temperature, when the particles of water group themselves together into ice flowers or feathers, and draw the particles of colour lying between them also into similar shapes. The glass is now brought into a warmer room in which the water is allowed an opportunity of slowly evaporating, when at last nothing is left but the pigment, which can be burnt-in in a muffle. The photographer, however, will stop at the preliminary stage. He will not burn the pattern in; he will simply place it before his camera and take a negative under most favourable circumstances—not the least so being the power of placing a suitable backing behind the frost picture, the inability to do so under ordinary conditions often militating against the reproduction of many beautiful effects. With regard to the production of a low temperature there need be no difficulty whatever, as we have repeatedly given formulæ suitable for the purpose, many of which may be found in our ALMANAC.

We conclude, having thus described one particular class of picture capable of being made a means of profit, by pointing out that it is only one of many that might be with advantage taken up by an enterprising photographer.

THE death is announced from Paris of the Abbó Moigno, a leading spirit in scientific circles of a generation back. Commencing his scientific career as a contributor to various magazines of that class, in 1843 he established *Cosmos*, one of the leading reviews of its day; and this and its successsor *Les Mondes* became the media for the interchange of ideas of the early photographic experimentalists. The deceased was himself one of the earliest practical workers in photography, and his name was a very familiar one in connection with our art-science thirty or forty years ago. He died at the age of eighty-one.

PHOTOGRAPHERS' advertisements are sometimes very remarkable reading, and frequently go to strange lengths, but we never remember meeting with anything at all approaching the following, which we saw gravely stated in one of the daily papers as the advertisement of a photographer:—"In consequence of the daily increase of accidents by railway the public are earnestly requested to call at ——— and have their portraits taken, that some memento of departed friends may be left to sorrowing survivors."

GOVERNMENT aids photography in many ways, if not by direct "endowment of research," though, indeed, photography plays a [illegible] one, in a branch subsidised in this manner, [illegible] which much is to some persons as a red flag to [illegible] published statistics we learn that Government spends eight hundred and sixty pounds per annum in photographing our gaol-birds, and it used to spend a great deal more. Woolwich arsenal comes in for seven hundred and sixty pounds a-year, and a thousand pounds is spent under the auspices of the Science and Art Department for the photographing of art objects and the reproduction of pictures.

IN regard to the damage of photographic parcels in transit through post, as dwelt upon by us a week or two ago in a leading article, we may state that we have received a further communication from the Chief Secretary of the Post Office. We are sorry to say that so far our trouble seems to have been entirely thrown away, for we are left just where we started. The substance of the long letter received is simply a suggestion that still stronger wrappers should be used, and a further recommendation is given to send by parcel post as being in most cases a less risky mode. As to the hint we gave that information should be published of the places where the automatic dropping apparatus is in use so that special packing should be given, the Secretary points out that such information alone would not be of service. It cannot be doubted that the great amount of damage done to such parcels in transit is very great when a year's aggregate is examined, and we trust that others will follow our steps in appealing to head-quarters, this being the only way to obtain redress. We have written a further letter still to St. Martin's, repeating that the usual mode of packing is very strong, and pointing out that the official who first called to see us upon the subject informed us that there was a growing custom of sending small parcels-post packages by the mail bags. There for the present the matter rests.

APROPOS of the power of appreciating the minute shades of differences in colour, which was somewhat prominently brought forward at a few of the recent discussions on dark-room illumination, we may call attention to a second edition of the tests for colour-blindness which has just been published by Messrs. Churchill. The tests were prepared by Mr. Charles Roberts, F.R.C.S., for the Anthropometric Committee of the British Association, and he has added some valuable introductory remarks to it. It is a singular thing that many persons colour-blind to one colour arrive at mature years without a suspicion of their defect, and it often happens that the first discovery is attended with some amount of annoyance. We had the privilege of knowing a gentleman of great culture who studied painting with the intention of following it up as a profession, and he had attained manhood and pursued his studies for many years before he became aware that he was colour-blind. A very clever and celebrated provincial photographer is to our knowledge quite colour-blind, and we have been informed by a well-known contributor to this Journal that there is a marked difference between the power of colour perception of his eyes. With instances like this before us it cannot be wondered at that such apparently contradictory opinions should be held upon the question. We have no doubt that many photographers are slightly or considerably colour-blind. The Rev. T. A. Preston has made about three thousand observations upon the subject, and he finds that two and a-half per cent. of the boys he has examined are colour-blind, not to speak of a very large proportion who are near-sighted and long-sighted.

IN some respects it may be regretted that the Copyright Bill has been withdrawn; but it is to be hoped that it may be re-introduced with improvements in another session, for, as it stood, it was open to many amendments. That a Copyright Bill of a very stringent character is desirable we believe. The larceny of the results of a man's brains, be it pictorially or verbally expressed, is to our mind as great a theft as the purloining of a watch or purse, and it is to be hoped that when a Bill, as nearly final as can be expected, is passed it may be a real help to photographers.

THERE is one very large class of persons whom, by reason of their crass ignorance, it would be very difficult either to touch by law or to teach the moral right that exists in the product of a man's intellect, and yet occasions must arise at times when the photographer's patience and forbearance are greatly tried. A case has just been brought under our notice that fully exemplifies what we say. A well-known photographer had a sitter who had never hitherto had a good portrait, and he took especial pains that the picture he produced should prevent him being able to say so again. The picture (*a carte*) was a success, and some little time afterwards a question was asked as to the price for enlarging it to cabinet size. The price was stated, and for a while the matter lay in abeyance. The photographer's surprise can be imagined when, a month or two later, his sitter calmly brought him an unmounted enlargement "to be fastened upon card;" it had been sent to America, enlarged, and returned to this country! Our readers may guess at the answer the photographer gave to this amazingly-cool request, which was not impertinent, simply because of its thoughtless ignorance.

STILL another piracy case. An art exhibition, in connection with a *conversazione*, was being arranged upon the walls, and the friends of the promoters had assisted by sending in photographs. Two large photographs—not from engravings but from wretched foreign lithographs—of two well-known (and much pirated) pictures, the *Emigrant's Return* and the companion picture, had been sent in, when their piratical character was distinctly pointed out to the committee-man. To use a sporting phrase he, however, never "turned a hair." "Oh! they will do to fill up," he said, and up the pictures went to a post of honour! When such an event could happen under the sanction of a committee expressly constituted for the furtherance of art and art teaching, how is it possible to grumble at the piracy or the attempts at it sanctioned and encouraged by the general public?

A FEW FURTHER NOTES ON STANNOTYPE, BY THE INVENTOR.

THE able series of articles on stannotype, which lately appeared in your journal, have been so exhaustive that I am afraid I cannot add much to them, except in calling attention to small matters of detail which have come under my notice from time to time during the past year or two.

Failures, as a rule, result from some trifling cause which, when known, may easily be obviated. How often have I been called on to give the reason of some defect or other, and on explaining the cause have had for reply—"How stupid it was of me not to think of it!" Everything, however simple, requires a certain amount of experience or apprenticeship. It is in trifles that thorough success must be sought for. Just as I sat down to write this article I received the number of THE BRITISH JOURNAL OF PHOTOGRAPHY for July 11th, and, to begin with, I cannot do better than notice your answer to a correspondent.

Alluding, as it does, to one of the principal causes of failure (which, by the way, applies mostly to all processes where gelatine is concerned), your correspondent, "Experimentalist," complains of his ink not setting. Unless he is possessed of a cool cellar or underground room his cook would tell him that he could not have jelly for his dinner. My own experience during the last week will, doubtless, be of use to him. The temperature of the printing-room rose to 86°, and printing operations were brought to a standstill, the ink, although strong in gelatine, keeping liquid in the bottle. However, on removing the presses, ink, &c., to the basement, where the temperature was under 70°,* all went on smoothly again.

Prints *can* be obtained at high temperature by a long process of cooling by the iron body of the press; but after a time this becomes too warm to cause the gelatine to set, and gives rise to a great annoyance, which, being an important point in working, I may here mention, as it applies to all prints taken too soon from the mould.

The paper carrying the print, on being removed from the mould (owing to the gelatine not having set thoroughly), leaves some of the darkest parts (where there is most gelatine) in the hollows of the mould, and if these are rubbed off with the same flannel that has been used to grease the mould the trouble is increased tenfold. Although the mould may appear clean and bright the next proof will stick worse than the first, owing to the fact that a sort of emulsion has been formed between the gelatine and the grease, which entirely prevents the removal of future prints. The only remedy is, after removing all superfluous gelatine, to wash the mould with clean warm water and grease afresh.

I have called attention to this particularly, as it is a fault likely to occur at any time, but especially in hot weather. Everyone cannot afford the luxury of ice; otherwise the difficulty of hot weather printing is easily removed. I remember some years ago, at the last great Paris Exhibition, going into an *annexe*—a handsome building of one storey, in the grounds—where M. Vidal was working the Woodbury process. The room was crowded and the heat excessive from the combination of crowd and the broiling sun shining on the building. From old experience I thought to myself that the crowd would certainly go away disappointed if they expected to see anything in the printing line where gelatine was concerned. What was my astonishment to see a middle-aged woman with a turn-table before her, quietly stripping the prints from the moulds at intervals of five or six minutes! The air was suffocating, and I was glad to get out. My friend M. Vidal afterwards explained to me that under each press there was a tray containing ice, so arranged that it could be re-charged when melted.

This reminiscence of hot weather in connection with Woodbury printing has called to my recollection another case further back in the annals of time. The late Emperor of the French, who took a great interest in all scientific matters, happened to visit one of the exhibitions, and was so pleased with the Woodbury process that, not having the time to devote to everything at once, he made a special appointment to come privately with the Empress, so as to have a practical demonstration all to themselves. The day was hot and the gelatine would not set, even after five to ten minutes in the press. What was to be done? A few pounds of ice were procured and laid on the backs of the presses, and in the course of half-an-hour, by the time their Majesties arrived, all was going smoothly. What would he have thought of the process he had admired from description if the *practical* results had been similar to those which once occurred at a lecture where, the room being heated by the over-crowding of a numerous audience, the print had come away leaving half the gelatine in the mould? Only one of ready wit could have explained it as a *double success*, as the lecturer did on that occasion.

I can, therefore, affirm that with a suitable room, which can be found in almost every house, there should be no difficulty in working either the Woodburytype or stannotype processes, provided a suitable gelatine be used; and such is now to be had.

Referring again to the article, or rather answer, to "Experimentalist:" I come to a point on which, from long experience, I must differ slightly from the Editors; that is, that "the longer a solution of gelatine is kept melted the more its setting properties become destroyed." Now, on the contrary, my experience is that to keep a mixture of gelatine, with or without the addition of any other matter, for any length of time it is necessary that it *should be melted* every day, of course not allowing it to rise to too high a temperature. I cannot do better than give an illustration from a circumstance which lately occurred. Some thick flakes of gelatine in the old glue form, and of a high setting quality, were put to soak in water on the Saturday. On the Monday morning following they were found all soft and rotten on the surface, and, on melting, the solution was found to have lost all its setting properties. Now this same sample of gelatine in solution has been in use for several weeks during the whole of the late hot weather without any change, but has been kept melted every day. Soft gelatines—such as Nelson's amber—on the contrary, lose their setting properties by too much melting. The above fact, which long experience enables me to vouch for, seems at variance with existing ideas, though I must say that it is a verification of the old proverb of the proof of the pudding being in the (h)eating.

A great many defects arise from want of care in the storing and handling of the paper used in printing. Any crease formed in it will make a white mark wherever the paper is dented, and if left in a room where dust can fall on it every speck of the same will cause a white spot in the print.

The chief point in obtaining a good stannotype printing mould is to get a positive that has been rightly exposed—just such a one as will, when laid on paper, show the right amount of detail. In the Lambertype process each print had to be exposed separately to light; but for the purposes of stannotype printing we have only to produce one such print, as obtained by the process named, to enable us to produce many thousand stannotype prints. As the positive is, so will your prints be. If over-exposed, the resulting prints will all have the same over-exposed look. Such a positive as is used for enlarging is not the slightest use for stannotype.

In drying the printing moulds by the aid of spirit make allowance for the time this has been used. When quite fresh half-an-hour to an hour will be long enough; but if the spirit have been used some time it will have taken up a good deal of water, and the reliefs should, therefore, be allowed to remain a proportionately longer time.

During very dry, hot weather—such as we have lately experienced—the gelatine relief, if kept open to the air, may crack and leave the glass; but this cannot occur when once covered with the tinfoil coating. It is very rarely, indeed, that our atmosphere is so dry as to cause this, but in drier climates it is advisable to increase the amount of glycerine in the tissue.

* During the short duration of hot weather that we experience in this country it is advisable to do as the Woodbury Printing Company were in the habit of doing—that is, commencing printing operations at five o'clock in the morning, leaving off at noon, by which time the metal of the presses becomes warmed through.

In applying the tinfoil to the mould care should be taken that the india-rubber solution is thoroughly set; as, if not, and any were squeezed out on to the india-rubber rollers, it might soften their surface and so cause them to become tacky, making the foil stick to the rollers. In smoothing the foil on the sheet of plate glass see that the latter is perfectly clean, as any grit or dirt would cause holes in the foil.

In remelting the surplus ink that has run into the gutters of the press, and the scrapings from the prints, do not forget, on remelting, that owing to the evaporation the ink will have become denser, and will therefore require the addition of water. Many people have experienced some little difficulty in the gelatine leaving the glass during the process of development. This is due to several causes, but mainly by using too opaque a mask. The paper used should be such as will allow the light to act very lightly on the film. An abrupt transition from the thick border to plain glass is apt to produce this, more especially if the tissue, by keeping too long, has become slightly insoluble. In the making of the positive, the film being much thinner, blacker paper may be used as a mask; in fact, where a negative has to be duplicated or quadrupled a perfectly opaque mask is a necessity.

In conclusion: I cannot do better just now than call the attention of your readers interested in stannotype to the leading article in a late number of the Journal, entitled *Keeping Cool*, and say that I shall at all times be glad to answer any queries on the subject through the medium of the Journal. WALTER B. WOODBURY.

OXYHYDROGEN EXPLOSIONS.

I do not quite understand the drift of Mr. Houston's communication. So far as I do understand it, he (1) wishes to know how far I am acquainted with, or believe in, "dust explosions" generally; and (2) meets whatever I may have heard concerning explosions in the United States, by what he has *not* heard.

As to the first point: I happen to be pretty fully acquainted with the subject, and with Professor Peck's experimental lecture upon it, which was delivered in May, 1878, at the special request of the millers of Minneapolis, U.S. Just about three months ago I myself repeated two of those experiments in a familiar lecturette upon some phenomena of combustion to a small society of working men, using for the purpose flour and the spores of lycopodium. I know how, in the United States, such explosions have taken place in many flour-mills, in a manure factory, a confectionery establishment, a brimstone-mill, and probably in some others; while in this country the chief examples are flour-mills, breweries (Messrs. Allsopp had an explosion in 1877) and coal-mines. I said clearly that it was perfectly easy to produce *purposely* a dust-explosion in a gas-bag.

But these cases do not touch the question in point. In all of them we have dust known to be explosive constantly produced; we have more or less constant production by attrition of ignited particles, or (often) naked lights introduced into the known explosive dust; and we have a known long list of casualties. I am perfectly open to conviction; but I have been utterly unable to learn that any gas-bag explosion recorded has ever been even probably traced to any such cause; and surely those who imply that bags are "unsafe" on that ground, ought at least to be able to point to some one case where such a cause at least seems to have operated. At present I believe this particular danger to be a pure myth; but we are all open to any evidence on the subject.

As to the other point: I have already cited an explosion of a bottle at the Royal Institution some years ago, with the very uncomfortable symptom of *the iron being burnt*. In regard to the United States: from the papers I see, my impression is that, owing to the extreme absorption in politics, ordinary "accidents and offences" are *not* reported there with anything like the completeness of English newspapers; and that (with one or two exceptions) the technical journals are poor by comparison in real intelligence of any kind. I have been told what I stated by persons who have been personally acquainted with what they alleged; but, not dreaming of the fact being challenged, I never noted special incidents. One case, however, should be as good as many in reply to this peculiar argument; and it is only a few weeks since Mr. R. A. Proctor stated, in *Knowledge*, how discomposed he had felt, when assisted at one of his lectures by a bottle operator, by both operator and apparatus—so much so, that he "made a change." He further relates that, not very long after, that operator's apparatus exploded, with the loss of two lives. That was my reason for specially mentioning Mr. Proctor's name.

I have nothing to say to any man's "preference" for bottles. I shall "prefer" them when the stated conditions are fulfilled. But others who *cannot* use them without expense or inconvenience ought not to be condemned without reason shown and some shadow of evidence. I wrote in their defence—not to attack bottles. And I may say, in conclusion, that to bring about their general use one of the most necessary things is to *reduce the price of gas.* In America it is ridiculously cheaper than 8d. per foot. The chemicals cost 2d. per foot here, and I think 4d. per foot and the hire of the bottle should pay. It might not pay at first; but a wholesale demand would put another face on the compressed-gas business altogether. It is long since I heard, but I think in America the wholesale price then was about six cents, and the retail about seven and a-half cents. If they can do it there, why cannot it be done here? LEWIS WRIGHT.

PHOTOGRAPHIC INDUSTRIES.

A WEST-END STUDIO.

If the photographers of the metropolis were called upon to declare by vote who, in their estimation, was the member of their fraternity possessing the greatest amount of ingenuity in things appertaining to the mechanics of our art-science, they would without a single dissentient voice proclaim the name of Alexander Cowan. While circumstances have conspired for over twenty years to associate this gentleman with the establishment so long known as that of Hills and Saunders, "photographers by appointment to the Queen," Porchester Terrace, Bayswater, W., nature has certainly designed him for an inventor.

There are two classes of inventors: the one thinks the matter out, conceives the adaptation of means to an end, completes the general principles in his head, but is unable to prosecute the matter any farther. Mr. Cowan does all this, but, in addition, possesses the important faculty of being able to carry all his ideas into practical execution. This statement will receive prompt confirmation from all who attend the meetings of the various metropolitan photographic clubs, associations, and societies—of all who have had opportunities of inspecting the useful inventions he has from time to time submitted for examination, while admiring the fine fitting and beautiful workmanship of the same. But we would err were we to leave an impression that the fertility of invention displayed by this gentleman was confined to what are termed the mere mechanics of our art; for, on the contrary, in both the chemical and what we may designate as the other physical aspects of photography he has made his name well known.

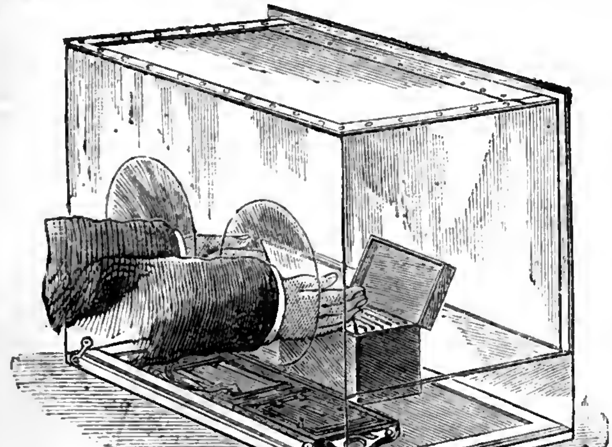
Remarking that on the occasion of a former visit (some years since) Mr. Cowan made his camera exposures through the medium of an electric wire, which extended from end to end near to the roof of the studio, our first glance was an upward one, with a view of ascertaining if this remained *in statu quo.* We found that the electrical conditions had undergone a change, and that the camera contained them all within itself, or, more correctly, within the stand. Glancing downwards we perceived as a conspicuous and somewhat ornamental appendage to the camera stand what purported to be a large electro-magnet, but which, when the top was removed by Mr. Cowan, revealed the fact that it was in reality a four-cell constant battery, two elements being ensconsed in each limb of the pseudo magnet. The exposing shutter being inside of the camera, it will easily be understood that the sitter is not necessarily aware of the moment at which the exposure is made.

But in the matter of exposures Mr. Cowan prefers "two strings to his bow;" hence the same camera has also attached to it a pneumatic apparatus, the exposing action of which is this gentleman's own invention. By its means the exposure may be either extremely rapid or prolonged at will. There are two shutters—one above the other. They are actuated by gravity, but each is held in check by an appliance similar to the pallets of a clock movement. When ready for exposure the lower of the shutters stands before—or, as in this case, behind—the lens. By pressing the pneumatic ball this lower shutter falls without the slightest jerk, being caught between two springs at the bottom. But the action by which it is released throws the upper limb of the pallets into a notch in the side of the upper shutter, which is thus held in its place until the pressure is removed from the ball, when it, too, drops and cuts off all passage of the light. A momentary pinch of the ball causes an exposure as quick as may be obtained with many of the so-called instantaneous shutters.

Conversing with Mr. Cowan on the subject of transferring plates from the plate-box to the dark slides when at a distance from a properly-darkened room, we were shown the portable changing-box he had introduced some time ago. It forms, when closed up, a packing-case, in which is stored away a camera for 12 × 10 plates, grooved boxes containing ample supplies of plates, together with dark slides and all the "belongings" of the camera. When the contents are removed the box is erected by means of appropriate stretchers. It is then found that the body consists of four thicknesses of black calico. There are two sleeves through which the hands are inserted. The plate-box and dark slide having previously been placed on the bottom, for which special facilities are afforded, the hands are then inserted and all the manipulations effected by feeling. By the exercise of care and a little system any one who makes trial of the method of changing plates on any table before him will be surprised to find with what ease and certainty this may be done when the eyes are closed or the room rendered totally dark. The annexed diagram gives a good idea, not only of the changing-box, but of the way by which the plates are transferred by touch to the slides, and from them back again to the plate box.

Descending from the studio we passed into a garden through the basement story, in which are situated the laboratories, enlarging-room, and a well-appointed amateur mechanics' workshop fitted with carpenter's bench, turning-lathe, circular saws, and quite a number of other mechanical appliances. At the foot of the garden is the house devoted to the preparation of dry plates.

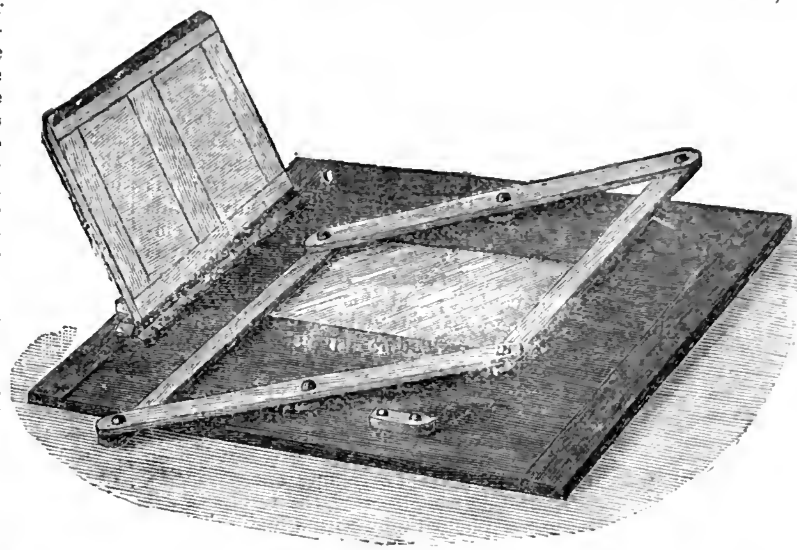
Here we saw a machine for cleaning the emulsion off the back of the plates. It is very ingenious, but we fear it could not be described without the aid of elaborate drawings, although it is simple enough in itself. A plate having been seized by the pneumatic



holder is first coated with the emulsion, and, without relaxing the grasp upon the holder, is held for a moment on the top of two large vice-like jaws, which are padded, and which by the action of a lever, operated by the toe of the person coating, immediately opens, and thus removes any gelatine which might have got on the back. A ratchet actuated by automatic means effects a change of the rubbing-cloth, and brings a fresh portion of the surface into action with each plate.

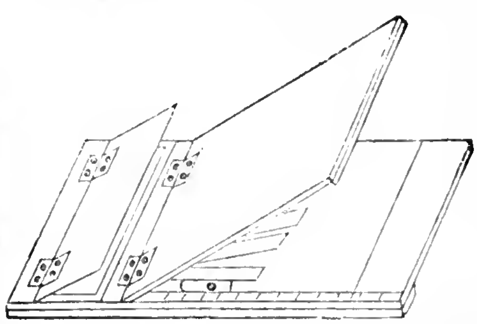
The drying-room is ventilated by a species of calorigen, by which the moist air is drawn off and conveyed to the outside, an influx of dry air taking its place. The time required for the complete desiccation of a plate under ordinary atmospheric conditions may be said to be from six o'clock in the evening till ten o'clock the next morning.

In the drying-room are several cutting-boards. Various means have been contrived to effect the division of a plate into two parts absolutely equal to each other. It is questionable if anything *can* equal or even approach that of Mr. Cowan's in simplicity and absolute certainty of action. On a cutting-board of any required dimensions are erected four long slips of wood pivoted at the corners, the two side pieces being also pivoted to the board at their centres. It follows that, no matter how this framework is moved from side to side, its

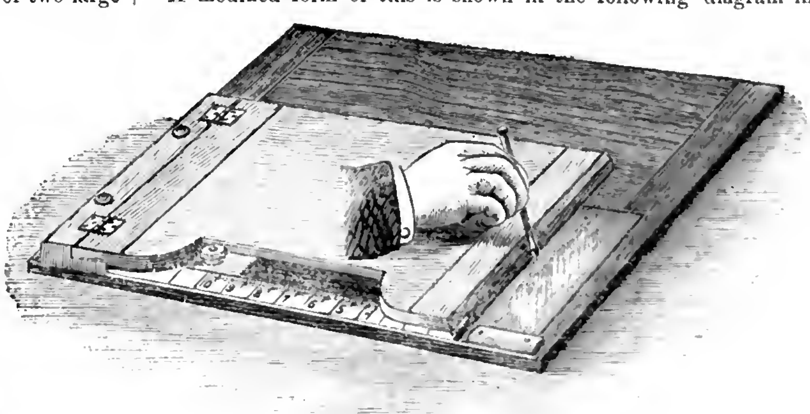


ends will always preserve parallelism and equidistance from the centre. A glass plate may be laid on the cutting-board "anyhow," when by a lateral motion of one end of the frame it will be pushed into an unerring central position by the end bars, after which a second board having a straight face is folded down upon the plate and the cutting diamond applied to the plate, which is thus bisected. This cutting-board is shown in the accompanying diagram, in which a plate is shown centered in a state of parallelism. The bars being then brought square with the board (to effect which a check piece is employed), the ruler or straight-edge shown at the left end is folded down as the guide for the diamond.

Another convenient form of cutting-board we saw in action is that which was described in our ALMANAC for 1879—its purpose, unlike that of the one just described, being to permit of a large plate being cut into smaller ones of definite dimensions. A series of rules of wood of various lengths can be folded out upon the cutting-board, and the end of the plate brought up against any one of them. The hinged flap is then lowered down till a sharp fillet at the end comes to the film and holds the plate securely, when the diamond is drawn across its outer edge.



A modified form of this is shown in the following diagram in



which the stop is made movable; and a still more complete form is one containing two movable stops on each side of the board, enabling one to accurately gauge any odd sized plate, and at once adapt the board to cut *exactly* the same proportion without resorting to measurement in inches.

We have alluded to the enlarging-room. There is one feature in the fitting of this which is worthy of special notice. It is this: that the basement of the travelling easel upon which the plate is supported is attached to the wall instead of resting upon the floor. This imparts a degree of firmness and solidity quite impossible to be obtained when the floor forms the means of support. The axis of this enlarging apparatus is horizontal, the light being directed through the negative and lens by a mirror placed outside, which is susceptible of being adjusted to any desired extent. Only in this department of the establishment is the wet collodion process employed. The method adopted in ordinary cases of enlargement is as follows:—From the small negative a transparency is produced on a gelatino-chloride plate by contact; and this transparency when placed at the mirror-end of the apparatus yields a negative of any dimensions up to twenty-six inches. The negative thus obtained—on wet collodion, as we have said—is employed in the production of a print in carbon. For enlarging Mr. Cowan employs a portrait combination lens of large diameter—large, at anyrate, as compared with those so frequently employed for a similar purpose.

From the various communications publicly made by Mr. Cowan respecting gelatino-chloride as a means of obtaining transparencies, it will be readily understood that we witnessed the results of his investigations in this branch of photography with a high degree of interest. We may here recal a description we gave of a frame of transparencies he showed at the annual Photographic Exhibition of last year. It contained twenty lantern slides, all of them being the same as regards subject, and all gelatine emulsion plates prepared alike, yet not two of the twenty were of the same colour. The tones ran through every shade and gradation from a very decided red on to a cold black, passing from red to bistre, sepia, the various shades of browns, purples, and blacks—blue-black, brown-black, and jet-black. And yet, as we have said, the plates were all prepared alike, the special tone being obtained by modifying the developer. We saw several transparencies made in the modified developers. For cold tones, citrate and oxalate of potash mixed with sulphate of iron were employed. Warm tones were obtained by citric acid and carbonate of ammonia in various proportions (together with iron), the addition of chloride of sodium imparting a specially-rich, warm tone.

From the preparation to the packing of dry-plates the transition is natural. Of all the mechanical inventions of Mr. Cowan probably his plate-packing machine is that which will elicit the highest admiration, on account of the happy adaptation of means to a particular end. We shall not attempt to describe it, but will merely say that a plain strip of paper, which is hereafter to be folded into a zigzag form and inserted between the plates, is placed upon the bed of the machine, a plate being then superimposed. By a motion of a side piece the paper is folded and another plate ready to be laid down, followed in turn by a similar action. These alternations are repeated till the entire dozen plates are conveyed to the bed of the machine, when all are found admirably piled on top of each other with an indented slip of paper between each, the whole being ready to be placed in the packing-box in which plates are usually sent out.

We would needlessly prolong this article were we to speak of numerous mechanical inventions of a minor character which owe their existence to Mr. Cowan; but among these we may allude to, without describing, his lantern transparency printing-frame and his lantern-slide carrier, a description of which was given in a recent number of THE BRITISH JOURNAL OF PHOTOGRAPHY.

In connection with several of the productions we have mentioned Mr. Cowan has allied himself with Messrs. Marion and Co. as distributors—a fact of which the readers of our advertising columns are well aware.

SELF-REGISTERING HYGROMETER.

WE have often pointed out the many uses to which a hygrometer can be put in photographic operations. Such work in gelatine plate or tissue drying being naturally governed to a great extent by the amount of water present in the atmosphere, a ready means of ascertaining that amount will be of considerable use in arranging the most favourable conditions.

Doubly useful, therefore, would be an instrument which informs us of the hygrometric state of the atmosphere—not only at the time of making an observation, but also for the whole period intervening since the previous observation. Such a self-registering instrument would be a valuable check upon the state of films and tissue after being placed in the drying-rooms, and would show at once whether any unevenness might be put down to atmospheric causes, or whether others should be sought.

According to our contemporary, *La Nature*, MM. Richard Frères, well known as constructors of self-registering barometers and thermometers, have turned their attention to hygrometers, and, after some amount of success with gold-beaters' skin as the sensitive agent, have discovered an animal substance never hitherto tried for the purposes of hygrometry, and possessing remarkable qualities of permanence and exactitude.

This material is unprepared cow's horn, which, cut in bands about two feet long, a third of an inch wide, and one-eightieth of an inch thick, have enabled these gentlemen to construct an instrument answering every scientific requirement. In it the tension of the band of horn is used in connection with a small lever working direct a needle or style. This style carries at its extremity a pen similar to that used with the now-familiar self-registering barometer. There is thus obtained in ink a diagram of the hygrometric state of the air upon a piece of paper rolled round a cylinder revolving once in a week by means of a clockwork attachment.

The instrument is graduated by comparison with a clock working in atmospheres artificially created with extremes of moisture and dryness, these points being taken by means of a Regnault's condensation hygrometer perfected by Alluard. It is easy to understand that an instrument so regulated gives the absolute hygrometric state of the atmosphere, thus avoiding the inconvenience attaching to the indications of other instruments in which animal membrane is employed, they, as is well known, requiring comparison with a table of constants to reduce their indications to those of absolute measure of the moisture present.

It is stated that several instruments constructed on the new principle have been working and under examination for two years, frequent comparisons with the condensation hygrometer having been made. The maximum error in one rare instance was five per cent., but usually it did not attain one per cent.

SILVER PRINTS.

[A communication to the Photographic Society of Great Britain.]

THE paramount importance of ensuring permanency in our silver prints has induced me to put together a few notes, as supplementary to the interesting paper on *Fading* read by Mr. John Spiller at the last meeting of this Society. It will be well, in the first place, to decide upon the standard we are to set up as to permanency. Will a picture on paper, an engraving in fatty ink, *e.g.*, supply it? or are we to put silver prints in competition with flint or wrought-iron, expect them to resist boiling, or even soaking, in strong solutions of hyposulphite of soda without injury? The phrase "permanent" is very elastic, and at best is but an expression used to indicate durability, not by any means indestructibility; but, for all intents and purposes, if a silver print will remain good as when made if treated as most pictures of any value are treated, hung on the wall or placed in the portfolio, it in my opinion fulfils all the requirements that can reasonably be expected of it. What more need we seek? Many silver prints produced in the early days are as good and perfect now as they were then, no especial care having been taken of them; and this in not only one or two isolated instances, but in many.

Now it is an axiom that anything that can be repeated must be subject to certain rules, or the reproduction could not take place; therefore it is absolutely certain that, if we knew the precise conditions attending the manufacture of these particular prints, by following the same routine exactly we should risk no failure or have fading prints—in fact, permanency would be assured. As an aid to permanence, many years ago Mr. Spiller suggested the use of ammonia carbonate in the hyposulphite bath as assisting the solution of the unstable silver salts formed in the paper; at that time I was using carbonate of soda, but with a different intent. I had been complaining of the reducing action of the hyposulphite solution on my proofs to a brother photographer, who attributed it, as many faults were attributed in those days, to acid hypo. If this were the case, I thought the addition of a little alkali might remedy it, be a reasonable precaution, or, at any rate, do no harm. I made the addition of sodium carbonate to the hyposulphite bath, with a decided improvement in the results, for which I substituted the ammonium-carbonate after reading Mr. Spiller's remarks thereupon, and continued its use afterwards. About nine years ago I adopted it as an improvement at Mr. Bedford's works, and after using a hundredweight or so of the ammonia-carbonate discontinued it, finding that a whitish deposit was formed on the surface of the prints, which, though very slight, still injured their appearance as the light fell upon them at certain angles. This deposit was loosely attached, and a rub with a soft rag easily removed it; but the trouble incurred was considered to more than overbalance the advantages gained. The use of ammonia was in consequence discontinued.

We will now, for the present, leave the matter of permanency to consider of what in reality a silver print consists; a definite understanding on this point is very material to any argument that may result thereupon. To get an idea of this it will be necessary to sketch out the process of silver printing *ab initio*, taking the paper itself for a starting-point. Photographic paper is, and has been from the first, almost exclusively supplied from foreign mills, the words "Rives" and "Saxo" being almost synonymous with photographic paper. This, the foundation of our prints, seems somewhat inferior to earlier makes. The inferiority is not in appearance or texture, but in the increased difficulty of causing it when sensitised to retain its whiteness without extraordinary precautions that were unnecessary at an earlier date; an hour or two in warm weather is sufficient length of time to gain a decided yellowness, when formerly, under similar conditions, the colour would be pure and white for a day or two. I am not sufficiently acquainted with the manufacture to suggest the reason; I can only record the fact.

This seems to be the only portion of a silver print that is *actually* beyond the control of the photographer, if we except metal spots, which in the Saxe make of paper seem more numerous now than formerly; these are, however, local troubles, and have no effect on the permanence of the print, and are probably due to particles of metal abraded from the machinery during the process of manufacture, or hot-pressing afterwards, or rolling.

Albumenising is the next process, which is now so seldom done by photographers that it is practically out of their control, although they could do it if they so willed; and much depends upon it. This should consist of pure fresh egg albumen mixed with a definite quantity of some chloride, and applied to the surface of the paper, *secundum artem*. Ammonium-chloride is, I believe, generally preferred as giving a better colour than other salts. In addition to this, some makers add other substances for the purpose of increasing the gloss, or to improve the keeping qualities of the paper. Citric and acetic acid are added, more especially during warm summer weather. If albumen from blood or gelatine is used, mixed with or in lieu of pure egg albumen, imperfect results are more likely to occur, and the proofs on such paper are wanting in richness and evenness of colour, acting themselves as a caution against the use of that particular sample of paper. Stale albumen is well known to give a higher gloss, but its offensive smell and doubtful qualities as a rule cause such paper to be rejected. Prints upon it have, however, been found to remain bright and pure, as with fresh albumen, and to show no signs after the lapse of years either of fading or yellowness. The paper, being albumenised and dried, is now floated on a bath of silver nitrate, of a strength of between sixty and seventy grains per ounce. The strength is, however, somewhat regulated by the amount of salt in the albumen, care being taken to have a *considerable* excess of silver salt. A large amount of uncombined silver nitrate facilitates both printing and toning. The prints are richer in colour, and tone more readily, and, to my thinking, if strong baths are used, more permanent. The paper thus prepared is dried and exposed to the light under a negative to make a positive print. The resulting action has been, and still continues to be, somewhat a matter of conjecture, but not less important on that account. A number of complex changes undoubtedly take place, and, according to various careful experimenters, the principal change is that the chloride of silver is reduced to the form of a subsalt and a red substance, which is left on decomposing the subsalt by hyposulphite of soda in the act of fixing. This is the theory set forth in *Hardwich's Chemistry*. It is, however, somewhat incomplete, and will not account for the varying results continually brought before us; therefore, again adverting to the axiom that anything to be repeated must be subject to some definite rule, we undoubtedly require further knowledge of this particular part of the process. What, for instance, is the "red substance" that forms an important part of the photographic image? When silver nitrate is applied to organic matter darkening of the substance takes place, not only in the light, but in the dark, the silver being reduced to a metallic state, light greatly accelerating the change which bears some relation to the intensity of the light acting upon it. Suppose, in addition to the subsalt theory already advanced, that the silver became reduced partly to a metallic state, and partly to a state of oxide, nitric acid being liberated. Many years ago M. Devill found, that by acting on silver nitrate with chlorine, dry nitric acid was formed. Is it unreasonable to suppose that free nitric acid being liberated by the reduction of the silver nitrate to a metallic state, which, in its turn, is partly deoxidised by the light, the oxygen attacking the reduced silver, nitrous acid escaping and acting on the organic matter with which it is in such intimate contact that xanthoproteic acid results, which we know is of a deep yellow colour, and darkened by alkalies, this may form the basis of the "red surface" to which Hardwich refers. The preservative effects of a carbonated paper on sensitised paper is well known, and the effect is especially noticeable when placed in the printing-frames, at the back, and in close contact with the sensitive paper during the operation of printing. Its preservative qualities are attributed to this power of neutralising any liberated acid. In connection with this, I may remark that the addition of a considerable quantity of nitric acid to the silver bath somewhat expedites the printing, and that the ready sensitised and some samples of unsensitised paper contain a very large amount of free acid. The result tends, in all instances, to more rapid impressions. The silver print seems to principally consist of coloured organic matter, oxide of and metallic silver, previous to toning, which inclines me to the opinion that a silver print consists of *two entirely distinct images—one an organic and the other of a metallic nature*—and that these images exist in varying proportions one to the other, and may be produced at will, depending almost entirely on the force and continuance of the light used in their production. With a weak light, and short exposures, the image will be principally organic; with a long continued and powerful light, metallic. This duality of the image seems to me to have been the stumbling-block over which we have so long continued to trip, and will explain the varying amount of permanence in proofs prepared in a *seemingly* identical manner. The organic image is, I believe, the image that fades, and this idea is supported by a variety of evidence. For instance, the lasting qualities of prints from delicate and thin negatives that are printed in a very subdued light to get the best impressions, are allowed, on all sides, to be less permanent than stronger impressions. For my own part, notwithstanding their attractiveness, I believe they are the most unstable of all photographs, and that such prints, without any doubt, no matter how carefully prepared, have but a short existence—ten years at the very outside, and frequently one or two. On the other hand, a strong metallic image—that is, one printed in a good light from a fairly dense negative—is, to all intents and purposes, quite permanent, if prepared with reasonable care. The theory of the duality of the silver print is not, if I may so term it, an upsetting theory, but merely an additional one. The ultimate forms that the varied and complex changes that take place lead up to is the production of a metallic and an organic image intimately combined, which although having different proportions, one to the other, cannot exist entirely separate.

The next stage in the production of a silver print is the toning. The substitution theory is the one generally accepted—that is, the silver chloride is abstracted from the image, and its place supplied with gold. The double chloride of gold and sodium or calcium becomes, by interchange of elements, the double chloride of silver and sodium or calcium, according to the salt used. If these reactions take place the abstracted silver should be found in the exhausted gold bath. May I ask if this has been satisfactorily determined by actual experiments? I have have heard this query put before, but have never heard the reply.

Supposing, however, a somewhat different action takes place, and, instead of the abstraction of silver from the image, each particle of metal becomes coated with gold—electroplated as it were—then an explanation is offered of the somewhat obscure changes that take place in this part of the process. An organic image would be obviously incapable of attracting a deposit of gold, otherwise of being toned, and the attempt to make it would result in the partial or entire destruction of the image. Adopting this theory, it is easily understood why a print from a weak, thin negative can never be made of a rich, deep colour, the small amount of metallic image with which it is combined being too little to attract sufficient gold before the bleaching effects of the toning bath upon the organic image has partially obliterated the impression. If the image be strong and rich, printed from a fairly dense bright negative, the toning can be carried much farther without this destructive effect taking place. By continuing its action the colour gradually loses its richness, but the image will not be destroyed in any reasonable length of time. The effect is, however, precisely the same. The destruction of the organic image takes place more or less according to the depth of the impression; but there is sufficient of the metallic image present to prevent the dual image being altogether effaced. The organic portion acts throughout as a coloured medium, to which most silver prints owe their warmth and richness, and the metallic part, to which they owe their permanency. We find by actual practice there is no *necessity* whatever to carry the toning process past a certain stage to ensure permanency. Even by stopping short of the most *perfect effect with regard to permanency*, we get an impression that will be sufficiently durable, so that there is considerable license in the matter of colour without incurring any particular danger. I think the very highest point to which toning can be carried with advantage is to stop it just before any reduction of the organic image takes place, known by the disappearance of half-tones; to carry it farther is at the sacrifice of richness and quality.

The desired colour being obtained, we come to the last chemical process the prints have to undergo—that is, fixing. To effect this we immerse the prints, well washed from the gold bath, in a solution of sodium hyposulphite, or thiosulphite, as it is perhaps more correctly called. Much stress is to be laid on the importance of using freshly-made solutions, and continuing the action sufficiently long to dissolve all that is soluble in the hyposulphite solutions from the paper. The time required varies with the temperature and the kind of paper; about a-quarter of an hour to twenty minutes usually suffices. No exact time can be stated, a very thickly albumenised paper requiring longer than samples thinly albumenised. The print should look clear when held up to the light, showing that the more opaque salts are removed. This part of the process, in my opinion, with a print lightly prepared in other respects, determines if it shall yellow and spoil, or remain bright and permanent. When the hyposulphite has effected its purpose and dissolved all those compounds which, we know by experience, lead to after-trouble, the proof must be thoroughly washed and dried. The results, I am convinced, are permanent impressions; and, so far as I can see, this is the result at which we wish to arrive.

In the foregoing remarks I have necessarily said much that is thoroughly well known; but my excuse must be, that without a rough sketch of the process of silver printing I could not point out those matters that, I believe, have so much to do with the vexed question of permanence. If others, by experiment, confirm the idea of a dual image, it will be obvious that the varying and puzzling results we have hitherto experienced can be reasonably explained, and will be a puzzle no longer. EDWARD DUNMORE.

ON THE ILLUMINATION OF THE DARK ROOM.

THE very unusual and, I believe, unprecedented course taken by the Editor of the *Journal* of the Photographic Society of Great Britain of printing Mr. C. Ray Woods' remarks, during the discussion on my paper upon the *Illumination of the Dark Room*, in form with a heading as though those remarks had been what is known as a communication to the Society, has doubtless been the cause of their being reproduced in your columns in the form adopted with papers authorised by the Council to be read at the Society's meetings. These remarks of Mr. Woods having thus gained such an immensely greater circulation than they would otherwise have obtained, I trust that you will allow me an equally public reply to them through the same channel.

One point that Mr. Woods addresses himself to is the defence of his use of the term "cathedral green." What I object to is the use of that term, as applied by Mr. Woods, to indicate any particular colour, seeing that blue-green and yellow-green, each in a variety of depths, may each be intended.

A matter that Mr. Woods particularly criticises is my statement that green glass (of the colour I showed) is a better protective supplement to stained red than the cobalt glass recommended by Captain Abney, and states as a fact—not as a mere supposition—that the reason I found it so was because I had not employed the precise red used by Captain Abney. Now, as I showed the results of two experiments with stained red glass, each of them being, like the pattern shown by Mr. Woods as Captain Abney's, flashed red on one side and stained silver yellow on the other, but not precisely of the same depth of colour, one being rather lighter and the other rather darker than Captain Abney's—and as with each of these pieces the green had given more illumination and more protection to the plate than the cobalt—there seems no probability that the use of a stained red intermediate between these two would cause a reversal of the result. If Mr. Woods, however, be still of opinion that with any shade of stained red glass cobalt is as good a supplement as green I invite him to send a piece of red and cobalt to any competent independent judges—say the Editors of this Journal, if they will undertake the experiment—and I will, on seeing the depth of blue to be competed with, supply a piece of green. I leave Mr. Woods free to select lamp light, magnesium light, or daylight, if he think that the choice will make any difference in his favour. He complains of my having used magnesium in this particular experiment; but, as this light comes between lamplight and daylight in actinic richness, it seems to me the fairest to select rather than either alone when trying mediums that are to be used with both.

It is noticeable that Mr. Woods leaves most of my arguments untouched. The proposition that red light has at least as much effect, or more, upon the sensitive film in proportion to its luminosity as yellow, and which was so strongly exemplified by Mr. Sawyer, cannot be said to be affected by Mr. Woods' experiments and remarks, as the relative luminosity of the red was not taken into account. The arguments—first, that the great difference of relative sensibility of the ordinary gelatino-bromide plates and collodion bath ones to different coloured light, which had so long been affirmed, did not exist, and, therefore, that the different *colour* of light required in the dark room in the two cases, which had on that account been insisted upon, was a mistake; second, that the great effect upon the colour sensitiveness of a bromide plate, caused by the addition of iodide, was also a mistake; and, third, that Captain Abney's experiments, which, it was thought, demonstrates the superiority of red light, were vitiated by the different conditions under which the comparison for photographic effect was made from those existing when testing the luminous power, the changes of conditions being favourable to the transparent medium, which happened to be the red—were all passed over, and it is satisfactory to see that South Kensington, as represented on this occasion by Mr. Ray Woods, found after a month's preparation nothing to say in reply to these propositions. W. E. DEBENHAM.

WHERE TO GO WITH THE CAMERA.

[It is hoped that this series of articles will be continued at regular and frequent intervals during the vacation months, and we shall be glad to receive contributions to the series from any friends able to treat of new and interesting ground.]

A WEEK'S RAMBLE IN NOTTINGHAMSHIRE.

I WAS tempted some little time after the introduction of gelatine plates to take a number of them, together with an 11 × 9 camera, to "Merrie Sherwood," and the series of pleasing pictures of sylvan and other scenery encourage me to recommend the land of Robin Hood to any tourist photographer in search of pretty woodland "bits" and picturesque ruins, &c., &c.

Taking an early train from King's-cross we reach the quaint old town of Newark, whose fine parish church and ruined castle of historic fame are well worthy of a visit. The former can be only successfully photographed with a lens of wide angle, the best view being obtained from Kirkgate; but even then it is wofully curtailed by the proximity of the adjacent buildings.

The castle may be "taken" from several points of view, enough of the ruins being left to make a very effective picture, and one not quite so hackneyed as that of the many much-photographed castles of the country. In a room of the castle, which is still intact, may be seen some interesting relics and a stuffed hound, the latter said to have belonged, when alive, to King John. A few hours will suffice for Newark, whence the train may be taken to Retford.

There is not much at Retford to interest one, unless it be the fine market-place on a Saturday, or the two churches of St. Michael and St. Swithin, both of which are very pretty. But from its excellent railway accommodation the town may be constituted one's head-quarters for a day or two, and first-rate accommodation is obtainable at the White Hart Hotel.

Fifteen miles from Retford, and a still shorter distance from the neighbouring town of Worksop, are the ruins of Roche Abbey; and a prettier bit of scenery than that in the immediate vicinity of the ruins cannot be found in England. The grounds of the Abbey are open to the public on Thursdays. Close by is the residence of a gentleman, an amateur photographer, who, on my visit, courteously gave me some information as to the neighbourhood and valuable assistance in taking my views. At least a dozen plates may be advantageously exposed on "bits" of "rock, water, wood, and dell," and artistic scraps picked out by the score. The ruins alone may be photographed from several points of view and make pleasing pictures, while the grounds, not spoiled by artificial cultivation, afford a profusion of photographic subjects.

Roche Abbey will "run away" with one day of the week, and a good day too. Another day may be spent in the woods. Taking train from Retford early in the morning to Chequer House, we walk thence to Normanton Inn, where we dine, and walk on either to Worksop or through the fine woods to Clumber, Thoresby, and through "Birklands" to the "Major Oak." Birklands is a remnant of ancient Sherwood Forest, and justly celebrated as being composed of some of the oldest oak trees in the country, gnarled and twisted into all manner of curious forms. The "major oak," being hollow, will accommodate sixteen persons.

Mine host of the Normanton Inn will give all the information necessary for finding one's way about in this woodland region. The inn is situate close to Clumber and the "Dukeries," and should the tourist be fond of sylvan scenery he cannot do better than remain here a few days and nights, when he will be treated to such bird music as will gladden a Cockney's heart. I hear from a correspondent that the nightingale is now in full song.

A few miles from Normanton Inn is Welbeck Abbey, the seat of the Duke of Portland—by no means a pretty building; but close to hand is the "Green Dale" oak, with a carriage drive cut through its stem—another "monarch of the forest." Near Normanton Inn there are also the pretty villages of Edwinstow and Budby, and within a few miles Rufford Abbey and the market town of Ollerton, not yet desecrated by a railway. Proceeding to Worksop we find the only object of interest to be the Old Priory gateway (which still remains intact), the Abbey Church, and Worksop Manor. These are each worthy of a plate. Going on by the Midland Railway to the village of Cresswell, the "Crags" (two rocky cliffs covered with trees and ivy, and with a lake between), are well worthy of attention, and five or six plates may be exposed.

Now, on again, per Midland Railway, to the old town of Mansfield. There is nothing very striking here but a few old houses and the parish church, &c. Then on to Southwell, where the minster will afford some recreation and an opportunity of using more plates. From Southwell we journey to Nottingham, unless, whilst at Mansfield, permission be obtained from Newstead to photograph that celebrated abbey, the home of Byron. This place being carefully looked after, permission is necessary before one can be allowed on the premises.

At Nottingham there is plenty to look at and plenty to photograph. Nottingham Castle, perched on a lofty cliff overlooking the vale of the Trent, first demands our attention, and makes a good picture. The market-place (the largest in the kingdom) on market day is a spectacle, and furnishes matter for a good instantaneous picture, whilst the Rock Cemetery, with its grottoes and chasms, is worth a plate or two as a memento of this curious and unique burying ground.

Close by the Trent is Clifton Grove, immortalised by Kirke White, and well meriting his praise, while with the village of Wilford by the "silvery Trent" we finish our pleasant ramble through the once romantic domain of "Bold Robin Hood"—

"A forester good,
As ever drew bow
In merry Sherwoo

About three miles from Nottingham is Wollaton Hall—a splendid building in (I think) the Elizabethan style. I have not photographed it, but, having passed by it a great many times, I am of opinion that it would make a nice picture if accessible to the tourist photographer.

I have here indicated the above short tour, embracing most of the principal objects of interest in my native shire; but should the tourist desire only pretty scraps of woodland scenery, he cannot do better or cheaper than locate himself at Normanton Inn for a week or so, where he can amuse himself to his heart's content. W. B. ALLISON.

THE ROYAL INSTITUTION.*

THE following is the conclusion of our translation of the lecture on *Colours* by Monsieur E. Mascart, Professor at the College of France, recently delivered in French at the Royal Institution, under the presidency of Mr. Warren De La Rue, F.R.S.

THE INFLUENCE OF THE SPECTRUM ON WATER FLEAS.

Is the vision of animals the same as that of man, or rather are there points of difference between them to the extent of their being able to see radiations which are invisible to us? To answer this question I will repeat a curious experiment performed by M. Paul Bert. In a glass vessel some water is placed containing a great number of small fresh-water shell-fish, belonging to the family of *Daphniadæ*. When a beam of light is sent through the vessel the water-fleas rush into it, and place themselves in the path of the rays. The greater part of the animals are in the same mood, and seek the light when it is not too intense. When we throw a spectrum upon the vessel, it is seen that the water-fleas again enter the illuminated region, but with differentiations which are very remarkable. The smallest of them swim about in the rays of the whole spectrum; a few of them in the red rays. They are abundant in the yellow and green, more plentiful in the blue and violet, and they are disseminated also in the ultra-violet. The largest water-fleas, on the contrary, take up a position almost exclusively situated between the green and blue. These animals see then the same rays as ourselves, despite the distance which separates man from crustaceæ in the zoological scale; and they appear even to partake of our infirmities, since some of them act as is they were affected by colour-blindness. Sir John Lubbock has made known in this same Royal Institution the results of a fine series of researches on the vision of ants, bees, and wasps, and brought out the very curious fact that the ultra-violet rays appear to ants brighter than the luminous radiations of the spectrum. The characteristics of animals studied in this aspect would be of the highest interest.

THE INFLUENCE OF COLOURS UPON LIFE.

So far we have considered colours but as the ornamentation of nature; but their influence upon the development of living things is exercised under the most varied conditions. Light and colours have, without doubt, a psychical influence, and this moral impression is nothing more than the translation of a physiological action.

In certain sanitary establishments for the treatment of the insane the patients have been made to live in golden-yellow light, which appears to exercise a happy influence on their character and to render them amenable to kindly sentiments. Certainly it is not the yellow sodium light which produces this result, but a sort of white light, in which the extreme blue and red rays are partly absent, so as to cause rose and yellow tones to predominate.

The predilection of animals for certain colours is not the result of artistic preference. If water-fleas seek the green light and ants the ultra-violet light it is without doubt because they find therein better conditions for existence.

Plants yield themselves well to this class of study. An ordinary plant—such as one of those which we have commonly under our eyes—grows, developes in every way, increases in weight, produces leaves, flowers, and fruits, and breathes; in other words, continual exchange is going on between the elements it contains and the gases of the atmosphere. These different acts of vegetative life are performed very unequally under the influence of diverse radiations—luminous or calorific.

The growth of a plant, by the elongation and multiplication of cells, takes place chiefly under the influence of the calorific rays, and for each plant there is the most suitable temperature. If a plant receive heat on one side only, it developes on that side and becomes stunted on the other.

In the light a plant grows more healthily than in darkness, but at the expense of its general nutrition and transversal development. Here the different colours have a very marked specific action. With a good light the retarding action, insensible with the invisible rays, presents a first maximum towards the red extremity, a minimum in the yellow where the light is the most intense, and a great maximum in the violet. The rays composed of short wave-lengths are, therefore, the most active.

This gives a simple explanation of heliotropy—that is to say, the tendency of plants to turn towards the light. When a plant is exposed to a lateral light, the lighted portions grow more slowly than those which remain in shadow; the plant consequently deflects its head in the direction of the light. On measuring this inflection, when set up by the different regions of the spectrum, it is discovered once more that the effect is insensible in the yellow, is more marked in the red, and has its maximum in the blue and violet.

We can deal now with the subject of the mechanism of nutrition. Besides the loss of water by evaporation, plants have two kind of respiration. One goes on continuously by day and night, and gives off carbonic acid gas; it is a sort of combustion correlative to life and is analogous to the respiration of animals. The other is intermittent, taking place only in the presence of light, and its function is to separate from the carbonic acid of the air the carbon of which the plant makes sugar and wood, at the same time disengaging the oxygen. The colouring matter of leaves, chlorophyll, plays the principal part in this nutritive respiration. The chlorophyll has to make itself in the first instance, then to exercise respiratory functions; and here, again, the different colours exercise a very unequal influence.

If the formation of chlorophyll in the plant is examined with an average light, it will be seen that it is produced throughout the whole length of the spectrum—very feebly in the infra-red, with a maximum in the intense yellow, and with a regular diminution extending into the ultra-violet of the solar spectrum. The curve of this action has a path analogous to that which Fraunhofer has given for the distribution of luminous intensity in the spectrum; but it is more prolonged towards the more refrangible end. Here, again, there is a preferential intensity beyond which the chlorophyll forms itself less easily. Beyond this a point of intensity is reached which destroys it, as in plants exposed to the full light of the sun.

Experiment proves that the production of oxygen does not take place except in the presence of grains of chlorophyll. If a ray of white light is made to traverse a solution of chlorophyll, and is afterwards analysed by a prism, an energetic absorption band will be seen in the red, and two others in the blue and violet. Now these are precisely the rays absorbed by the green substance which effects the decomposition of carbonic acid, and I cannot resist the desire to show you the ingenious method employed by M. Engelmann to put this fact in evidence.

In his experiments on fermentation, to which M. Tyndall has given such authoritative support, M. Pasteur has divided the little microscopic beings into "*aerobies*" and "*anaerobies*." The former breathe and grow in the presence of the oxygen of the air, but oxygen kills the latter. If we examine the first class of bacteria swimming in a liquid they will be seen to concentrate themselves around air-bubbles to get oxygen. If the liquid be deprived of air-bubbles and a piece of green weed is placed in it, the bacteria swim about indifferently so long as the light is very feeble; or, still better, if it have been passed through a solution of chlorophyll. But let white light be substituted, and the bacteria will be seen to precipitate themselves on all the grains of chlorophyll to seize the traces of oxygen disengaged; they constitute, therefore, a very delicate reaction.

To see the effects of different colours it is but necessary to bring a microscopic spectrum to bear upon a transversal cutting of a leaf. The bacteria will accumulate on the plant in the red just at the maximum point of absorption by chlorophyll, then in the blue, and the density of the population (so to speak) will almost follow the curve of absorption of the colouring matter.

I cannot dwell very long on the facts of natural history. I may state, however, that there are in this department great specific differences, bearing relation to the proper colour of different plants, resulting from the unequal absorption of their colouring matters. It will suffice to cite an example. The water of the sea has a different colour according to the thickness of it looked through by the observer, because of its unequal absorption of different radiations. Following the depth of the bottom on which it reposes, a marine plant meets with conditions more or less favourable, and is more or less well armed in the battle for existence. When we examine a sea-beach when the tide is out we find blue seaweeds near the level of high water, lower down green weeds, then brown weeds, and, lastly, red weeds in the regions which are rarely uncovered. At the upper part of a precipitous shore we perceive a series of bands of different colours which mark the limits where each species, better fitted as to physical conditions, has eliminated and vanquished neighbouring species; and this is not a question of depth, because we find the red algæ between wind and water in sheltered places, in the crevices of rocks, in deep caves, and where the light is of feeble intensity. In citing facts of this nature I am sure that you have all rising to your lips the name of one of the glories of England and of humanity—the naturalist Darwin.

Light, then, is the inexhaustible source from which living things borrow energy under all its forms and under conditions the most unexpected, and I request permission to close this lecture by citing some words of Lavoisier, which, when their date is taken into consideration, will appear perhaps to be a kind of divination:—"Organisation, sentiment, spontaneous movement, life, exist but at the surface of the earth, and in places exposed to light. It may be said that the fable of the torch of Prometheus is the expression of a philosophical truth which had not escaped the notice of the ancients. Without light nature would have been without life; she would have been dead and inanimate. A beneficent God, in giving light, has covered the surface of the earth with organisation, feeling, and thought."

* Concluded from page 427.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 10,029.—"Plate-Changing Apparatus for Photographic Cameras." JAMES BROWN, 49, Southampton-street, Pentonville, London; and FRANK BISHOP, 22, Soho-square, London.—*Dated July* 10, 1884.

No. 10,033.—"Portrait Holder." W. H. RICHARDS and W. D. WILKINSON.—*Dated July* 11, 1884.

PATENT SEALED, JULY 8, 1884.

No. 1,898.—"Improvements in the Construction of Cameras." CHARLES SANDS and JOHN JAMES HUNTER.—*Dated January* 22, 1884.

JULY 11, 1884.

No. 3,026.—"Apparatus for Exposing Plates in Cameras." JOHN and ALFRED GEORGE HOPKINS.—*Dated February* 9, 1884.

IMPROVEMENTS IN AND RELATING TO COLOUR PRINTING, ALSO PARTLY APPLICABLE FOR PRODUCING COLOURED PHOTOGRAPHS AND FOR SIMILAR PURPOSES.

A communication by AUGUSTE BISSON, of Paris, France, heliographic engraver, to W. R. LAKE.

THIS invention relates to colour printing, but is also applicable for producing coloured photographs and for similar purposes.

The said invention comprises an improved method or process which is applicable to all kinds of photographic or other pictures, amongst which I will particularly mention the proofs obtained by means of carbon or salts of silver, such as those obtained by photoglyptic or phototypic processes. These pictures may be portraits, reproductions of natural objects, or pictures of any other suitable description.

The said method or process consists essentially in printing, impressing, or applying, in the special manner hereinafter described, the necessary colours, either directly upon one or the other face of the gelatine film bearing the carbon proof or the photoglyptic proof, or upon a proof obtained upon a translucid support—such as mica, vegetable parchment, dioptric paper, transparent mineral paper, and paper mounted upon cloth or the like—to which substances I impart complete transparency by means of an operation which I carry into effect either before or after the production of the picture. This operation consists simply in immersing the paper or other substance which is to be rendered completely transparent in a bath of varnish composed of the following ingredients, namely:—

Volatile or rectified benzine	1,000	grammes.
Resin	150	,,
Linseed oil	10	,,

This mixture is prepared in a water-bath, and by a simple agitation which ensures an intimate mixture of the materials.

The picture being perfectly transparent, either naturally or by means of the treatment above indicated, I effect the colouring in the following manner, that is to say:—When it is required to reproduce a picture I take a photographic proof produced by means of a salt of silver, upon which proof I apply as faithfully as possible, as a tone, either oil or water colours, in such a manner as to exactly reproduce the shades of the picture.

With regard to portraits, it will be sufficient to give a simple statement of the colours.

Having obtained this outline sketch or copy of the picture, or a pencil or crayon tracing upon any suitable paper, each outline having as a base the same tone or shade—that is to say, for example, a dozen different tracings are made, if there are twelve different shades in the picture, each tracing comprising only the outline surrounding one colour; each of these tracings is then placed upon a sheet of stout paper or cardboard, or a very thin and opaque sheet of material in order to intercept the rays of light for the subsequent operation—the outlines applied to the said paper, cardboard, or metal are cut out carefully. Then, this operation being completed, as many stones as there are pieces cut out are prepared; these stones are prepared in the dark or under the action of a yellow light, with a saturated solution of bichromate of potash in albumen or gum. When the said stones are dry, the opaque cut-out pieces are laid thereon at the places which are to be coloured; each stone is then exposed to the light, a piece of strong plate-glass being placed upon the said stone to cause the said cut-out pieces to properly adhere thereto. A complete impression or *facsimile* of the cut-out pieces is obtained after a few minutes' exposure, and the sensitive substance is afterwards removed by washing in the ordinary manner.

I then place successively upon each stone (taking care that each impression registers properly) either the carbon or the photoglyptic film, or the photographic or phototypic picture produced or transferred upon a support rendered completely transparent in the manner above indicated, in order to effect the impression of the colour either directly upon the front or upon the back of the film as required.

The stones being inked in the ordinary manner, the printing is commenced with the shades of the figure—in the case of a portrait, for example, the dresses and the like—and terminated with the flat tints of the flesh and of the costume.

The colours should be prepared so as to accelerate the drying thereof, which is completed in a drying stove similar to those used in printing establishments.

If it is only required to obtain a small number of similar proofs, it is advantageous to dispense with the printing operations, and to effect the colouring directly with the cut-out pieces which I term patterns, and which are obtained in the manner above described; this operation resembles oriental painting.

I paste upon the back of the picture, if necessary, a piece of transparent paper, such as vegetable parchment or mineral or dioptric paper, according to the colouring effect which I desire to obtain; then, after having made, by hand, the eyes, the lips, and other details of the portrait, I take successively the prepared count-out pieces, and by the aid of short brushes I successively apply, by means of flat tints, the different shades I desire to obtain, passing from one proof to the succeeding proof having the same colouration. When the oil or varnish colour is dry, I terminate the operation with the ground tone by causing a tinted paper in harmony with the subject to adhere to the back of the picture by means of varnish.

This process, which appears complicated, is on the contrary very practicable, as will be readily ascertained by making use of it. It will, moreover, be seen that, in either case, the long and costly employment of a designer and colourist is avoided by the application of flat tints obtained either by printing or by hand by means of cut-out patterns as above indicated.

The coloured proofs are finally mounted upon and caused to adhere by varnish, dextrine, or any other suitable substance to a support, care being taken to put the said proofs under pressure and allow them to remain so during a whole night. These proofs may be mounted upon panels or upon Bristol boards; the latter may be first subjected to a glazing or smoothing process, and then covered with an encaustic enamel or a light varnish to protect them from the action of the air.

As regards copies of pictures: they may be mounted upon cloth, and the illusion completed by intercalating a piece of any suitable fabric between them and subjecting them to a sufficiently-strong pressure during a whole night; the said copies will thus acquire the aspect of an oil painting on canvas, and may be mounted upon a wooden frame and varnished in the same manner as an oil painting.

Having thus fully described the said invention, I claim:—

The above-described improved method or process of colouration—by printing or impression—of pictures obtained by photography or by processes derived therefrom, which method or process is based essentially upon the following points, viz.:—

1st. The printing or impression of the colours upon one or the other face, either of the transparent gelatine film of proofs obtained with carbon or by photoglyptic engraving, or of these proofs transferred upon perfectly transparent supports, or of photographic or phototypic proofs obtained upon paper or other equally-transparent supports.

2. The above-described method of treating in a cold bath, formed of rectified benzine, resin and linseed oil, in, or about in, the proportions named, various partially-transparent supports, such as vegetable, dioptric or mineral paper, or vegetable parchment, in order to give to such supports a complete transparency.

3. The method of successive printings or impressions by flat tints of the different colours to be obtained by means of thin patterns made of opaque substance, such as metal, cardboard, or the like, which have been previously cut out to the exact outlines taken from a photograph of the picture of the different shades to be produced, and which are applied upon a lithographic stone treated with bichromate of potash to obtain parts representing the exact forms of the tinted parts, and which are then imprinted successively on the proofs suitably registered and prepared in the manner above indicated.

4. The modification of the method of printing, consisting in operating by hand, when only a few reproductions are required, by means of the cut-out patterns above indicated, which facilitate the rapid application, by flat tints put on by means of a brush, of the different colours which it is desired to obtain.

5. The above-described method of mounting the coloured proofs obtained as above indicated, upon Bristol board, wood panels, or cloth, according to the appearance which it is desired to give to the picture.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK

Date of Meeting.	Name of Society.	Place of Meeting.
July 22	Bolton Club	The Studio, Chancery-lane.
,, 23	Bristol Amateur	Studio, Portland-st., Kingsdown.
,, 23	Photographic Club	Anderton's Hotel, Fleet-street.
,, 24	London and Provincial	Masons' Hall, Basinghall-street.
,, 24	Liverpool Amateur	Free Library and Museum.
,, 24	Oldham	The Lyceum.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AT the meeting of this Society, held on the 10th instant, the chair was occupied by Mr. A. L. Henderson.

Mr. W. M. ASHMAN, referring to some experiments described at the previous meeting by Mr. W. E. Debenham, said that he had experimented with hypo. baths since then. In one case he had added a considerable amount of strong liquor ammonia to a bath, and left a negative in it for thirty hours without its suffering in any way.

The CHAIRMAN inquired whether the plate had previously been subjected to the influence of an alum bath.

Mr. ASHMAN replied that it had not.

Mr. W. COLES had also experimented in the same direction. He had cut a plate in two, and placed one half in clean new hypo., and the other half in a collection of old used baths for three days. In neither case was the film affected, and he supposed that where it did dissolve that effect was due to some peculiarity in the gelatine.

The CHAIRMAN inquired whether anyone had experimented with formic acid as a developer for dry plates, as recommended by Mr. H. J. Newton, of New York.

Mr. ASHMAN had made some experiments which confirmed the view that formic acid was not a developer itself. He had poured some of the acid on to an exposed plate. The only result was that the gelatine frilled; there was no reduction of silver. He had also mixed bromide of silver, pyro., and formic acid in a test tube and exposed to light for some time; but again no reduction of silver took place.

Mr. A. COWAN exhibited a cutting wheel of American design in which the wheel was very much larger than in the old pattern. It could, therefore, be more easily sharpened and would cut several thicknesses of paper (certainly four) at one time. The rule against which it was to work should be both thick and broad.

The CHAIRMAN showed strips of the cardboard which had induced the broad, spreading marks of reduction on the plates with which they had been in contact, of which he had spoken at a previous meeting. He also produced negatives foggy all over which had been taken on plates packed with this cardboard, and he attributed the fogging to the spreading of the action of pressure or shearing stress set up at the edge of the card.

Mr. COWAN thought that the reduction or fogging was not due to pressure at all, but to chemical action.

The CHAIRMAN inquired whether Mr. Prestwich could give any information about marks resulting from packing.

Mr. W. H. Prestwich packed with a common thick paper or cardboard, and now never got markings. Formerly, when using cartridge paper, he did get them, but they did not spread.

The Chairman said that some few days since he had made several experiments with Mr. Cobb, and asked that gentleman to give the particulars.

Mr. W. Cobb said that Mr. Henderson had a few days ago written on some plates, and made marks with a pencil on paper laid over the films. These plates were cut in two, and parts developed at the time; the other parts were left until that day and then developed. Contrary to what had been anticipated, those plates which had been kept before developing shows the markings weaker than those which had been developed immediately after the marks were made. He (Mr. Cobb) further stated that he considered the question of dark markings on the edges of plates was an important one. He was in a position to state that pressure was not the cause, but that damp, either in the plates themselves or in the material used for packing, was. He had found these marks on some commercial plates which had been kept upright in grooved boxes and not subjected to any pressure. Some of these plates he produced. Some months since he had all the paper that was to be employed for packing thoroughly dried before being used, and with plates thus packed he had not found any markings at all. Since then he had in one case omitted to dry the paper first, and the batch packed with this paper had, as he remembered, taken a long time to set. When they were opened a short time since an image of the paper was found to develope on the plates, but where the paper had slipped in packing and the plate was uncovered it developed clear.

Mr. F. York inquired what kind of paper had been used.

Mr. Cobb replied that it was chrome yellow paper similar to that used for dark-room windows.

Mr. York had seen markings such as those referred to on plates packed both in cardboard-grooved and wooden-grooved boxes, and whether kept upright or stored flat.

The Chairman considered that it was a serious matter, as there seemed to be three dangers to guard against. If the paper were damp that was said to produce marks; if well dried there was danger of phosphorescence; and then there was a danger of chemical effect from the paper itself.

Mr. Cobb thought that the proper course was to dry both plates and paper well before packing. He also showed some parchmentised paper, which was what he now used for the purpose.

Mr. Ashman remarked that parchmentised paper, which was simply paper passed through sulphuric acid and washed, had the advantage that it did not readily absorb moisture.

Mr. York inquired whether all the acid was washed out after parchmentisation. Perhaps Mr. Haddon would explain the action of the acid.

Mr. A. Haddon said that there was simply a dehydration—the removal of the elements of water from the substance of the paper.

A Member inquired whether any experiments had been recorded of the effect of pressure in producing phosphorescence.

The Chairman said that such would be found in one of the photographic journals.

Mr. P. G. Graham remarked that some fifteen years ago he had packed up plates which a gentleman well versed in emulsion work had said would not keep, owing to the process by which they were made. His own opinion was that they would keep, and packets that had been opened from time to time bore out this view; in fact, they were now even better than at first. The method of packing employed was to take a long strip of yellow and orange paper—similar to that mentioned by Mr. Cobb—as wide as the length of the plate, and to wind this round every two plates, placed back to back, till the dozen was made up. In every case the paper was carefully dried before use. Small and large-sized plates were stacked in one box, one packet upon another, in grosses, so that the pressure on the bottom packet must have been considerable; but in no case had he found any marks from pressure.

The Chairman passed round a silver print on opal, printed right out, and sent with a letter, which was read, by Mr. J. Crosby, of Rotherham.

A Member inquired the details of manufacture, and it was suggested that the Secretary should write to Mr. Crosby for particulars.

The Chairman exhibited some plates showing effects which he thought explained the reason why from the same batch of emulsion some plates were quicker than others. He attributed it to the greater or less time they had taken in setting. On a summer afternoon, when the temperature was high, the emulsion would take so long to set that the coarser bromide had time to settle to the bottom. With some that had taken from twenty to thirty minutes to set, he found that they acted with quite half again as much sensitiveness when exposed from the back as when exposed on the front. The more quickly plates were set the more rapid and uniform they were. He also thought that this settlement of bromide would explain one cause of frilling, the bromide preventing the gelatine from adhering. He (the Chairman) also mentioned that someone from abroad had called on him to prove the superiority of a new secret developer. On making careful experiments, however, against his (the Chairman's) own developer the secret one was found to give less detail and more green fog.

The Chairman being about to start for America the best wishes of the Association were accorded to him, and it was suggested and acquiesced in that during his absence he would send to the Association leaves from his note-book.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

This Association held its usual Board meeting on Wednesday, the 2nd instant, at 181, Aldersgate-street, E.C.

The minutes of the previous meeting were read and confirmed. Mr. T. W. Cowper was elected a member of the Association.

The correspondence and other matters having received attention, the meeting terminated.

MANCHESTER PHOTOGRAPHIC SOCIETY.

The fifth outdoor meeting for the present season of the above Society was held on Saturday, the 12th inst., at Matlock Bath.

As announced in the list of summer meetings issued to the members at the beginning of the season, the time of departure from Manchester was fixed for one o'clock p.m.; but at the subsequent request of several gentlemen who wished to devote a greater portion of the day to photographic work in so beautiful a locality, it was decided to travel by an earlier train. This change having been made known amongst the members as widely as possible, the party left the Central Station at 9.50 a.m., arriving in Matlock a little before 12 o'clock at noon. Notwithstanding the extremely unsettled state of the weather, and the prevalence of thunder-storms during several days previously, the morning opened delightfully fine; and, with the exception of a stiffish south-westerly breeze, the weather throughout the whole of the day could hardly have been more propitious.

In accordance with a prior correspondence with the secretary of the recently-established photographic society at Derby, a trip to Matlock had also been arranged by that Society for the purpose of meeting, and fraternising with, the Manchester party; and it is much to be regretted that, partly owing to the unavoidable absence of Mr. Warburton—who should have "generalled" the Manchester members on the occasion—as well as to an imperfect knowledge of the surrounding district, the party, acting under local guidance, had somewhat unwittingly committed itself early in the day to a long drive, which unfortunately prevented the meeting with the Derby members until late in the afternoon.

Successful negatives were obtained of the High Tor, Heights of Abraham, Lovers' Walk, and some general views of the town, the configuration of the ground on which Matlock stands being singularly favourable for giving the necessary "coigne of vantage" at several different points.

Access was procured to the grounds adjacent to Willersley Castle, where some views were obtained on the Derwent; also of the beautiful and picturesque little church, founded by Sir Richard Arkwright, at Cromford.

Lea Hurst, the residence of the noble-minded and self-sacrificing Florence Nightingale, was also visited, and permission having been obtained several plates were exposed, in some of which the party was grouped on the lawn. The house is delightfully situated. The simplicity and taste with which the grounds have been laid out give the place an air of peace and retirement, befitting, as one would think, the residence of a lady whose life hitherto has been a mission of mercy.

The return drive was by Crich Hill, where, as the result of a peculiar geological formation in the heart of the mountain, a serious landslip occurred some two or three years ago. The views from the tower on the summit of the hill (but not photographic views) can hardly be surpassed for extent and beauty. At this point, however, time was becoming a serious antagonist, and the remainder of the journey to Matlock was made with all possible dispatch. A hurried tea was taken in company with the Derby brethren, and, at the suggestion of Mr. McKellan, supported by several others, it was proposed that a special day trip should be shortly arranged for a joint meeting of the two societies at Ashbourne, for the purpose of working the charming and romantic scenery in Dovedale. It is to be hoped, if such a meeting should be arranged (and of which due notice will be given), that the Manchester Photographic Society will muster in strong force—not only on account of the grand and imposing scenery to be met with in Dovedale, but also to give the right hand of fellowship to the representatives of the Derby Photographic Society.

The next outdoor meeting of the Society is proposed to take place at Speke Hall, on Saturday, July 26th. The train will leave London-road station at 10.20 a.m. Members and friends will please to send in their names to the leader, Dr. C. P. Bahin, Stanley House, Heaton Moor, two or three days before the date of the excursion.

LEEDS PHOTOGRAPHIC SOCIETY.

The usual monthly meeting of this Society was held at the Philosophical Hall, on Thursday, the 3rd instant,—Mr. J. W. Ramsden in the chair.

After the confirmation of the minutes, Mr. Whitham was elected a member of the Society.

Mr. Washington Teasdale called attention to a number of very fine lantern slides which he had taken on Ramsden's special lantern plates. He said the plates were very slow, the exposure required being from thirty seconds to two minutes (according to the density of the negative), at a distance of twelve inches from a fish-tail burner. The tone of colour obtained by the pyro. developer was a rich brown, and the great characteristics of the plates was absolute clear glass in the shadows, with the best gradation of tones and half-tones that he had ever seen. He also drew attention to two or three slides that had been transferred from the fixing-bath to the alum solution, the result being a red stain.

Mr. Pocklington had also been using the same plates and got very fine results, some of the most effective being those toned by immersion in a bath of—

1.	Nitrate uranium	20 grains.
	Water	1 ounce.
2.	Ferridcyanide of potassium	20 grains.
	Water	1 ounce.

Two parts of No. 2 to one part of No. 1.

In answer to a question as to what was the cause and the best cure for flare in double combination lenses, it was suggested that flare was very frequently caused by the front lens being in a dirty condition.

Mr. H. Rodwell remarked that the lens of the scenograph always gave a flare-spot when used with the smallest stop, and as a preventive an additional stop was supplied to fix in front of the other.

In answer to a question as to what was the best way to recover the silver from a quantity of soda and water in which the films of several gross of negatives had been dissolved, and as to whether it was worth doing, Mr. J. W. Ramsden suggested a number of methods that might be employed, but thought the best would be to add a quantity of sawdust to the liquid and then reduce in the usual way. In his opinion, however, the result would not be worth the trouble, seeing the very small quantity of silver used to make the image.

A Member asked the following question:—He had an etching copyright of a very valuable painting. Supposing he made for his own use, and for exhibition in his own home to his friends, a lantern slide, would he be liable to any prosecution if it were known to the owner of the copyright that he had done so?

A long and interesting discussion took place. At the close it was generally agreed that in doing so the member would be liable to prosecution, and if convicted the owner of the copyright could obtain damages; but, if the slide were used only in the way described, the damages would be so small that it would not be worth the while of anyone to incur a long and costly trial to obtain them.

An inquiry was made as to whether any of the members had seen the "vulcanised fibre" that had been recommended for making shutters for dark slides, &c. Although several of the members had heard of it none had seen it, and it was not known where it could be obtained. From a description given in one of the journals it was thought that it would be very useful, not only for shutters, but for stops, &c.

Mr. Teasdale said he deprecated the use of brass for stops, and had used for some time stops made of ebonite, as being much better; but he thought that if the Willesden paper were supplied in black it would be most useful, not only for this purpose, but for many others where thinness, toughness, and lightness were required.

Mr. Ramsden exhibited a very portable camera and instantaneous shutter adapted to work close to the back lens. They were much admired.

The meeting was then adjourned

GLASGOW AND WEST OF SCOTLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

A special meeting of this Association was held in the new rooms of the Association, 180, West Regent-street, on the evening of Thursday the 10th instant,—Mr. Hugh Reid, President, in the chair.

After the adoption of the minutes the following new members were admitted:—Messrs. John L. Coulson, David Pratt, James Kirkwood, Samuel Walker, William B. Smith, and James Torrance.

It was agreed that any amateurs visiting or passing through, but non-resident in, Glasgow should have the use of the dark room, &c., without charge, on the introduction of any member of the Society.

After a little discussion it was arranged that the next outdoor meeting of the Society should be held at Kilmun and Holy Loch, on Saturday, 9th August. Members to leave by the 8.30 a.m. train from St. Enoch's Station.

The members present were very much pleased with the new rooms, and it is expected that the Association will derive great benefit from the increased accommodation for meetings and the conveniences of the dark room for developing, enlarging, &c.

After the usual votes of thanks the meeting was adjourned.

OLDHAM PHOTOGRAPHIC SOCIETY.

On Tuesday, the 24th ult., the members of this Society with a few friends visited Bakewell, Haddon Hall, Chatsworth, and Rowsley, in Derbyshire. The day was favourable. Fourteen cameras were at work, and about 100 plates, varying from 12 × 10 to stereoscopic size, were exposed. On development the quality of the majority of these plates have turned out satisfactory. After passing an enjoyable day the party, numbering thirty-one, partook of an excellent tea at Rowsley, and returned by a quick train at eight o'clock p.m.

The monthly meetings of this Society are now held at the Oldham Lyceum, the first meeting at which place was on Thursday, the 26th ult., when thirty members attended,—Mr. John Risley, President, in the chair.

A good show of work by members was exhibited, and the Chairman brought a new drop-shutter of his own invention before the meeting, the simplicity and perfection of which secured great praise.

Six new members were proposed at the meeting. This Society was established in 1867. It now consists of over fifty members, and is in a most healthy condition.

DERBY PHOTOGRAPHIC SOCIETY.

An outdoor meeting of this Society was held at Matlock, on Saturday last, the 12th inst. Among those present were Messrs. C. E. Abney, C. Bourdin, S. J. Cholerton, T. Scotton, F. Shute, F. W. Simpson, and R. L. Warham.

Starting from Derby at 2.5 p.m., the party alighted at Matlock Bath station, and immediately set out for the well-known High Tor. The weather at starting was everything that could be desired; but no sooner was the formidable array of cameras pointed at the gigantic rock than a black cloud obscured the sun. "Everything has an end," and this proved true with regard to the cloud; for, after waiting patiently for some time, the weather cleared up and the sun again shone. Having secured this picture a move was made to the "Lovers' Walk," and here the party met two members of the Manchester Photographic Society.

Some views of the river and "Lovers' Walk" having been taken, the members next drove to Cromford, where they met the rest of the members of the Manchester Photographic Society, and returned with them to Matlock, where the two societies "tea'd" together at the Peveril Dining Rooms.

The President of the Manchester Society (Mr. J. Pollitt), in the course of a few remarks, invited the Derby Society to join them in an excursion to Dovedale during the summer. The members then separated.

Correspondence.

TRANSPARENT MARKINGS ON GELATINE NEGATIVES.

To the Editors.

Gentlemen,—In your issue of the 4th inst., my friend Mr. A. Pringle complains of many of his plates being spoilt by being marked about an inch or so from the margin with an insensitive band; and another correspondent in last week's issue makes the same complaint.

I also have had considerable trouble and loss from the same cause; but I cannot agree with your correspondent, Mr. D. W. Hill, as to the reason of this—at least in my own case, as I have used the plates in slides having no hinge. I have noticed, however, that the tissue paper which is placed between the plates in packing is not always the same size as the plates, but generally half-an-inch narrower all round. The insensitive line is not always on the same side of the plate with me; but sometimes on the right, at other times on the left, occasionally along the top or bottom, and again sometimes round two sides. May not undue pressure where the paper ends be the cause of this marking? If so, the remedy is evident.

I may say that I have some plates of the same make which have the paper entirely covering the plates to the edges, and no such markings have I ever found on these; in fact, they are the finest and most perfect plates I have ever used.—I am, yours, &c., John Jackson.

Friar's Mount, Waverley-road, Clifton, July 12, 1884.

BLISTERS IN PRINTS.

To the Editors.

Gentlemen,—It would, I think, be a great boon to all photographers if some of our able experimentalists would kindly investigate the cause of blisters in silver prints. So far as I am aware this has not yet been done systematically, as was the case with the question of the action of hypo. in fixing, and of which you have given us such a well-timed and useful reminder in this week's Journal.

What we want to know, *with certainty*, is the cause of these annoying defects. At present I think all that is known amounts merely to one or two empirical notions.—I am, yours, &c., "Bromo."

Leamington, July 12*th*, 1884.

THE PHOTOGRAPHIC SOCIETY AND ITS REPORTS

To the Editors.

Gentlemen,—The length to which Mr. Herbert B. Berkeley's letter in your last issue extends makes the task of digesting and replying to it seem rather appalling; but, as my name is referred to more than once, I will endeavour shortly to answer some of Mr. Berkeley's remarks.

Mr. Berkeley comments upon my objection to the "slip system" by saying that he has a higher opinion of men than I have, and that it would be more complimentary to my fellow-members if I were to give them credit for not seizing opportunities for "cooking" the reports. Is Mr. Berkeley's opinion of men so high that he is prepared to guarantee of every person who may happen to become a member of the Society that he would not do so? In the particular case to which I referred I imputed nothing unworthy to the member the alteration of position of whose remarks made mine appear absurd. He might well have thought it was desirable to put his two remarks into one sentence, and, not having the slip of my observation made between them before him, would not see that he was doing injustice to me or anyone; or it may have happened that the slip was furnished to him with his two sentences condensed into one.

As to the argument that any error in the Society's *Journal* can be corrected in the same publication, but that such a protest would seldom be required: I would point out that the time which must elapse before such correction could appear is longer than most people like to lie under a misrepresentation which may make them appear ridiculous. A month is the shortest time, and at present it will be nearly half a year. At the last ordinary meeting, for instance, Mr. Sawyer said that he should like to have the opportunity of exposing a plate for five minutes to the light of my composite light lamp. This was reported in the Society's *Journal* for June; but my reply that he should be most welcome to do so, and that I should be pleased to furnish him with any of my patterns, was omitted from the report. Now the Society's *Journal* will not in the ordinary course appear again until nearly Christmas time.

Mr. Berkeley says that the reporters do not take down the speaker's actual words. I do not know what is his authority for this statement, but I believe that in important cases they commonly do take down the actual words, although when writing out the report for publication they necessarily condense, and omit repetitions, &c.

Mr. Berkeley is very broadcast in his charges of misrepresentation. "The Editors, like the other writers, totally misrepresent my meaning," he says. Misrepresentation is a more serious charge than Mr. Berkeley seems to think; and, as he has not given any instance of what he calls misrepresentation on my part, perhaps he will think proper to withdraw his charge—at all events so far as I am concerned.

In a letter in the same issue of the Society's *Journal* as that from which you quoted Mr. Berkeley's first letter is another by him, in which he complains of my having attributed to Mr. J. B. B. Wellington the first production of beautiful warm tones upon bromide plates similar to those obtained upon chloride, and claims priority for himself. In support of this he refers to a print which had been for some years in the possession of Capt. Abney, the editor of the Society's *Journal*, and in a footnote Capt. Abney confirms his claim. Mr. Berkeley refers to having published the matter some seven years earlier. I have looked through some volumes of photographic publications without finding the reference, although I have come across a good deal of writing of Mr. Berkeley's in support mainly of two propositions—one that it is better to use excess of silver in making bromide emulsions; and the other that chloride of silver would, when a proper developer was discovered, be found more sensitive in the camera than bromide. (This was before Dr. Eder's publication of the method of using iron developer, which has so popularised the chloride process.) I have not yet met with the description of the method of producing warm tones on bromides. Will Mr. Berkeley kindly furnish the date? It is unaccountable, if his results were in beauty anything like those of Mr. Wellington, that the matter was not taken up and made much of at the time and largely employed since.

In answer to Mr. Andrew Pringle, I heartily accept his apology for charging me with want of courtesy. Had I accused him of "want of logic" generally, I should feel an apology due in turn from me. As, however, he has withdrawn the complaint, which appeared to me to be illogical, there is nothing more that need be said.—I am, yours, &c.,

July 14, 1884. W. E. Debenham.

THE PHOTOGRAPHIC SOCIETY.

To the Editors.

Gentlemen,—Will you allow me a few lines in reply to Mr. H. B. Berkeley's letter in your last.

As one of the "anonymous ones," may I point out that my letter and those of others were not "personal attacks" on Mr. Berkeley, but were reflections upon the conduct of the Society whose self-elected spokesman and champion he had become. If Mr. Berkeley chooses to write in his own name, with the chance of having the council and officers to back him, it is no reason why a humble private member should follow his example with the certainty of having the same august body—to use Mr. Berkeley's elegant expression—"down on him like a load of bricks."

Mr. Berkeley's last letter has not added one single new argument to his previous ones, nor has it shaken a single one of the counter arguments. It may, in fact, be taken as a type of what we may expect when the "slip" system becomes general; it is an extension of what *was* said for the purpose of explaining what was *intended* to be said.—I am, yours, &c.,

July 14, 1884. A Member.

To the Editors.

Gentlemen,—In Mr. Herbert B. Berkeley's somewhat wordy communication last week the writer speaks of the valuable matter which I and my friends barter over the attractions of the refreshment table. Allow me to point out, as Mr. Berkeley is so particular on the point of "misrepresentation," that I spoke in my previous letter of the valuable information which "passed from one to another," &c., &c. Now, I find the dictionary gives the meaning of "barter" as "to give one thing for another"—"to traffic by exchanging."

If Mr. Berkeley's photographic ideas do not soar any higher than bartering or exchanging, I would inform him that there *are* a large number of the members of our Society who are willing to impart information and advice without expecting any *quid pro quo*.—I am, yours, &c.,

July 15, 1884. Looker On and Listener.

REPLIES: ILLUMINATION OF THE DEVELOPING-ROOM AND OTHER MATTERS.

To the Editors.

Gentlemen,—I have of late been so much before your readers, controversially and otherwise, that I feel myself not only justified but constrained to retire into my shell, and to cease to occupy more than necessary of your valuable space. This being the case, allow me to notice as succinctly as possible the various writers who bring my name into their communications in your issue of today.

My first antagonist is my very good friend the Rev. H. V. Macdona. That gentleman asserts that I have "taken an idea into my head, and am riding it to death." What "idea" does he mean? The "idea" that ruby is preferable to yellow for a dark room window is pretty old, and was taken into the head of men superior, as they were anterior, to me in photographic science. And if Mr. Macdona will read my articles he will find I am far from riding anything to death; for my distinct advice is that every man should use what colour he likes and finds best, the gist of my writing being a warning, founded on medical authority, to make sure that the eyes are not damaged by the change so much urged on us. That is the Scotchman's way of "riding to the death"—boldly, but carefully. Mr. Macdona's "illustration" has certainly nothing Scotch about it; in fact, it smacks of the "sister island." After having "given great attention to the different testimonies" * * * * he feels "perfectly convinced that a great boon has been conferred * * * * by the happy discovery of a medium which combines the maximum of luminosity with the minimum of actinity." The "happiness" of the discovery is the very point upon which we are at issue; in fact, Mr. Macdona "begs the question" in a thoroughly jovial and good-natured manner.

Mr. D. W. Hill's notes on *Transparent Markings* on negatives are evidently written with the intention of helping me out of a difficulty, and I thank him cordially. But that my markings did not arise from the same cause as his will be apparent from the following facts:—Other plates used in the same camera did not give the same effects, while the faulty plates used in other cameras did. My marks were not always at the same end of the plate; they were often not at the end at all, but at the sides. My plates did not lie in slides at all, but in a changing-box; and my slide for the changing-box has not india-rubber American cloth in it. As a matter of fact, the fault lay in the drying of the coated plates; and the manufacturer behaved all along in the most handsome way, trying to discover the cause of the mischief. Now that he has rearranged the drying-room of his establishment, he is sending me plates as perfect in their coat as they are in other respects.

I seem, from Mr. H. B. Berkeley's remarks of July 5th, to have misrepresented or misread his letter to the Parent Society's *Journal*; but I seem also to have sinned in a numerous, if not good, company. The very fact of so many people having misrepresented or misread his letter speaks pretty strongly for the truth of what I before alluded to—the difficulty of seeing what he really did mean. It appeared to me when I wrote, as it appears to me still, that the *Journal* of the Photographic Society of Great Britain cost more than it was worth, and I see no reason why I am not to say so. Mr. Berkeley's letter brought the conduct of the *Journal* into public notice, and I had my humble finger in the pie. I am myself a member of the Society in question, and, in spite of Mr. Berkeley's insinuation pretty broadly stated, I am not one of those who pay their guinea with one hand and *decry* the Society with the other. I have every wish for the prosperity of the Society, and by what right I am accused of wishing otherwise I am at a loss to discover. If the members of the Society are to show their interest in its welfare by silence, whatever may happen, we had better put up the shutters, or "sport our oak" and docket it—"Back in five minutes." On such conditions I have not another word to say. My chief comfort is that in his letter of July 5th I do not suppose Mr. Berkeley represents the Society as a body, nor will I believe that the Society as a body considers itself beyond the reach of honest and frank, but thoroughly well-meant, criticism.—I am, yours, &c., Andrew Pringle.

Craigcleugh, Langholm, July 11, 1884.

Notes and Queries.

R. Beard sends us two safety valves constructed on the principles described by Mr. Hardwich. We hope soon to be in a position to try these, after which we will report upon them.

"Opaque" desires the names and addresses of certain makers of lanterns to which allusion has been made in this Journal.——It will be necessary for him to specify particulars before this request can be complied with.

G. Dobbs asks—"Does the Government guarantee me anything when I register a photograph by entering it at Stationers' Hall?"——We reply: By this act Mr. Dobbs is enabled to bring an action against anyone who, by copying his picture thus entered, infringes his copyright.

"By what means can I cement a trough that will hold acid solutions?—B. S. Boyle."——In reply: Let our correspondent mix together equal quantities by weight of pitch, resin, and plaster of Paris. First melt the pitch; then add first the resin, and lastly the plaster, which must be quite dry. This forms a cement suitable for the purpose mentioned.

A. M. Donaldson says:—"I have a quantity of home-made spirit of wine which is pretty strong, and which I intend employing for photographic purposes. But I have not taken any special precaution to get rid of the last traces of fusel oil which, from my manner of proceeding, I suspect must be present in some small degree. Can you inform me of any means by which I can detect the presence of this oil?"——In reply: There is a very excellent way of ascertaining the presence of fusel oil in alcohol, but it depends on the sense of smell. Break up some chloride of calcium into small pieces and put them in a beaker; then add just sufficient of the spirit to moisten the whole. Cover the beaker and allow it to stand. In a short time the smell of fusel oil, if any be present, will be distinctly perceptible, and increase in intensity after standing for some hours. The slightest trace of fusel oil may be detected in this way.

T. J. Hart asks—"What is a 'chemical focus?' I have a hazy sort of idea concerning the meaning attached to the term by many writers, and I think them wrong, if my idea be correct. Perhaps you will kindly say what is meant by the term, and also if it be a correct one to apply to an optical instrument."——We reply: The term is commonly employed to distinguish between the visual focus of an imperfectly corrected lens and the focus at which most of the chemical or active rays are brought to a point. It is this latter that is spoken of as the "chemical focus," in contradistinction to the "visual focus," which is situated on a different plane. In popular phraseology, when a lens is said to have a chemical focus it simply means that it is not properly corrected for colour. The best lenses have their visual and chemical foci coincident. On the subject of the correctness of the expression employed we shall not here make any comment. The language of strict optical science does not always apply to photography, which has a nomenclature peculiar in many respects to itself.

J. Jobson has experienced some difficulty in obtaining transparent oil colours for painting lantern transparencies. Those he has secured are somewhat opaque and lacking in brilliancy. This is especially the case with the greens and reds. He inquires, too, if there be no better yellow than gamboge.——In reply: Our correspondent is not the only one who has experienced the difficulty just described. We are pleased at being in a position to indicate a termination to his troubles. Mr. Newman, of Soho square, has succeeded in producing some transparent oil colours that are simply admirable. A green, which is very brilliant and perfectly transparent, is issued by this firm in small tubes, under the designation of "chromium green oxide," which is a most useful colour, answering well for foliage. The "carmine madder" of this firm is the most brilliant red that is necessary, and is quite transparent; equally transparent is a new yellow, which is issued under the name of "aureolin." We are glad that a firm of such high reputation as that of Newman is bestowing attention upon the more difficult class of transparent colours for lantern pictures.

Exchange Column.

I will exchange a 19 × 16, and 8½ × 8½, camera for anything useful; see advertisement.—Address, W. Hudson, 62, High-street, Bordesley, Birmingham.

I will exchange a burnisher, nine-inch roll, new, for a three-wick lantern or slide.—Address, G. V. Sankey, photographer, Woodville, near Burton-on-Trent.

Wanted, a 5 × 5 square bellows camera, folding tailboard, with one single and one double slide for coil, in exchange for sewing machine or lantern slides.—Address, C. J. Emery, Walton, near Ipswich.

I will exchange a whole-plate landscape lens, rack and pinion, perfect definition, for a quarter-plate (or larger) portrait lens; photograph submitted and required.—Address, M., care of Mr. Joseph Wild, Charlotte-terrace, Farnworth, Widnes.

I will exchange a Grubb's patent portrait lens, two and a-quarter inches, front lens fitted in separate mount, also a solid ivory walking-stick, splendid fishing-tackle, case, and waterproof fishing bag. Wanted, a rectilinear lens or whole-plate folding camera.—Address, W., 8, High-street, Kington, Herefordshire.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

T. Bourke.—We regret we cannot supply you with the gentleman's present address. He has removed quite recently.

W. Bennett.—You had better apply to the makers of the paper. They may possibly be able to supply you with a formula for a warmer tone.

Geo. B (Hants.).—See article in the present number. We shall be very much pleased to be informed of the result of your experiments in that direction.

R. C.—We believe the apparatus to which our correspondent refers is that styled the "*multum in parvo* tripod stand," manufactured by Messrs. H. Newton and Co., Liverpool.

Hypo.—If the solutions are concentrated such a result will certainly occur; but with weak solutions there will probably be nothing further than a slight deposit formed after some time.

A Yorkshire Amateur.—During the hot weather try treating the plates with a solution of alum before fixing them. This will, no doubt, prevent the minute blisters of which you complain.

Instantaneous.—The thing is much better in theory than in practice, unfortunately. No one has yet succeeded in producing anything like good results; but do not let this deter you from experimenting, however, as you may be more successful.

Printer.—If by "muddiness" our correspondent means what is usually known by "mealiness," it is probably caused by not allowing sufficient time to elapse after adding the gold. Twenty-four hours should be allowed. "Printer" had better forward us a sample print.

H. K.—1. The transparent spots appear, judging from the prints, to be due to air-bubbles adhering to the film during the development. The only remedy now is to touch out the spots with india-ink.—2. See answer to "A Reader (Brighton)."

B. G. Y.—You cannot possibly do any harm by removing the lenses from their cells and blackening their edges, as you suggest. On the contrary, they will be improved by the treatment. We are surprised that the maker should have sent out the instrument without first taking this precaution against reflections.

Giaggiolo.—Are you sure the defects proceed from the emulsions at all? It is possible, after all, that it is not due to the fixing solution being too strong. Try fixing in a bath composed of one part of a saturated solution of hyposulphite of soda diluted with three parts of water. If this do not get you out of the trouble write again, sending us an example.

J. Ewings.—The groups of fish are very artistically arranged. The only fault in connection with the pictures is that the negatives are somewhat under-exposed. If you had given a longer exposure the silvery scales of the salmon would not be so chalky, and the shadows between the fish less heavy. The group of mackerel is the best of the series. That is fully exposed.

An M.D.—The photographs, as pictures, are not what might be called "first class;" but, for the purposes of your profession, they, we may say, should prove very valuable if published. For such purposes the technical excellences of the photography is only of secondary importance. These prints appear to show every detail, and that is all that is requisite. Such subjects can never be made into artistic pictures.

W.—The stain is caused by the negative being insufficiently fixed before you proceeded to intensify it with the mercury. We know of no practical method by which the stain can now be removed. In future you will do well to allow the negative to remain in the fixing solution for a much longer time than is apparently necessary to dissolve out the bromide—more particularly when the negative has to be intensified afterwards.

L. J. H.—About the only thing you can now do to improve the picture is to introduce a few clouds. These would make a vast improvement. Had you employed a smaller stop in the lens the definition would have been much finer. So far as we can judge from the print the negative appears to be fully exposed. If you print-in the clouds, as we suggest, you will be surprised at the difference it will make in the appearance of the photograph.

G. F. T.—1. The experiment is worth making, though we can scarcely tell you what is "likely to be the result" without ourselves performing it. As it will be quite as easy for you to do so, and as you are probably more interested in the matter than we are, we should decidedly recommend you to test the question for yourself.—2. Infusion of quassia was recommended as a preservative for dry plates as far back as 1868. We see no reason why it should not be utilised in connection with gelatine if it have any advantages.

J. Cohen.—To get a more metallic appearance in the deposit on glass positives you must add a little nitric acid to the developing solution; indeed, if a very metallic image be required, the acetic acid may be omitted entirely, and replaced with nitric. The following will give a very bright deposit:—Sulphate of iron, fifteen grains; nitric acid, five drops; water, one ounce.

S. R.—1. Now that you have added the two residues together your best plan will be to precipitate the silver with sulphide of potassium (liver of sulphur). In future they should be kept separate. The old developing solution from gelatine plates is of no value, and certainly should not be added to the washings of prints, as the ammonia would tend to dissolve the chloride of silver when formed.—2. To prevent reflection from the edge of the aperture.

Jas. Watkins.—From your description the failure appears to be due to the tissue not containing sufficient colouring matter to prevent the light penetrating through the film to the paper; hence the reason you cannot remove the latter to develope the print. Try again, and add a little more india-ink. The tissue you have made may be utilised for printing from weak negatives. It is only very strong ones that will print through and cause you trouble.

A Reader (Brighton).—The reason the bath refuses to tone is that, for some reason or other, the gold has become precipitated. This is proved by the black deposit on the sides and bottom of the bottle. It is impossible for us without being made acquainted with all the details to assign the cause. If the bottle were dirty it might cause the gold to be precipitated. Exposing it to a strong light after being used will also cause precipitation of the gold. It is a good plan to prepare the solution in a concentrated form, and to dilute it down when required for use.

J. D. C.—A number of photographs of various sizes and descriptions have reached us from this correspondent, with the request that we will express an opinion as to their quality *at the price*, the prices being quoted. In reply: We must say that the work is certainly fairly good, especially when the low prices are taken into account. But the examples are stated to have been all, or nearly all, refused by our correspondent's clients, whose "ignorance," "meanness," and "shabby gentility," he thinks, do not permit them to recognise a good photograph. As many of the specimens sent us exhibit very palpable signs of long exhibition in the show-frame, we cannot help thinking that our correspondent has, under the circumstances of their rejection, scarcely acted a proper part in exhibiting the pictures.

Errata.—In Mr. R. Keene's article *On Landscape Photography* (page 440), in the thirteenth line of the second paragraph, first clause, for "past" *read* "earlier;" in the third line, third paragraph, for "toil" *read* "moil;" in the eleventh line, third paragraph, the passage reads "albumen dry plates came next—tannin, coffee, and beer plates—all useful," &c.; for "wet" in the first line, fourth paragraph, *read* "beer;" second line, sixth paragraph, for "makers" *read* "makes;" in the thirty-fifth line, second column, for "light" *read* "lights;" in the forty-sixth line, for "even" *read* "once;" in the forty-eighth line, for "production" *read* "subtle gradations;" in the fifty-third line, for "and" *read* "or;" in the sixty-third line, for "and" *read* "yea;" in the seventy-ninth line, for "clearness" *read* "*chiaroscuro;*" in the eighty-second line, for "arrived" *read* "aimed;" in the eighty-third line, "after this" *read* "series to;" in the sixth line, first column, page 441, after "acknowledge" *read* "yet no class," &c.; in the same line, for "use" *read* "useful;" seventh line, after "of" *read* "the"; for "photographers" *read* "photographer;" for "they" *read* "who;" in the twelfth line, for "limit" *read* "kind;" in the fourteenth line, for "upon" *read* "after;" in the next line, for "result" *read* "results;" in the twenty-first line, for "greater" *read* "great;" in the twenty-third line for "contiguous" *read* "with," and for "objects" *read* "object;" in the next line for "lenses" *read* "leaves," and in the following line for "robes" *read* "boles;" also in the twenty-eighth line, for "ream" *read* "record." The author's proof did not arrive last week before we went to press.

Received.—A. F. Genlain; "Photographer;" E. J. Chesterman. In our next.

Photographic Society of Great Britain.—The next monthly technical meeting of this Society will take place on Tuesday next, the 22nd instant, at eight p.m., at the Gallery, 5a, Pall Mall East.

Photographic Club.—At the forthcoming meeting of this Club, at Anderton's Hotel, Fleet-street, on Wednesday next, the 23rd inst., the subject for discussion will be—*The Effect of Coloured Media on Sensitised Paper.* The Saturday afternoon outing will be held at Hadley Wood; train to High Barnet Station. Meeting afterwards at "Old Salisbury Arms," High Barnet.

LONDON GAZETTE, *Tuesday, July* 15, 1884.

Adjudication.

Alfred Joseph Moores, West-street, Wareham, Dorsetshire, outfitter, boot salesman, and photographer.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1264. Vol. XXXI.—JULY 25, 1884.

EMULSIONS IN GELATINE AND ALBUMEN.

As we stated last week, the methods of emulsifying by precipitation are most suitable for employment in connection with gelatino-albumen emulsions, though it is not absolutely necessary to follow that plan. Our reason for giving the preference to the precipitation methods is that, owing to the comparatively small quantity of gelatine used—a large portion of the usual quantity being replaced by albumen—the emulsion is less easy to wash in the ordinary manner without loss. Owing to the solubility of the albumen in water it is obviously impossible to add that to the emulsion until after washing, as it would be removed with the other soluble matters. Moreover, if such a course were pursued, though the albumen would have the effect of rendering the emulsion more viscous, and so improve its power of holding the haloids in suspension, it would not in the slightest degree increase the strength of the jelly, but, practically, rather the contrary.

Though it is quite possible to wash in the ordinary manner or precipitate with alcohol an emulsion containing only ten grains of gelatine in each ounce, the extra care required militates against the employment of these methods; but, in the case of those who object to the precipitation processes, there is nothing for it but to accept the risk. We shall, however, confine our description to the processes with which we have succeeded best.

Of these the one we prefer is based on Mr. W. K. Burton's principle, though we have varied it in the details. We have adopted the following formula:—

1.

Gelatine	30 to 50 grains.
Bromide of potassium	300 „
Water	20 ounces.

2.

Silver nitrate	1 ounce (437·5 grains).
Nitric acid	1 minim.
Water	1½ ounce.

3.

Iodide of potassium	15 grains.
Water	1 drachm.

The three solutions having been made, we commence their mixture by cautiously adding, drop by drop, the solution of iodide of potassium to the concentrated silver solution, agitating after each addition. The first effect will, of course, be the formation of a precipitate of iodide of silver, but this is rapidly redissolved by the excess of silver nitrate until the solution becomes saturated. Under favourable conditions the full quantity of iodide may be thus added—that is to say, if the silver solution be sufficiently concentrated and its temperature not too high. However, the addition of iodide is continued until a permanent milkiness remains, when the remainder of the iodide, if there be any, is set aside until again required.

The bromised gelatine solution is now raised to boiling-point in the ordinary digester, and the silver added to it in the usual manner, and thoroughly mixed by shaking or stirring. When this is done the remainder of the iodide is added, and the cooking proceeded with by any of the methods in vogue. We prefer for our own part the ordinary boiling process, which is carried on to the verge of the blue stage if an emulsion of moderate rapidity only is required, or further in proportion. Or, after allowing the emulsion to cool, ammonia may be added, and the whole digested at a low temperature for an hour or so.

By the above plan of adding the iodide a very fine state of division is ensured as well as a higher degree of sensitiveness. The proportions of silver and haloids are so near the point of neutrality that very little trouble will be experienced in securing a rapid deposition of the sensitive precipitate; but if it should exhibit a reluctance to subside longer digestion with ammonia or longer boiling, as the case may be, will bring about an improvement. We find that an emulsion made in the evening will have invariably subsided sufficiently by morning to allow of the first change of washing water being made. Three such changes in all will prove ample.

The precipitated bromide having been thoroughly washed is transferred to a suitable flask or bottle; or, preferably, the washing may be performed in one of the conical precipitating or "parting" flasks, obtainable at any chemical glass warehouse. Into this is introduced 200 grains of hard gelatine, such as Heinrich's, previously swelled in distilled water, and sufficient water to make the bulk up to ten or twelve ounces. Heat is applied, and, as the gelatine dissolves, the flask is vigorously shaken to secure the thorough emulsification of the bromide. If, as will probably be the case, the bromide show a tendency to retain a slight granularity, it will be necessary to raise the temperature to about 200° Fahr., or even higher, and to keep it there, with occasional agitation, until the necessary degree of fineness is attained. It is for this reason—the probable necessity for the application of a high temperature—that the albumen is not added until the last stage of the operation.

While the above operations are proceeding, take the whites of the necessary number of eggs and beat them into a stiff froth without the addition of water, ammonia acetic acid, or any of the ordinary additions. For the above quantities of the ingredients four ounces of liquid albumen will suffice, or, roughly, the whites of four eggs. These having been converted into froth of such consistency that the vessel containing it may be reversed without any loss of albumen, the latter is transferred to a clean funnel of sufficient size, placed in a bottle or other vessel to catch the albumen as it gradually reliquefies, which it will do in the course of a few hours.

Returning to the emulsion, which we will now suppose to have gained the requisite degree of fineness: it is allowed to cool down to 90° or 100°, when the albumen is poured into it, and thoroughly mixed. All that now remains is to make the bulk up to twenty or twenty-four ounces (according to taste) to filter, and the emulsion is ready for coating.

Emulsion made in this manner sets rather more slowly than usual owing to the smaller proportion of gelatine it contains, but dries rapidly to a hard, glassy film. The films appear thinner and more transparent especially when dry than ordinary ones, but show no deficiency in the matter of density. Should still greater hardness be required, if the plates are to be long kept or subjected to the vicissitudes of travel, they may be passed singly, after drying, through a dish of good methylated alcohol carefully filtered. This will coagulate the albumen, and though it gives a little extra trouble the return is worth the outlay.

Such plates are moderately sensitive, giving, with half-an-hour to three-quarters' boiling, fifteen on the sensitometer. They develope quickly, owing, no doubt, to the comparatively-porous character given to the film under the action of the alkaline developer. The ammonia, indeed, seems to penetrate instantly, by its solvent action on the albumen, to the very glass itself.

Other methods of precipitation, such as Abney's, may be adopted if preferred, or the late Dr. Monckhoven's carbonate of silver and hydrobromic acid process may be employed, provided the albumen is not added until the bromide of silver has been fully formed. But the plan we have described in detail seems to be the simplest.

The hardness of such films appears to offer a fair prospect of their possessing better keeping qualities than some of the plates of which we have heard recent complaints; and if no impediment in the way of reduced sensitiveness should intervene we shall expect to see albumen films much employed in the future.

MERCURIAL INTENSIFICATION.

Among the numerous experiments made by the late Mr. Frederick Scott Archer, after his introduction of the collodion process, were those which led to his discovery of the bleaching agency of bichloride of mercury followed by the blackening of the image (thus whitened) by means of a solution of hyposulphite of soda.

In the course of time other agents than the hyposulphite were found to have the effect of darkening the chlorised image, and some one or other of these have secured the special favour of those who have had recourse to their aid in intensifying an image which was considered too feeble to produce a brilliant print. Among such agents we may mention iodide of potassium, cyanide of potassium (both alone and saturated with silver), sulphide of ammonium, and simple ammonia.

Each of the reagents named, and others besides, possesses its own special characteristics. For example: in the intensification of a negative of printed matter in which pure whites and intense blacks were required, the after-treatment of the whitened image, either by diluted sulphide of ammonium or solution of cyanide of potassium saturated with silver, followed as a matter of course, both giving extreme intensity, although the former imparts a deep brown colour by contrast with the purer black of the latter. Either of these, however, is apt to produce contrasts too strong to be pleasant in portraiture or landscape work. Diluted ammonia has, for photography of this class, assumed a position of high popularity, and is now employed to a greater extent than any other of the various agents by which the chlorised image is affected. It is not our intention to refer here to the characteristics of these agents or to classify the differences in the images that result from being subjected to their action, but rather to point out another which may with great advantage be added to their number.

In our *Notes and Queries*, in another page, one of our correspondents directs attention to the fact that a solution of sulphite of soda possesses advantages as an agent for employment in connection with bleaching by means of bichloride of mercury. The strength recommended is a saturated solution diluted to the extent of one-half. We have tried this method of intensification, and like it much. The tone is different from that obtained by either hyposulphite of soda or ammonia, and is of a pleasing character. For chemical reasons, into which we do not pause here to enter, there is no discolouration of the image even if it were suddenly transferred from the bichloride bath to the sulphite solution, the products of the decomposition being soluble in water.

Our trials of this intensifier have embraced both gelatine negatives and collodion transparencies, and we have nothing but high commendation of the system to make, so far as we have tried it.

COOLING AND VENTILATING.

The excessive heat experienced during the past few weeks has caused great discomfort to photographers generally, and it has also seriously interfered with the commercial working of several processes, more particularly those having to do with gelatine. In many studios, on some days, the heat has been really insupportable alike to the sitter and the artist; indeed, in some instances, to our knowledge, the former has been compelled to relinquish the idea of sitting for the time being immediately on the extreme oppressiveness of the studio being experienced.

Of course it is in studios of the old-fashioned type—those constructed with the largest possible amount of glass, and situated on the tops of houses—where the greatest inconvenience is experienced; although those of more modern date, with a minimum of glass, have also been excessively hot and uncomfortable at times. Much of the oppressiveness of the studio, however, might be prevented by a more perfect system of ventilation, by which the atmosphere may be kept in constant motion, and continually changed. It is the stagnancy of the air that, in a great measure, causes the oppressiveness. If it be kept moving, although it may be of the same temperature, it will be rendered much more agreeable. The mere opening of the windows in the sides and roof of the building is not sufficient to accomplish this, unless there is a strong wind blowing. To be effectual, under all conditions, some mechanical means of keeping the atmosphere in actual motion is necessary.

It is true that many modern studios are fitted with ventilators of some form or other, most of which, however, are intended to be worked by the wind, and when there is a sufficient breeze to keep them in action the effect they produce, in most cases, is very satisfactory. What is unfortunate in connection with all ventilators dependent upon the wind as a motive power is that in sultry weather—at the time when they are most required—there is not sufficient force in the wind to set them in motion.

In the Health Exhibition is to be seen a great variety of contrivances for effectually ventilating and changing the atmosphere of rooms and workshops, several of which are well adapted for ventilating studios and photographic workrooms, and require but a small motive power to drive them—a small gas engine of one- or two-man power being quite sufficient for a studio of ordinary dimensions.

We pointed out, a few weeks back, in an article entitled *Keeping Cool*, that the atmosphere in the basement of a building rarely exceeds a convenient temperature for the working of most photographic processes, whilst in the studio the heat may be quite insupportable. Now, if the cool atmosphere of the basement could be transferred to the heated studio what a comfort it would be both to the sitter and the operator! This is perfectly practicable, and the outlay for the necessary appliances is but small compared with the convenience and comfort secured. All that is required is to have one or other of the numerous forms of "blowers" or fans now in the market fixed in the basement of the building, with a six-inch common iron stove-pipe leading to the studio. Here two or three branches should be added, so as to deliver the cool air in different portions of the room near the floor. In the vicinity of the blower—though preferably in another apartment, on account of the heat evolved from it—must be fixed a small gas engine, several forms of which, suitable for our purpose, may now be had at a very moderate price.

It will now readily be seen that, when the blower is in action, a continuous current of cool and pleasant air will be driven into the studio, and thus render the atmosphere there far more comfortable. As the cold air in the basement would soon become exhausted, some means must be adopted to keep up the supply. This will be most effectively done by arranging the sponge cloths at the window, as we described in our previous article. If the studio be situated at a great distance from the source of cold air it will be found desirable to cover the leading pipe with felt or other non-conducting material; or the pipe may be constructed of wood, which, in itself, is a very good non-conductor of heat. The only drawback to a wooden tube—or rather spout—for the purpose is that the constant current of air, when dry, is liable to cause the wood to split, and so become leaky.

If the pipe be conducted outside the building it should be taken on the north side of it, and certainly be covered with the felt. Then, if a small stream of water be allowed to trickle on to the felt-coated pipe—near the upper portion—it will be kept moist throughout its entire length. The evaporation of the water will then not only keep the tube itself cool, but in some instances will reduce the temperature of the current of air within several degrees lower than it was when it left the basement. It is by no means necessary—or, indeed, is it desirable, on account of the heat from the engine—the apparatus should be fixed in the apartment from whence the supply of air is drawn; for it may be situated in any other portion of the building, by simply having a tube leading from the blower to the place from which the air is taken.

An objection may possibly be raised to this method of rendering the studio more comfortable during excessively hot weather on account of its being somewhat expensive. But we think this should not militate against its adoption, particularly when we see the lavish expenditure that is now very frequently made in decorating and furnishing reception-rooms and studios, which only conduce to outward appearances and not to the actual comfort of the sitter. There can be no question whatever that the more the sitter can be made to feel at ease, while a portrait is being taken, the more satisfactory will be the picture and the greater the credit to the artist. After all, the expense need not be greater than is often incurred for a large lens and camera that is rarely required. When once the apparatus is provided the cost of keeping it in action is merely nominal, as it will probably not exceed a penny or so per hour for gas.

Of course the plan here suggested of changing the atmosphere of apartments can be applied to many purposes in connection with photography besides that of cooling the studio. It might be utilised for combating the difficulty alluded to by Mr. Woodbury last week in working the Woodburytype and stannotype processes when it is not convenient to conduct the printing operations in the basement itself; also for keeping up a constant supply of cool air to the coating-room during the preparation of dry plates, and likewise in the manufacture of carbon tissue.

When we commenced this subject we intended to have said something about the apparatus that is now so largely employed for producing air of intense coldness, which may well be made available in many ways in connection with photographic operations, but space will not permit.

CAMERA PRINTING BY ARTIFICIAL LIGHT.

Equality in the illumination of the backing of a negative which is being printed from by the agency of a camera is an indispensable condition of success. In solar camera printing a well-made condenser supplies all the conditions of illumination in a manner that cannot be surpassed. So likewise in collodion transfer work, as commonly practised, does the uniform light of the sky subserve a similar purpose. But, as neither the sun nor the uniformly-lighted sky is available for the requirements of many who desire occasionally to produce prints from their negatives by the camera, the consideration of the best means of doing so by the aid of such appliances as are more or less abundant may prove of service, more especially to the amateur, who prefers to relegate this class of work to the evening.

Camera printing may be divided into several departments; but what follows is written after an investigation, as nearly exhaustive as possible, into the most effective and simple means of employing artificial light in the production of transparencies suitable for the lantern, the principles involved in this covering the whole ground of collodion transfers and enlargements upon paper prepared with gelatine emulsion.

If a negative be placed in a lantern competent to receive it, no difficulty will be experienced in visually reproducing it of any dimensions. None of the commercial lanterns of the present time, however, are constructed to receive other than *clichés* of dimensions not exceeding the capabilities of the condensers, which may be roughly stated as four inches in diameter; whereas we may desire illumination for a half-plate, a whole-plate, or even a size larger. In such a case the lantern fails. If one could command the services of condensers capable of transmitting light through an area eight or ten inches in circumference he would practically be in a position to undertake work of almost any description; but this not being the case in any save a few exceptional instances, we must have recourse to other means of securing illumination.

When a plate of ground glass is placed sufficiently near the source of light to be brightly illuminated, the rays from the lamp (which we may suppose to be one of the popular multiplex-wick class now so much employed in lantern practice) illuminate the centre in a degree so much greater than the sides as to interpose a serious obstacle to our special requirement—uniformity of illumination. This is corrected in some measure by the interposition of more than one plate of ground glass; but by the time uniformity has been obtained in this manner over a surface of sufficient extent, the energy of the light will have been weakened by absorption. When recourse has been had to the services of the condenser, in order to lessen the divergence of the rays of light, it is unfortunate that another evil is created—that of the representation of the flame as an ill-defined image upon the ground glass; and this proves rather more than the evil already mentioned. But when an objective of large aperture is interposed at a distance of its focus from the condenser, then we obtain perfect uniformity of illumination without loss of light.

The arrangements necessary in order to carry into practical effect this method of lighting so as to secure all its advantages are, first of all, a petroleum light of as powerful a character as possible, letting it be borne in mind that a more intense light is desirable for producing an enlargement than a reduction from any negative. The diameter of the condenser is of no special consequence; but it is of some importance that the object glass, especially the back lens, be large, in order that all the rays transmitted through the condenser be secured and passed on to the front. In the present case we have not so much to do with the image-forming capacity of the objective as its capability of permitting no light whatever to escape. A back lens of three and a-quarter inches in diameter, with a front lens two and a-half inches diameter, fulfil the conditions of lighting somewhat better than any other form of objective we have tried. The adjustment of these lenses to each other is such as to permit the larger of the two to be little more than its own diameter in front of the condensers. If the light emanated from a point, as in the case of the lime light, instead of, as in the modern petroleum lamp, being characterised by magnitude, then an objective of smaller aperture would suffice.

The light from an objective of this class is emitted at only a slight angle of divergence, and when concentrated upon a plate of ground glass of about eight inches square it renders it intensely luminous when viewed from the opposite side. But it is necessary that the ground glass be scrupulously clean in the sense of being free from grease; for a spot of grease, by rendering that portion semi-transparent, would prevent it from fulfilling its functions as a radiator. A sheet of roughly-grained glass may sometimes be interposed with advantage between the fine glass and the light, at a distance of about an inch from the former; but if the finely-grained glass be of good quality, and be cleaned to perfect greyness, this should not be required.

The frame containing the negative is placed in front of the ground glass—the nearer to it the better, so long as it is beyond the plane of sharp focus—and to the negative thus situated the lens of an ordinary working wet collodion camera is directed. If the image be required to be of the same dimensions as the negative, then the camera must be extended so as to have its focussing-screen removed from the lens a distance equalling twice its focus. As a type of lens known to most photographers, we might mention the No. 2 *carte* of Ross or the No. 113 of Dallmeyer as belonging to the class that will, with full aperture, cover a square for the lantern in an excellent manner without the necessity for any diaphragm being employed—no small advantage when working with an artificial light of the character now in question.

When all the arrangements are complete, and a wet collodion plate is exposed, a good image will be impressed in an incredibly brief length of time—a period measured by seconds rather than by minutes. With certain negatives an exposure of fifteen seconds will prove ample; with others the time will have to be increased or diminished according to circumstances. An enlargement of nearly two diameters necessitated an exposure of a minute and a-half, the developer being ferrous sulphate, fifteen grains to the ounce, with a minute trace of tartaric acid.

Instead of transmitting the light through ground glass an equally even illumination may be obtained by directing the diverging cone of light from the lantern upon a sheet of white card or paper, in front of which must be erected the frame containing the negative. In this case the illuminating lantern and the camera must be placed at an angle to each other, both being directed towards the sheet of cardboard, which should be at an angle having regard to each, and so situated to the negative as to receive all the light emanating from the lantern without any falling upon the negative. But the ground-glass method is that for which we entertain a preference.

A PRINT-WASHING TROUGH FOR *CARTES* AND CABINETS.

There are throughout the country dispersed among the workrooms of photographers, professional and amateur, as many different forms of washing troughs as there are days in the year. Though, on the one hand, ever and again we have new forms introduced, many of them strong in just claims for originality and usefulness, yet, on the other hand, a large number of photographers content themselves with nothing more elaborate than a water-tap and a dish. Further than this, paradoxical though it may sound, we say without fear of contradiction that the latter arrangement need be no less effective than the most elaborate and costly contrivance in the world; it requires, however, so as to deserve this encomium, to be used with great attention and worked with brains. Too often, we believe, is it the case that prints are put in a dish, the tap turned on, the water left running till morning, and the prints then taken out under the impression that they are washed—wasked, when, perhaps, the prints in the middle of the heap have never once changed their place for twelve hours! When, however, the prints are taken out one by one and placed in fresh water, and the process repeated from time to time, the dish system is equal to any other.

This is so laborious a process, and requires such unremitting attention over a considerable period of time, that mechanical or automatic means have been devised and been in use for many years. There are mechanical contrivances which require attention for a limited time, and there are automatic machines which need no attention at all when once they are set in action; and this class, if efficient and economical, is naturally the one to suit the generality of photographers. A print-washer that needs no time to be devoted to it nor attention given while in action—that simply requires the prints to be put in and a tap turned on with a certainty that a thorough washing will have taken place when the prints are taken out a few hours later—is the machine that will appeal to the photographic public. Many machines claiming to possess these qualifications have appeared, and which do exhibit points of excellence; but most of them leave something to be desired. We have, however, seen one, intended for *cartes* and cabinets, in which so many good points are included that, with the permission of the gentleman who designed it, we give a description of it and details of its construction. It is merely an adaptation of a very old pattern, but it avoids several of the defects which characterised the older arrangement.

One of the oldest forms of automatic washers was a trough or dish with a row of jets for the admission of water at the top, and a syphon, connected with an opening at the bottom, for drawing off the water when the trough was filled. It was early seen that a system for drawing off the washing water at intervals was far more effective in speedily ridding the prints of hypo. than the mere flushing with a continuous flow. This is easily proved by the oft-described experiment of putting a cupful of some coloured liquid in a dish of water, turning the tap on to it, and allowing the surplus to overflow, or connecting it with a syphon to draw the whole off when full. In the former case a distinct trace of the colour would be visible after the lapse of a considerable length of time, while in the latter the colour would be almost all discharged after the first emptying of the vessel.

The original form, then, of the syphon washer was a circular trough (first, we believe, made in zinc and afterwards in earthenware) with straight sides, a false bottom of perforated zinc to prevent the prints being drawn into the exit pipe by the outgoing current, and a ring of lead piping perforated with numerous small holes to send the water as a kind of spray on to the prints. In action it was found—first, that though the water was changed at intervals, much of the efficacy of the change was lost by the bulk of the prints adhering together in a mass; and, secondly, that a certain number of the prints, when the trough was empty, attached themselves to the sides and remained there all through, while many others, as the water drained away, became bent and their texture broken by sinking into the sharp angle at the bottom formed by the junction of the latter with the sides. Hence every morning (presuming the pictures to have been washing all night) there was a large percentage of prints spoiled by being permanently marked with a crease, or torn in their removal from the angle.

To remedy the defect of the prints collecting in a heap many devices were tried, and some machines were made with a jet placed at various angles in lieu of the series of spray jets, with the object of causing a cleansing action upon the prints by giving a rotary motion to the water in the trough. A brief inspection shortly after the machine was set in action would apparently show the object to have been attained; but, on a close examination, it was to be observed that after a while they would all clog together in a mass and so remain for hours.

To avoid the second evil—that of the prints collecting in the angle and becoming torn or creased—many plans have been tried, but none, perhaps, simpler or better than that adopted in the particular trough to which we are referring, which consisted simply in having it made without any angle whatever. A trough was constructed entirely of zinc, plain and perforated, and shaped exactly like a huge saucer, so that, no matter what position the prints were in during the periodical running-dry of the apparatus, they always fell upon an almost flat surface, the trough being made of large size, and shallow.

The chief difficulty next met with was turning the water among the prints so as to ensure their separation and the penetration of the fresh water among them. A spray action, as we have explained, did not cause them to separate. A jet set at an angle to give a rotary motion sent them in a clump into the middle of the trough; while, if a second jet at a different angle were used in addition, one or other, however opposed, would obtain the mastery and send a cluster of prints either to the side or again to the middle.

This difficulty, after a large number of forms and positions of jets had been tried, was overcome simply enough by increasing their number and setting them at a particular angle, so that at last what was practically a perfect syphon washer was designed. The prints were kept in continuous motion the greater part of the time, they were constantly changing their positions, and when they were left to drain were in no danger of creasing; in fact, so far as the syphon-washing principle was involved, it would be difficult to suggest an improvement.

The verbal description we have thus given would enable anyone to construct a trough; but to provide increased facility we will, in our next issue, supplement our remarks by giving a scale drawing, with a description of those other minor details an acquaintance with which goes so far to render the use of this or any piece of apparatus a real success.

The fine front of the National Gallery, in Trafalgar-square, is at present being disgraced by a corrugated iron shed now in course of erection at one side of the entrance. We had for the last few days been puzzled to account for the presence of this shed; but the following, from a daily newspaper, throws light upon it, and assigns it a position among our metropolitan photographic studios:—"A novelty will soon be introduced in the National Gallery. Of all the great European galleries ours was the last to recognise the presence of the photographer. The collections of Berlin, Cassel, the Hague, Madrid, and even Petersburg, were photographed in many sizes, and might be bought all over the continent, while our art treasures were only known to strangers by copies or engravings. Latterly photography was tolerated, yet it was only tolerated. But few pictures were done, and the sizes were small and the results

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INK-PHOTO, SPRAGUE & Co LONDON.

unsatisfactory. This reproach will no longer be heard. On the flagway, between the railings and the front of the building, a shed is being erected in Trafalgar-square which will be fitted up as a photographer's studio. The required canvases will here be taken with the advantages of a proper position and a good light. London is following the example set a dozen years ago by Dresden. In many of the other galleries the photographs were originally taken from the pictures as they hung upon the walls, and thus the copyist laboured under disadvantages which were evident from his results. We shall, no doubt, have a good reproduction of the collection, and, it is to be hoped, at moderate prices."

It is but a short time since we chronicled the feat of liquefying oxygen—one of the "permanent" gases; and now it is said that the production of liquid oxygen as an article of commerce is not only brought within the range of practical chemistry, but is a very probable occurrence. M. Cailletet has discovered a new method of bringing about the liquefaction, which is of so easy a nature, he states, that it may be looked upon as one of the simplest operations of the laboratory. He finds that *formene*, when slightly condensed and cooled in boiling ethylene under atmospheric pressure, is resolved into an extremely volatile, colourless fluid, which, in again passing into the gaseous state, yields a degree of cold sufficient to liquefy oxygen, thus rendering comparatively easy and simple the process which first required a costly and elaborate series of apparatus.

Nevertheless, until liquid ethylene also becomes a commercial product it is rather idle to speak of oxygen being so, and the manufacture of liquid oxygen for the lime light is, we should be inclined to believe, far more distant than some enthusiastic vaticinators would have us believe. Compressed oxygen may become the usual mode of carrying the gas to the lecture room; but the more likely commercial enterprise will be the making of the gas on a large scale at a cheap price for the purposes of storage or compression. Every method likely to bring about such economy will be hailed with much satisfaction by many photographers and lantern exhibitors. Many processes have been devised, and we have heard a great deal at one time or another of companies formed for the making and storing of oxygen under certain new patents. At present it is as dear as ever it was. The latest idea in this direction is that of M. L. Troost, who, in a note to the *Académie*, described a new principle to work upon in making oxygen. He stated that pure oxygen and the oxygen of the atmosphere are capable of passing through a tube of silver heated to 800°, while a mere trace only of nitrogen penetrates the metal. Upon this principle M. Troost suggests that pure oxygen may be obtained.

In the International Inventions Exhibition, to be held next year, there will be a special department for photography under the head of Group XXIX. According to the schedule just published the following will be the arrangements:—"Class 159. *Processes and their Results.*—Methods of gelatino-bromide plate-making, apparatus for making emulsion, apparatus for separating the sensitive constituents; coating, drying, and packing machines; emulsion and other processes; printing processes—silver, carbon, Woodburytype, platinotype; gelatino-bromides, collodio-chloride of silver, &c.; apparatus for washing, &c., prints and negatives; methods for making photographic lantern slides.—Class 160. *Apparatus (excluding lenses).*—Cameras, shutters, changing-boxes, slides, tents, lamps; apparatus for making enlargements and for microphotography. Class 161. *Application of Photography to various Purposes, Typography, Ceramics, Relief-moulds, &c.*—Method of producing printing surfaces; photographic enamels, photographic printing on pottery; photographic reliefs; use of photography in self-recording apparatus in scientific observations, &c. In addition to the special place for photography found in this group it comes in for mention also in Group XXVIII., under "*optical*" heading as "photographic lenses," and in Group XXV. under "*military equipment*" simply as "photographic."

The action of oxygen upon pyrogallic acid in solution is familiar to dry-plate workers. The rapidity with which it absorbs oxygen, shown by the red discolouration when rendered alkaline, and the non-colouration when acid, are well known by the state of the developer after use in the one case, and of the acid store solution in the other. It has been stated that tannin is also acted upon by the oxygen of the atmosphere; but, according to M. Antony Guyard, this is an error. He has made a long and elaborate series of experiments which conclusively prove that oxygen has no action whatever upon dilute solutions of tannin; but when rendered alkaline purified air acts, on the contrary, with great energy. This is a very interesting fact, and links tannin still more closely to gallic and pyrogallic acids. The same writer points out a very simple reaction for separating tannin and gallic acid, which are so often found together. Lead acetate acidulated with acetic acid will dissolve lead gallate, but fails to take up the slightest quantity of lead tannate; and so the separating of the two may evidently be done very readily.

Mr. Herbert McLeod, who has invented a simple sunshine recorder — which he described, but did not exhibit, at a recent meeting of the Physical Society—writes to say that the account published is in error. The instrument consists, in his own words, of a camera fixed with its axis parallel to that of the *earth*, and with the lens northward; and there is placed opposite to the lens a round-bottomed flask silvered inside. The light reflected from the sphere passes through the lens and acts on the sensitive paper. This is a very different thing from the description given in the papers.

An ingenious new glass tap is described in one of the foreign chemical journals. A glass tube is bent at right angles and its shorter limb passed through a cork, which is then fitted into the place where an ordinary tap would be placed (there are glass bottles to be had fitted with tubulures near the bottom for the purpose of inserting a tap). When fitted, there is simply a bottle with a piece of glass tube projecting upwards from the bottom, its contents being connected, of course, with the external air. All that is necessary to do in order to withdraw some of the contents is simply to turn the tube on its side, when the liquid will flow out as soon as the end of the tube is as low as the level of the liquid within the vessel.

Ether will dissolve chloride of gold, chloride of iron, nitrate of uranium, bichloride of mercury, &c., &c.; but if an etherial solution of any of the salts be shaken up with glycerine, the latter liquid, which dissolves them better than ether, will extract almost the whole of the salts and form a glycerine solution in lieu of the etherial.

DR. R. L. MADDOX.

The name of the gentleman whose portrait we give in the present number is familiar to most of our readers as having been connected with photomicrography for upwards of thirty years past, and as the originator of the gelatino-bromide process, the first description of which appeared from his pen in the pages of this Journal in 1871.

Dr. R. L. Maddox, after a voyage round the world in 1839-40 in search of health, spent many years abroad practising in an official and private capacity, but had eventually to renounce the arduous duties of his profession from constant suffering of a very painful nature, which has extended over half-a-century. He had early taken up the subject of microscopy as connected with his profession, and had translated Dr. Dujardin's manual at the time that Quekett's *Treatise on the Microscope* appeared. Owing to the impossibility of arranging for the use of the beautiful plates of Dujardin's work, the translation was never published.

Being obliged to return to England Dr. Maddox employed himself in trying to extend the labours of others by combining photography with microscopic research, and in this path was so far successful as to be the recipient of two medals, and for his various writings on this and microscopical subjects he was elected an Honorary Fellow of the Royal Microscopical Society.

About the time of his introduction of the gelatino-bromide process Dr. Maddox was carrying on a series of examinations on the living organisms found in the atmosphere, and which necessitated prolonged and tedious work with the microscope, amounting sometimes to sixteen hours in the day. In his method he differed entirely from those who had preceded him, and this has been made the basis of further and most extended researches by others, especially by Dr. Douglas Cunningham and his friend Dr. Miquel, of the Observatory of Montsouris, Paris. Dr. Maddox used an apparatus of his own invention—the "aëroconiscope"—a kind of multiple funnel set up as a vane. The wind traversing this instrument deposited the organisms on a thin cover-glass duly prepared for the purpose. The organisms were then cultivated, and many of them carefully figured, the results being published in the current Monthly Microscopical Journal.

Of the gelatino-bromide process we need scarcely say more than that its present high state of utility has been brought about by the labours of the many, and Dr. Maddox may justly be proud that he closed his paper on the process with the hope that he had given another handle to the photographers' wheel, which has indeed, without restriction, been turned to their common benefit.

He gave much of his time to microscopic drawing, as is attested in the work of the late Dr. Parkes on *Hygiene* and Dr. Nayler on *Skin Diseases*, and other authors; but his coloured drawings of many of the *Diatomaceæ* under reagents, and his figures of the ferments in the deposits of beer, &c., have, we believe, never been published. Worn down by much suffering, he was again obliged to reside abroad for a considerable period, and renounce his favourite pursuits; but since his return he has devoted much of his time to them, especially in the endeavour to photograph the *Bacteria*—some of the minutest living entities, which require both skill and patience for their reproduction by photography.

Dr. Maddox was always ready to impart any information he might possess, holding that the claims of Science, for her advancement, were—"if freely ye have received, freely give."

The accompanying portrait was taken specially by Mr. J. Thomson, F.R.G.S., 70a, Grosvenor-street, W., and is considered an excellent likeness.

PRINTING STAINS ON GELATINE NEGATIVES.

There are few photographers, either amateur or professional, who have not suffered more or less from their negatives becoming stained and spotted by contact with the silvered paper. This is especially the case with those who sensitise their own paper—and professionals are therefore, perhaps, greater sufferers than amateurs—one essential element in the production of these spots and stains being damp, which, for obvious reasons, is not present in the ready sensitised paper.

Perfectly dry silvered paper has apparently no injurious effect on a gelatine film. I discovered, on taking down a printing-frame for use rather early in the present season, that a negative with a half-printed proof in contact had inadvertently been stored away during the whole winter—probably for a period of four or five months—without having produced a single mark. On the other hand, some negatives I sent to a professional printer, and from which no more than two prints were taken, developed these objectionable spots within a week or two after they were returned to me, and caused me to arrive at the determination that I would do my printing at home in future.

The fact of a negative having been collodionised or varnished appears to be little or no protection in the long run, as, though the formation of the spots may be delayed for a time, they are certain to appear eventually if a negative be much used and with slightly damp paper. I saw a suggestion a short time back as to the employment of thin, translucent paper between the negative and print as a preventive. This seems good, but better still would be a transparent gelatine film or thin sheet of mica. The former could be easily changed when stained or spotted; the latter would possess little liability in that direction.

Prevention is, of course, better than cure; but where the malady already exists it is useless to talk of preventive measures. But, unfortunately, of all the curative measures hitherto proposed not a single one has proved effective in my hands except, perhaps, in very mild cases. So far as I am aware all the substances recommended for the purpose of removing the spots do so by virtue of their action upon silver and organic silver compounds, and their action takes place, therefore, on the negative image as well as upon the stains. It follows that where the defect is very pronounced the application of any of the usual "remedies" will do as much harm to the image as it does good from another point of view.

I think, however, I have found a remedy which acts without injury to the negative image. It consists in "chlorising" or whitening the whole image and redeveloping, when, by transmitted light, the spots will be found to have entirely disappeared, though they are still visible on the surface. I made the discovery in the course of some experiments in mercurial intensification, when, having selected for the purpose some negatives which had become useless from silver spots, I was astonished to find that after treatment the defect had entirely disappeared. However prominent the spots may be in the negative the effect appears to be rather caused by a change of colour than by the addition of any considerable quantity of silver to the film; at anyrate, when the whole of the deposit is converted, as I have described, into a new state and then reconverted into a printable image, the difference in the transmitted colour and density of the spots disappears. It is only fair to say that I have not had an opportunity of trying the remedy on any *very* bad cases, but such as I have treated have been bad enough to be useless for printing.

In addition to treatment with mercury followed by ammonia, I have succeeded with chloride of copper and redevelopment with ferrous oxalate; but, no doubt, any method based upon the same principle will answer equally well. I give the cue, leaving it to each individual to select his favourite method. The treatment with mercury need not necessarily result in intensification; while, if the want of permanency of the mercurial image be an objection, chloride of copper or ferric oxalate may be used.

H. Y. E. Cotesworth.

LIME LIGHTING.

I notice a discussion is proceeding in the columns of the Journal relative to the merits of various forms of gasholders, the question seeming to be whether india-rubber bags or iron bottles are preferable. I suppose that the tank gasometer may be considered shelved, as the water required for its use is one source of trouble, and the weighting up a still greater nuisance, to say nothing of the size of ten and twelve feet receivers—about the quantity required for a two hours' exhibition by a triple lantern.

Having had considerable experience in the United States with cylinders of large size, I must say they seem to possess advantages over everything yet devised for containing the gases used for the lime light, and, except by the grossest want of care, stand pre-eminent for safety.

I understand in this country that in the bottles used the gas is compressed as high as 800 lbs. on the square inch, and I have noticed also that the valve is unprovided with a stuffing-box. The pressure seems extravagant to an American, whose cylinders are large enough to contain from 15 to 100 cubic feet at 225 lbs.

The sizes favoured by lanternists are those holding 25 or 40 feet at that pressure, which frequently are pumped in to 100 lbs. by the operator, who uses a pump for the purpose of a portable nature, costing $40 (£8). It is very ornamental, has a heavy fly-wheel, oscillating barrel, handsomely nickelled, pressure-gauge, and exquisite inlet and outlet valves. At such a low pressure no water is required to keep the barrel cool, and the operation is a quick and easy one. Another pump is sold which will compress up to 300 lbs. by the aid of a long lever when portability is required, or, if stationary, by crank and double fly-wheels. The former costs $65 (£13), the latter $100 (£20).

I have used all these pumps by hand and power, and give results of the time taken to charge a twenty-five-feet cylinder:—

Oscillating pump	100 pounds,	10 feet,	20 minutes.	
Lever pump	225	,,	25 ,,	45 ,,
Crank pump (hand)	225	,,	25 ,,	32 ,,
,, ,, (power)	225	,,	25 ,,	25 ,,

A water vessel is preferable with the lever pump, though not absolutely necessary; with the crank form it is an essential. The barrels stand a test of a thousand pounds, and the apparatus is almost indestructible.

The retort used for oxygen is a continuous-action one, made of wrought iron. It has to be connected with a wash-bottle and receiver. The hydrogen is taken direct from the main, except in case of power being used, when a small gasholder is required to keep the pump regularly supplied.

Ninety-nine vessels out of every hundred are filled by the various calcium light companies distributed over the large cities of America. They charge eighteen cents (9d.) a foot for oxygen, three cents (1½d.) for carburetted hydrogen, and twenty-five cents (1s.) per week hire for each cylinder, irrespective of size. When returned the unused oxygen is allowed for at purchase rate. The purchaser pays carriage. It is nothing unusual to send cylinders a thousand miles; and, although the valves sometimes get slightly injured and the glossy paint is soon defaced, no trouble or delay is experienced in getting them in time.

The light is exquisite, and now that the problem has been solved (at least, so I gather) of its regulation, it is only a question of time before the bag is ousted, with its attendant pressure-board and weights.

Has it ever occurred to any limelightist to inquire into an explosive source that seems to have been overlooked—that is, the vapour given off from the hydrocarbon used in joining the seams of the bags? I know of two instances where a light was applied to discover leaks. One bag exploded with a terrific report. It was a small one holding only three feet, had been allowed to remain neglected, and so got hard and stiff. When tilled leakage was noticeable, and a light being used to discover the source caused its destruction. The other case was similar, only it happened with a large bag, which merely burned up. Both were filled with oxygen.

I feel sure Mr. Lewis Wright will never use bags when he sees a pair of large cylinders doing their duty. Mr. R. A. Proctor's manipulator was not fit for his task, and was probably the man killed in one of the Western theatres during the performance of the "Lights o' London." As he had transferred and pumped hydrogen into the oxygen receiver—had the error pointed out to him, and yet lit up!—whose fault was it? Regarding cases not being reported: they are, but two lines is often the space given, instead of half-a-column and likely a leader as well. A man who tried to light the oxygen first in an Ohio theatre was sent to prison; he was drunk at the time. I notice men here get one shilling and sixpence a show. The pay in America is one dollar (four shillings).

During the last twenty years the lantern has been advanced from a toy to a scientific instrument; but it is yet far from perfect. It seems to me the aphengescopic principle could be more fully developed if the light were stronger. I remember a lantern by Chadburn, at the Polytechnic, that showed *cartes de visite* an enormous size. The jet was very noisy I will allow, but of great power. Why do not some of our scientists turn their attention that way instead of worrying about safety-valves? Hemming and Tate's are the most perfect I know of; but the check on the flow of gas is a downright nuisance in every form.

Really, little remains to be written on lantern history, as it is so fully and ably treated by Mr. Samuel Highley, in Cassell's *Technical and Popular Educators;* and, if republished, would form the most perfect manual extant on the subject.

The lime has great influence upon the light. Those used in the United States are very long, the hardest magnesian limestone is used, and they fit into cups—a better arrangement than the wire—dispensing with the hole in the centre, which is troublesome to drill and causes innumerable splits to occur.

J. Simpson Tomkins.

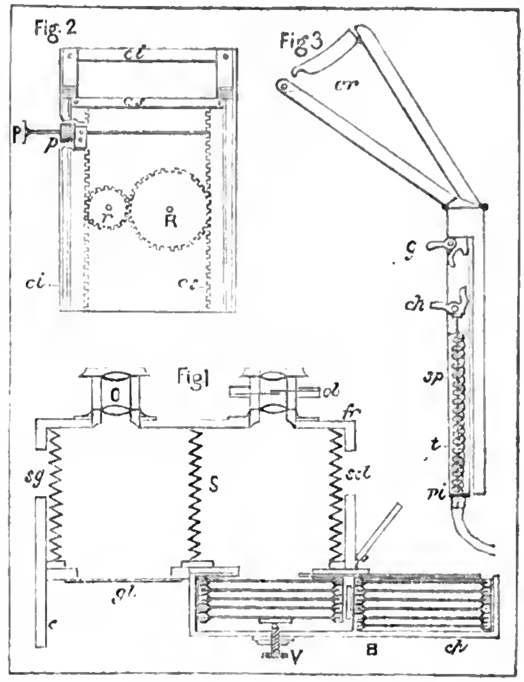
APPARATUS FOR INSTANTANEOUS PHOTOGRAPHY.

Professor Herman Fol has lately described in *La Nature* an instantaneous camera, with repeating backs, which he designed some time ago, but had not before published. He points out the usual difficulties attending the use of ordinary apparatus, and the loss of time between exposing and focussing, which, as he observes, causes the loss of many subjects. This latter difficulty, he states, has been surmounted in three ways:—First, by the use of lenses giving all objects in focus at once, and thus need no focussing. This plan he objects to as requiring longer exposures, giving an image that is neither quite sharp in any one plane nor in correct drawing. The second plan is that of Messrs. Muybridge and Marey. It requires the apparatus to be placed *in situ* beforehand, and the object driven between lens and screen—a plan possessing obvious objections, and suitable only to a confined class of subjects. The third plan is that employed by himself—a double camera with twin lenses—its principle having been, as he says, adopted long ago, though its application seemed to him to have been quite neglected till recently. Professor Fol thinks the later experiments with the same apparatus no more successful than the first, on account of the want of steadiness. Further: he says most of these apparata take only very small plates—M. Marey's gun, the photographic opera-glass, and M. Enjalbert's photographic revolver—and, the image being necessarily still smaller, they are practically useless.

His new apparatus, which he terms the "repeating photographic gun," had been invented before the publication of Messrs. Muybridge and Marey's mode of procedure, and has been in actual use over two years. It takes plates twelve centimetres by nine, although utilising the centre of the field only, and requires scarcely any adjustments in working it. Below we give detailed drawings and sections. The objectives are Steinheil's anti-planets two and a-half centimetres diameter and fourteen and a-half focus, capable of covering a plate thirty-two centimetres long. Of this we may say that a plate whose length is more than double the focus of the lens cannot cover sharply all over.

The shutter is a spring one with pneumatic release, and is made of two metallic plates, with apertures which pass in contrary directions between the places of the objectives where the diaphragm is usually placed. The exposure can be varied at will from the one-eightieth to the hundred-and-twentieth of a second.

The camera is composed of a bellows (*s*, *fig.* 1) completely divided into two spaces by a light-proof partition. This bellows Professor Fol had to construct for himself as one could not be purchased. Some pieces of cardboard, thin black silk, and a piece of black glove-kid were all that was needed. The left half of the bellows (*s g*, *fig.* 1) forms a compartment in which the left-hand lens throws an image on the ground glass (*g l*). The right bellows (*s d*) restricts the size of picture formed by the lens carrying the shutter, this image being identical with the first, but received upon a sensitive plate contained in the box B. A small board



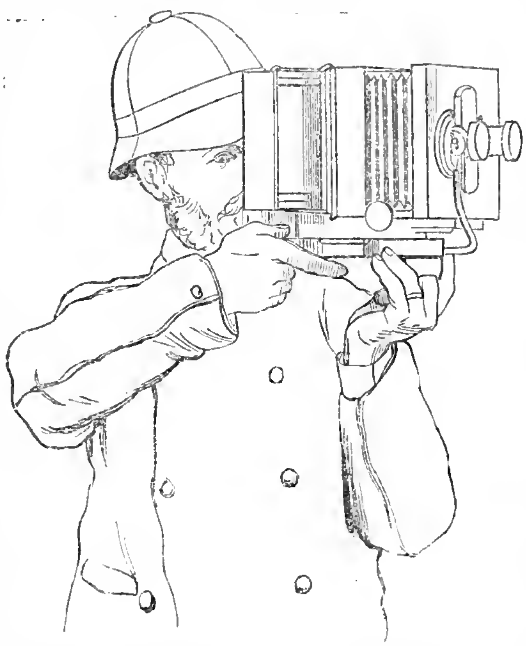
(*f r*) in front carries the two objectives, and has attached to it the front part of the bellows. A broad frame (*c*) carries the ground glass and the plate-box, and serves also as a place whereon to fasten the back part of the bellows. Focussing is performed by an apparatus described further on.

The plate-box is sufficiently large to contain a dozen plates in two lots of six each. Every plate is fixed in a little wooden frame backed with a piece of thin tin plate, which thus keeps all light from passing through. The two lots of plates are kept from one another by means of an incomplete screen, allowing room enough on one side, and on the other space for the frames to slide over one another. If, now, this box for twelve plates has only eleven, there remains an empty space, so that by inclining the apparatus the eleventh frame of one lot may be made to slide upon the other. When a plate has been exposed all that is needed to re-set the apparatus is simply to set it upright and then incline it towards the right, so that the exposed plate passes into the right compartment. If the apparatus be now turned so that the objectives point down, and the whole is inclined to the left, one of the right-hand plates will pass over to complete the left-hand set. Before each exposure it is desirable to tighten the screw (V) a little so as to press the foremost frame against the ledge of the box in order to make the image precisely correspond with that in the focussing half. By repeating these movements the whole dozen plates can be exposed without possibility of confusion, opening the box, or allowing light to gain admission except during an exposure.

The exposures complete, a metallic plate is pushed within, and separates the interior of the plate-box from the right-hand compartment, whence they can be removed, and the whole apparatus brought to within 13 centimetres by 16 by 24. Of course there is nothing to prevent it being furnished with twenty-two or thirty-three negatives.

The focussing is done by two frames of metallic rackwork in the under part of the apparatus (*fig.* 2), one carrying the front board (*ci*), while the other (*cs*) slides upon a groove of the frame. The two frames work together by means of a side button (P), terminating a rod which carries two grooved cylinders (*p*), the grooves working into a rack in the side pieces of the metallic frame (*ci*). The frame *cs* is worked by a horizontal wheel (R) with a vertical axis ended below by a knob, which is held in the left hand, and which helps to support the apparatus like a gun. A slight turning of the hand in one direction or the other suffices to give rapid motion to the front by means of the large wheel (R). A little toothed wheel (*r*) serves to transmit the motion of the large wheel at the side opposite to the frame, ensures its easy movement, and obviates all lateral displacement.

During use the apparatus is supported by a rest like a gun-stock, composed of four laths hinged so as to turn entirely over upon itself. The front part incloses a cylindrical tube (*t, fig.* 3), in which a piston works pressed by a coiled spring. In holding it this spring briskly pushes the piston in front and causes a compression of air in the tube, which is transmitted by the little india-rubber tube (*p i*) to the shutter, and effects its disengagement. To hold the spring it suffices to draw in front the piece (*c h*) until it catches the hook (*g*). A pressure of the finger upon this last causes the instant release of the shutter.



"The mode of using the apparatus as described is most simple, and in actual practice Professor Fol has obtained pictures of a variety of difficult subjects—pigeons flying, girls playing with skipping-rope, boys at leap-frog, &c., &c., and he quite thinks that his new apparatus will form a most useful complement to those of Messrs. Muybridge and Marey.

PHOTOMICROGRAPHY AT THE HEALTH EXHIBITION.

No. II.

At the same table will be seen a beautiful little aëroscope connected with chronometric clockwork, which causes the rotation of a leading central screw attached to a frame that carries a piece of glass like an ordinary microscope slide, divided by lines into twenty-four hours and one extra. This is smeared with a sterilised viscous material and turned face down, so that when the experiment is begun the extra line corresponds with the aperture in the funnel opening beneath. The clock, being allowed to act for an hour, brings the line of the next division into registration at midday. The instrument being attached to an aspirator and air-meter, the air is sucked through the funnel, leaving the germs, bacteria, fungi, &c., on the glass as it traverses centrally across the orifice of the funnel at the rate of an hour between each graduation. This is a most useful and ingenious instrument, but rather costly.

There is another of a somewhat similar function, consisting of a bell glass inverted over another with a ledge, which can be filled by vaseline, glycerine, or oil to render the inner space air-tight, whilst a disc divided into separate spaces and covered with a sticky material is made to rotate by a drum clock beneath, so that the divisions are brought opposite to a long slit ground out in the upper part of the bell glass for the air to enter. At the conclusion of the experiment the glass plate is removed and examined by the use of the microscope, though the naked eye can detect differences between the hourly deposits.

There is another small nickel-plated aëroscope attached to an ordinary water aspirator; a portable aspirator, consisting of two large glass jars, for drawing over a moderate but definite quantity of air; and an ordinary water aspirator; also a mercurial one for the drawing over fractional portions of air. Likewise on two pillars at the corners of the table are the modified forms of the Maddox aëroscope, as used at sea and on land. There are different forms of sterilising apparatus both for hot and cold filtration, and several flasks with readily-alterable fluids which have thus been sterilised, and remain perfectly clear. There are some useful little glass culture cells—a modification of Van Tieghem and Lemmonier's cell —and delicate pipettes for infecting the droplet of sterilised fluid placed on the thin cover glass for microscopic examination uner culture.

To the exhibits is added a very valuable list of disinfectants, ad such articles as prevent the rejuvenescence of bacteria in readily-putrescible fluid, the biniodide of mercury heading the list; 0·25 of a gramme preventing the putrescence of *one litre* of neutral bef broth—a thousand times less in weight than what is required of crystallised phenic acid. This list alone suffices to particularie Dr. Miquel's patience and industry. (See *La Semaine Médicale* fr 30th August, 1883.) It may be stated that the mildews, which are constant in the air, interfere largely by their rapid growth in the culture chamber if the sterilised liquid be at all acid; hence care is needed to neutralise, or even render slightly alkaline, the liquid in use. Dr. Miquel has raised an important point, *much overlooked*, as to the death and reviving points in different liquids, and the same liquids at different degrees of density. There are also M. Certes' exhibits of water analysis by colouring the different living organisms.

At the same table are other exhibits, and notably some microscopes by Verrick, and large model microscopes by Nachet, accompanied by a photomicrographic camera. This differs from any we are acquainted with, in that it contains a side tube carrying a prism, used in the examination and placing of the object, and which allows of the prism being withdrawn out of the field prior to exposure, so that a person seated at the side can manipulate the apparatus with ease. The camera is of a fixed length and carries at the side the focussing-rod, connected by a pulley and cord with the fine adjustment. We rather object to the position of the focussing-rod, which, like that made by Siebert, we fear may be somewhat in the way.

We must not longer linger over the interesting objects of this exhibit, which we heard a gentleman say was one of those of the greatest interest in the Exhibition, but pass to the table of M. Pasteur—a name too widely known and appreciated for us to attempt to further eulogise. His valuable contributions to the study of vinegar formation by aërial germs; his work on beer, with studies of the different yeast ferments, and the part they with other more minute organisms play in giving various flavours to beer; his mode of heating wine (Pasteurising); his extensive studies on the silkworm disease; his experiments on the cholera of fowls; his efforts to lessen the dire mortality in animals from cattle plague, by the inoculation of a modified form of the virus—all commercially attest to his genius and the value of the microscope. A list is given of the number of animals vaccinated, compiled from the combined labours of his assistants—Chamberland, Roux, Thuillier, and others.*

The above will suffice to induce those interested to examine the various forms of apparatus used in the culture and preparation of sterilised fluids. Among numerous flasks filled with such liquids, notably there stands a large flask—one of historical date—with which he confronted Baron Leibig's theory of fermentation, and showed that the minute living yeast cell was capable of inducing molecular changes in inorganic media. In 1848 he was led, through the discovery of left-hand tartaric acid, to the constitution of racemic acid. There are bottles of the right- and left-hand tartaric acids—pasteboard models of the same—"the one, if seen reflected from a mirror, being the image of the other." In 1858 M. Pasteur found that the right-hand tartaric acid in neutral media will ferment through the action of living ferments, and that these act chiefly on the right-hand acid. There is a phial of tartrate of ammonia, procured from the fermentation of racemate of ammonia, the right-hand salt being decomposed and the left remaining intact. It was supposed by M. Pasteur "that the molecular dissymmetry of organic substances might have an influence on actions of physiological and vital order," and was so stated.

There is blood drawn from a healthy rabbit into a sterilised tube, which for years has remained unaltered; also various culture liquids; single- and double-branched tube flasks. The doubly-branched tubes admit of the sterilised fluid being infected in one, while the other is kept normal for comparison. There are also a self-closing digester with manumometer for sterilising liquids; an oven for heating flasks; Schloesing's temperature regulator for water bath, which works by the dilutation of mercury; funnels for the hot filtration of viscous liquids; water-bath and regulator; funnel and water-bath; Moitessier's regulator for gas pressure; D'Arsonval's stove and thermosyphon; D'Arsonval's stove, with constant level and temperature effected by means of the D'Arsonval regulator. This is made by Weisnegg, and admits of very minute estimation of temperature—"to the $\frac{1}{10}$th of a degree." Possibly this might be useful, if modified, for gelatine emulsion making. There are other cultivating stoves.

* Dr. Thuillier unfortunately succumbed to cholera during his study of this epidemic in Egypt; Dr. Roux and Dr. Straus are now occupied at Toulon in the study of this serious malady.

Exhibited also is Pasteur's experimental brewing apparatus without the entrance of air; a gas stove for sterilising and drying vessels, and hot bath for sterilising by heat up to 120° C.; a biscuit porcelain filter for filtration in vacuo; a water filter, invented by Dr. Chamberland, for filtering through unglazed porcelain tubes at the normal water pressure. These can be readily removed, cleaned, and even rebaked for use when soiled. We must not omit the historical flasks opened by M. Pasteur at different mountain heights.

There are also various forms of apparatus which have been required for special purposes. There are beautifully-made transfusion and vaccinating instruments; the cautery of Dr. Pasquelin for bloodless operations; a modification of Dr. Roy's, and sliding microtomes; Verrick's microscopes; large and medium stands; lithographs, plain and coloured, of the silkworm moths, caterpillars, internal organs, and figures of the disease corpuscles; figures of many figured ferments found in beer and wine; also drawings of the vinegar process; while adjoining will be seen the mode of examination of silk worm moths, as carried out on a large scale, with much that is interesting in this fortunately recovered silk worm rearing, the loss of which would have proved most serious to France; and close to this exhibit is a model apparatus and drawings of the mode of Pasteurising wine by one of the large wine merchants—M. Houdart. Besides what we have enumerated, there are a few photomicrographs from negatives by Dr. Roux, which have a special claim for notice.

We had the pleasure of examining two small negatives about the size of a sixpence, which bore enlarging up to the ordinary lantern size of transparencies, and to the fidelity of these we can testify. These negatives go far to support what is not generally allowed—that better negatives of bacteria and very minute objects can be produced without the eyepiece, by obtaining more perfect small negatives, than by original large direct negatives. There is, of course, the additional trouble of copying and enlarging; but we must not let this stay our hand when we are seeking for the best work. The plan adopted by Dr. Roux, which is one to meet *rapid laboratory work*, was to fix a small camera or cell to the eye end of the microscope containing the little gelatino-bromide plate, the position of the focus and the image having been previously determined by placing a piece of plain glass in the slide, and on its *upper* surface a few scales of a moth or butterfly. These are brought into focus by a low-power objective used as a focussing-glass, and the image of the object on the stage of the microscope and the image of the scales are made to coincide. Hence, by withdrawing the little camera and inserting the focussing objective, the focus of any object on the stage can be made to occupy the exact position of the scales on the transparent glass. In other words, the focus of these and the new image are coincident, and, the surface of the small gelatino-bromide plate falling exactly on to the same plane, there can be no error through the different thickness of the glass plate, as the focus of the scales, the image of the object, and the sensitised surface are in one plane.

The illumination is by a small paraffine lamp. The arrangement is simply removal of the eyepiece, insertion of the focussing objective, and then the fixing the little camera in position. There is no reason why a somewhat larger camera may not be used, and a rather longer and larger tube adapted to the working microscope, or the camera may be in part supported, as suggested by Dr. A. C. Mercer, of Brooklyn, U.S., by a strut from the stand of the microscope. For the most perfect work it would, perhaps, be preferable that the camera should be only loosely connected with the eye end of the microscope, though otherwise a fixture. The plan of development adopted by Dr. Roux was that, we believe, recommended by Colonel Stuart Wortley, of soaking the plate in weak ammonia before applying the pyro., and then adding ammonia as required to to bring up the image. We would strongly recommend examination of these exhibits, and we must again remind those disposed to aid photographically in the study of the bacteria, that patience—the common virtue of the photographer of the infantile world—will be largely requisitioned, even under favourable circumstances.

There are other photomicrographs in the gallery of the Albert Hall; and in Dr. Cheyne's laboratory will be seen some of Dr. Koch's photomicrographs of the bacteria of disease, and a Siebert's camera; but we must not further particularise.

EXPERIMENTAL COMPARISON BETWEEN AZALINE AND EOSINE PLATES.

In order to ascertain how the different stained plates sensitised for colour represent the colours, one colour scale was photographed: I. With eosine collodion of the usual composition; II. with eosine gelatine emulsion plates (two per cent. of a 1:400 eosine solution); and, III., with azaline gelatine (one per cent. of a 1:30 solution of azaline) plates, all taken through the same yellow glass. The wet eosine collodion plate required an exposure of four minutes; the two dry plates a minute each. The result was as follows:—

Colour.	I. Eosine-collodion wet plate.	II. Eosine-gelatine dry plate.	III. Azaline dry plate.
(a) Naples yellow..	Lightest.		
(b) Chrome yellow.	A little darker than Naples yellow.		
(c) Red lead......	Black........	Black........	Grey.
(d) Dark red......	Black........	Black........	Black.
(e) Rose........	Darker than chrome yellow	Like chrome yellow	Rather darker than chrome yellow.
(f) Light green..	Like chrome yellow	Lighter than chrome yellow	Darker than chrome yellow.
(g) Dark green....	Grey	Grey	Dark grey.
(h) Cobalt........	Dark grey..	Like chrome yellow ..	Dark grey.
(i) Ultramarine ..	Black......	Like chrome yellow ..	Black.

From the above it will be seen that green acts too powerfully upon the eosine dry plates as well as upon the wet plates. A light green, which to the eye appeared darker than chrome yellow, appeared lighter than it in the photograph. Then red lead acted excellently upon the azaline plate, but quite insufficiently upon both the eosine plates. Rose colour did better with the eosine gelatine plate than with the wet eosine collodion plate. The difference between the sensitiveness of the two eosine plates for blue was very remarkable. In the wet plate it came out decidedly dark; while in the dry plate, in spite of the yellow glass, it came out *as light as chrome yellow*.

The wet eosine plate so far represented the relative values of the colours more correctly than the dry plate; but the azaline dry plate far surpasses them both—not only by its sensitiveness to yellow-red, but also by the correctness with which it reproduces the gradation between blue and green. H. W. Vogel, *Prof.*
—*Mittheilungen.*

MISCELLANEOUS SUBJECTS.

Another New Rainband Spectroscope.

A year or two ago a description was published in these pages of a pocket rainband spectroscope, made on M. Janssen's principle, by Mr. John Browning, the well-known optician, accompanied, however, by the objection that some persons were unable to see the rainband through it, and, in occasional instances, perhaps, through any other instrument. Perseverance and experience have much to do with the matter, and in some instances colour-blindness may come into play. As M. Mascart has said, one person in every ten is markedly colour-blind, usually without knowing it. In their recognition of the more delicate tints of the spectrum it is possible that no two observers are alike, and no man has the right to set up his own eyesight as that by which the eyesight of all other men should be judged. Who is to decide whether that which one man calls red has not the same influence on his brain as that which another man calls green, the colour being the same to both merely in name and position in the spectrum? Until one man can put his brain behind another man's visual apparatus, who is to answer this question?

To overcome objections as to difficulty in seeing the rainband, especially with a pocket spectroscope, Mr. Browning set to work to make one to give plenty of light and plenty of dispersion. This he did partly by the use of glass prisms specially heavily charged with oxide of lead—so heavily charged, indeed, that slabs of the glass feel almost as heavy in the hand as slabs of metal. This special glass has a faint yellowish tinge. The compound direct vision prism is placed nearer to the eyepiece than in the original instrument; in fact, it almost touches it. In the mechanical arrangements there is improvement—a half-turn of a milled head moving the telescope of the spectroscope in or out a considerable distance by means of a lever arm and pinion. Where portability is necessary, combined with efficiency, it is the best instrument of the kind I have seen. It was of constant use to me during the whole of last winter when travelling in Switzerland; and for various researches I am carrying on in connection with photography it is in constant demand. A large spectroscope is one of those instruments which are of no use to a man who does not mean to thoroughly study spectroscopy, and to go in for real hard work. For *dilettanti* use a pocket spectroscope is the proper thing, and is excessively valuable for ordinary purposes. A powerful spectroscope means hard work and hard study; it cannot, like a powerful telescope, be to any great extent made a means of intellectual recreation to all comers.

The Standards of the Photographic Society.

The Photographic Society of Great Britain having done such good work in the establishment of standard screws and stops for lenses, why should it not now do something to promote better and standard lights in developing-rooms? It might do this by fitting up a shadow actinometer of the description recently used by Professor Dewar at the Royal Institution, and testing the lanterns constructed, or in course of construction, by those who are seeking to improve the light for developing commercial gelatino-bromide plates. The test for non-actinicity might be the effect produced upon half a plate at eighteen inches from the flame of the lantern, as compared with the effect of the competing lantern upon the other half of the same plate, both halves exposed for the same time, developed in the same dish, and fixed in the same bath of thiosulphate of soda. Next, each lamp could be tested as to the intensity of its light by the shadow actinometer, by which it is possible to compare the intensities of two lights of different colours. It may, perhaps, be safely assumed that on the average the developing-rooms of photographers are twice as dark as they need be, to the unnecessary straining of the eyesight. The proposed testing would also bring out information of scientific interest; for at present very little is known about the relative space-penetrating powers of coloured lights of low intensity. When readers of memoirs bring forward new lanterns the illuminating power of each lantern should be tested by the actinometer before the reading of the paper, so that the listeners may have some idea of the value of the light brought under their notice. Knowing its illuminating power, the only remaining question will be the amount of its action upon a plate at a fixed distance from its flame—say eighteen inches or two feet.

If the Photographic Society had standards for testing varieties of apparatus, so as to be able to do for photography that which Kew Observatory does for meteorology, its attractiveness and usefulness would be greatly increased. It should be able to test lenses, lanterns, and plates by means of standard apparatus, and give certificates of the result in figures—for a small charge, if need be—as at Kew. Most scientific societies have an excellent library for the use of members. Why is the Photographic Society without one?

The standard light used in the actinometer might be that of the Carcel lamp, with its light passed through a given thickness of solution of pure bichromate of potash in distilled water; or the standard candle used for the testing of the illuminating power of gas might be employed. In some cases the lights from two competing lamps might be directly tested against each other, instead of employing a standard light. Standards of measurement in the rooms of the Photographic Society would abolish a certain amount of vague talk, and give a distinct impulse to the progress of photography. It is to be hoped that at the forthcoming Congress on International Photographic Standards at Brussels, no attempt will be made to found an international establishment with photographic standards, but that each nation will have one of its own. These suggestions are made on the supposition that the Congress does not meet merely for the vulgar but useful commercial purpose of establishing uniform sizes for photographic plates, but that it will have some scientific ends in view. When does the Congress meet?

Studios with Top Light.

On the high road from England to Switzerland by the quickest route *viâ* Calais, Boulogne, Rheims, and Chalons-sur-Marne—a cross-country track with but one through train in the twenty-four hours—the traveller, after speeding in darkness through central France, in the cold grey of morning finds himself near its eastern borders between the Vosges and the Jura mountains, both too far off to impart much in the way of beauty to the scencery, and Belfort is usually the first town of any size to greet his vision. Nobody who is anybody ever gets out at Belfort, where everybody would be glad to see somebody, who, however, alighteth not. Why should he? and is not Basle close at hand? However, some two or three months ago I had the curiosity to visit this same Belfort. It is a military town, hot and dusty, very strongly fortified, and the scene of fierce fighting during the Franco-Prussian war. Near the theatre is a photographic establishment, perhaps the largest in the town, and the studio is built on the ground, with its glass side close to the street, just where the face of the side wall of a house or garden would be. Small boys and others are prevented from contemplating the features and disturbiog the peace of mind of the sitters by the use of ground glass instead of plain glass for the side of the studio, and this glass is protected from injury by wirework. As the side street is narrow, and has houses on the other side, the studio has too much top light. The ground glass would have obviated this to some extent by catching some of the light from the sky and throwing it into the room; but the owner has made the grave error of placing the polished side of the glass outwards, so that its shining surface reflects much of the needed light outwards and downwards. The example is, therefore, published here as a warning to others. In spite of all disadvantages the artist, nevertheless, turns out very good pictures. Scientific knowledge is but the servant of art-taste in a good photographer, and a man with good art-taste, without techical ability, will often produce a pleasing picture where the scientific mechanic fails. The natural elegance and good taste of the French tell greatly in their favour in photography.

Near the establishment of this Belfort photographer is that of a chemist, and photographic chemists are so honest in France they let you know what to expect; for this one has a plate of brass three or four yards long inside his window, with the word "Roguerie" printed on it in large black letters. "D," the actual first letter of the word is hidden from view because the brass plate is too long for the window.

The Dáphnia Pulex.

In his lecture at the Royal Institution Professor Mascart exhibited an experiment with a great number of specimens of the *Dáphnia Pulex*, or common water-flea. These were swimming about in water contained in a vessel with flat sides. The rays of the spectrum were sent through the bottle, upon which the largest and presumably the most sober-minded of the fleas took up their positions in the green rays, so as to form a living band in that part of the spectrum. That interesting crustacean, the *Dáphnia Pulex* of Latrielle and Larmarck, delights to abide in horse ponds, and where the water is green and juicy, though it is found also in running streams. Its moral propensities are of a low order, since it passes its whole life with a single eye to its own interests; in fact it has but one eye, and that a big one, connected by nerves with the two lobes of its brain. I question whether Professor Mascart was right when he suggested that the larger water-fleas selected green light because they were colour-blind. However honourable their position of being in his bottle and before the Royal Institution, perhaps they were home-sick, and careered about in the green ray merely in the hope of finding an outlet to their green pond with its flea umbrellas of green duckweed. That the smaller ones did not do the same merely proves that they were gay young things who appreciated the grandeur of their position. They belong to the *Cladócera*, or "branch horns." They have five pairs of feet, and two pairs of antennæ, the lower pair very large and used in swimming; the feet are "not much," and within the shell. Their motions are lively and brisk. In Professor Mascart's bottle they betrayed no lack of energy and excitement. In their native ponds and ditches, where no doubt they will be much sought hereafter by photographers who wish to use them to indicate the new flea line in the spectrum, they sometimes travel in a band a foot wide and several yards long, with no doubt leaders in front like certain birds of passage. They are frightened at shadows; for let but a new shadow fall upon the water the whole army of fleas vanishes in all directions. They flee away, so to speak. The beating of their hearts is rapid and isochronous. Phrenologists say that the brain at the back of the head denotes animal propensities; the whole of their brain is at the back of the head; they have no brain in front for the development of the intellectual and moral faculties. They carry their eggs on their backs, underneath their shells, and hatch them there. The young are unlike their parents—have no shell, no abdomen, and but few limbs. The egg-carrying part of the body is opaque at certain seasons of the year. They are three or four times as large as the land flea, to which they are related only in name. Their countenances are rigid, and betray little emotion under all the changing vicissitudes of life.

W. H. Harrison.

ON STAINED GELATINE PLATES.

The dye prepared by me, and which I mentioned at the conclusion of my last article, and which I have decided to call "azaline," has, on further trial, turned out a very excellent *optical sensitiser for gelatine plates*, though its action upon collodion is less excellent. It has three lines of absorption, two of which lie in the yellow-green and one in orange; and corresponding to the latter it produces quite a considerable sensitiveness to red, but has a slighter sensitiveness to green than eosine. This, however, is no disadvantage; rather it is an advantage, for green acts too powerfully upon common eosine. It is, however, very surprising that azaline does not, like eosine, diminish the collective sensitiveness to white light, but rather *increases* it, and with some emulsions even doubles it. For this reason I succeeded in taking a photograph with it of an oil painting with figures in white dresses without the slightest solarisation of the whites. The exposure required for a life-sized oil painting taken through dark yellow glass in bright weather was only a couple of minutes. The experiments will be continued.

H. W. Vogel, *Prof.*

—*Mittheilungen.*

ON THINGS IN GENERAL.

"Messrs. G. West and Sons have a frame of studies of yachts elaborately retouched;" so say the Committee of the Cornwall Polytechnic Society in their report upon the exhibits. Some value has been attached at one time or another to the awards of this Society to photographic pictures; but when this second time the Committee go out of their way to libel a photographer who has produced some of the most exquisite gems of pure photography that ever adorned the walls at Pall Mall, and call his examples of pure photography "elaborately retouched," the value of their verdict will be considered as about equal to its want of truthfulness. Messrs. West and Sons have just cause for grave complaint. Another gentleman they take under their wing in a very kind manner:—"The Judges are pleased to note the marked improvement in his exhibits over last year." What a glow of satisfaction would suffuse the cheeks of that gentleman at this kind expression of pleasure at the improvement he is making. It would almost annul the feeling of horror at the want of grammar in the language adopted to express their gratification. This report is very good reading. Of one set of pictures it says:—"They are a little too black and cold, and in many instances the subject is too low in the plate, which dwarfs the hills." Here is a nice little puzzle for the wet days, to discover whether the subject or the plate dwarfs the hills. "The Judges are of opinion that this gentleman can do better work, and hope he will profit by these remarks!"

I was interested to note the discussion at the Parent Society last month about quick exposures. Several members expressed the opinion that the quickest of exposures did not necessarily produce a more correct or artistic representation of the object than an exposure really quick but relatively slow. This is a text I am to get prosy on, I do believe, but its importance must be my excuse. To me the representation of quickly-moving objects by a picture depicting just one phase of the motion is an outrageous absurdity. Mr. Muybridge's photographs were invaluable, but to the anatomist only—not to the artist. Some of the positions of quickly - travelling animals were actually ludicrous; no artist would attempt to paint them in a picture. Similarly with sea pictures—or, perhaps, I should say, wave pictures—as discussed at the above Society. Everyone knows that an extremely-quick exposure would give the reflected sheen of the sun on the water as a series of reflections of individual distorted suns, and not as that long line of light which the eye perceives, or, rather, records, upon the brain. And so in breaking waves and rolling surf. Where the motion is comparatively slow instantaneous pictures are admirable, but where changes follow in rapid succession the eye only tells the brain of an average of a number of different pictures placed on one another—an average taken after Mr. Galton's principle. Mr. G. W. Wilson, in his Scotch views, when he produced his most beautiful photographs of rolling waves years ago, only used his cap to cover and uncover his lens with, and artistic indeed were his results. I do not wish to be understood from what I write that I object to quick exposures altogether; far from it. Some most exquisite pictures have been so taken; but the subject should be suited to the process, and not the process to all subjects.

Whenever Mr. J. R. Sawyer gives us a paper it is sure to be practical and to contain valuable hints. Such was his last on *Commercial Fabrics Suitable for Dark-room Illumination.* But what did he mean by putting the task of contracting the pupil of the eye upon the ciliary muscles which really work the lens of the eye? The muscular fibres of the iris are not the ciliary muscles, as his words would indicate; and so far from those muscular fibres acting slowly they form a conspicuous example to the contrary, for they act with great rapidity, though other unstriped muscular fibres do act slowly.

I note that in the discussion upon Professor Vogel's discovery, at the meeting of the Berlin Association for the Cultivation of Photography, two photographic reproductions of a chromo-lithograph were shown—one done in the usual way, and the other by his stained collodion process. In comparing the two copies it was noticed that the grain of the paper showed very much more clearly in the picture done by the ordinary process than in that by the stained film, and the reason given was that the shadows cast by the inequalities of the paper of the original were caused by reflected light and were yellowish in tone—a tint to which ordinary collodion is very sensitive, but the stained collodion very much less so; hence these shadows are not strongly reproduced in the latter. This is all nonsense as at present written, and it appears to me that the simple explanation is that the picture showing the grain most closely was under-exposed. Anyone accustomed to copying pictures upon paper knows that such is the usual effect of under-exposure.

Apropos of the subject of compressed oxygen that has been so much discussed of late, I was much amused by the perusal of your American correspondent's remarks upon the subject. "In England," he says "(where strength is universally sacrificed to weight), a small garden roller called a 'bottle' has," &c. That is very neat; "garden roller" is a very good term by which to describe these vessels. It is a pity that the system of compressed gas is not more general; I expect, however, that it will be ultimately. There seems to be some difficulty anticipated as to the heat produced in gas compression, it might be equally useful to give a word of warning as to gas expansion. A compressed gas-holder, if allowed to give out some considerable portion of its contents at a quick rate, would become so cold as to be almost dangerous to handle.

According to a report of the discussion at the Photographic Society of Great Britain, on the 24th June, one of the questions put forth at the City Guilds examination was—"What is the cause of green fog?" I could very readily understand the question being put as to *a* cause; but to assume, as must have been done if the question were properly reported, that there was only one particular cause is to assume what most assuredly has never been proved, and so the question was a misleading one.

To sum up photographic optics in a few dozen lines, and to describe the principle of achromatisation in a few dozen more, might seem an impossible task; yet Professor Rucker, in his lecture to the Leeds Photographic Society, almost succeeded in doing this, and gave a compact and useful lecture upon this important subject, about which, strange to say, there is more ignorance than upon any other in connection with the art among the general body of photographers.

I observe in *Recent Patents* one for preparing prints for colouring after a plan somewhat suggestive of crystoleum processes. I do hope we are not going to have another crystoleum fever. A year ago nearly every young lady in the kingdom was learning the art and producing more or less (to herself) satisfactory pictures in all the colours of the rainbow. The "craze," I am glad to say, appears to have almost died out. I have a strong idea that many ladies "went in" for crystoleum painting with the idea that by paying a guinea or two for lessons she had learnt a profession which would give her quite a settled annual income. How many have there not been doomed to utter disappointment! People never will believe that the smallest and lightest handicrafts cannot be learned without practice. Far less likely is it that the power to do artistic work can be picked up in a few weeks' time.

FREE LANCE.

FOREIGN NOTES AND NEWS.

DR. LOHSE ON ISOCHROMATIC GELATINE PLATES.—OBSERVATIONS ON THE SAME BY HERR SCHUMANN AND HERR OBERNETTER.—HERR ALBERT'S CLAIM.

IN the *Archiv* Dr. O. Lohse, of Potsdam, gives an account of how he prepared eight solutions of different strengths of eosine, the weakest containing but 0·0005 of a gramme of eosine to 100 c.c. of fluid, a proportion of 1 : 200,000, in which the dissolved eosine was, of course, quite imperceptible to the naked eye, yet he found that bromide of silver films saturated with it were rendered perceptibly more sensitive to yellow. This confirms Professor Vogel's experiments. A little ammonia was added to the preparatory solution of eosine and no special emulsion was used, only some ready-made plates were placed in a bath containing the solutions of different strengths.

In a subsequent article Dr. Lohse recommends for the same purpose, as a substitute for eosine in the preparation of isochromatic plates, an alcoholic solution of turmeric root. He found that this extract did better even than eosine, because it acted also upon the red part of the spectrum and increased the sensitiveness of that part where there was a minimum action with eosine. The sensitiveness to colour between the Fraunhofer lines D and H—that is, from yellow to violet—is nearly equal, being without any great preponderance of action in the yellow as compared to blue, such as occurs in the case of eosine. Dr. Lohse is of opinion that a mixture of eosine and tincture of turmeric may be used with advantage for staining plates. Dr. Lohse's experimental plates were prepared, like his eosine plates, by placing ordinary gelatine plates in a bath of ten c.c. of water, ten c.c. of ammonia (density not given), and a small quantity of alcoholic extract of turmeric. The eosine series was prepared by dissolving in every 100 c.c. of water containing ten per cent. strong ammonia, the following quantities of ammonia:—No. I., 0·5 of a gramme; No. II., 0·25 of a gramme; No. III., 0·125 of a gramme; No. IV., 0·0625 of a gramme; No. V., 0·0313 of a gramme; No. VI., 0·0078 of a gramme; No. VII., 0·0019 of a gramme; and No. VIII., as already mentioned, 0·0005 of a gramme.

In the *Wochenblatt* Herr Schumann says he has tried the extract of turmeric as recommended by Dr. Lohse, but got no favourable results with it. Herr Obernetter, who has also been experimenting with turmeric, writes that the sensitiveness to red induced by it is too slight. Elsewhere [see page 473] Dr. Vogel recommends a new dye, which he calls "azaline," and which he thinks superior to eosine on account of its action on the red rays.

A certain Dr. Albert claims to have used stained plates for two years, and scouts the idea of photographing through yellow glass. The negatives he has sent along with coloured originals to the *Archiv* seem to bear out his assertion; but he gives no details as to what substances he has employed in order to get a truthful reproduction of the colours.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 10,334.—"Washing Baths for Photographic Purposes." J. STURROCK, Dundee.—*Dated July* 19, 1884.

No. 10,370.—"Washing Apparatus for Negatives." C. STORTZ, Hassocks Gate, Sussex.—*Dated July* 19, 1884.

Our Editorial Table.

AMATEUR PHOTOGRAPHY. By D. J. TAPLEY.
New York: S. W. GREEN'S SON.

WE hear a great deal about the rapid spread of amateur photography in America since the introduction of gelatine plates; but, if American amateurs are satisfied with the intellectual food provided by the author of this work, we fear they will do little credit to photography. We do American amateurs the justice of believing, however, that, as a body, they are a little more advanced in intelligence than their would-be instructor would seem to think.

The motto on the title-page of the book is "Easy as rolling off a log." We do not quarrel with the author in adopting this motto, as we presume he alludes to the attainment of his own standard of efficiency, speaking of which he says:—

"After a few months of practice with no instructor except a book furnished with a cheap outfit, I have succeeded in making pictures that are a source of satisfaction to myself and friends, and that I am willing to compare with those of the average professional."

And then he straightway commences to write a book of instruction!

Of himself the author is good enough to inform the reader that he was "just forty-nine on the 22nd of last February," and then follow several pages of "twaddle" which, though they serve the purpose of filling up, have no earthly bearing on photographic instruction. After this he plunges *in medias res*, and the reader is indulged in a dissertation on photography, containing about as much information as would be extracted by an intelligent eight-year-old schoolboy from a one-hour's discourse by a lecturer who had never seen a dry plate in his life. The developing instructions, for instance, are specially good, and occupy eight lines of large type. They are as follow:—

"The plate is again covered from the light and brought to the 'dark room' (we use the bath room, as we can get plenty of water and can easily shut out the light), where, by the light of a red lantern, it is taken out of the plate holder and treated to a simple chemical bath which changes what was apparently a plain glass plate, covered with a whitish substance, into a beautiful picture."

Verily it is so simple that the novice must think it even easier and certainly far pleasanter than "rolling off a log!"

In connection with printing, the author sagely remarks that "the object of toning is to clear up the picture, making the whites white and the blacks of the particular dark shade that pleases the artist." Also that "the purpose of 'fixing' is to neutralise the chemicals that are alterable by light and make the picture permanent." In this chapter on printing, however, Mr. Tapley proves that his "few months' practice" have taught him one thing; for, speaking of printing, he says—"and in fact you may study this branch for years and still find something to learn." We may add—"practice is better than precept."

But we need go no further in showing how the pages are filled without affording a glimmer of information that a learner could find of any use. But we may conclude with a remarkable instance of how the "learner" may be led astray. Under the head of "Actinometer Tests" we have the following precious statement:—

"The 'actinometer' is a hydrometer for testing density of fluids, having a scale which indicates the number of grains to the fluid ounce. Thus a solution of 50 grains of nitrate of silver to the ounce of water allows the actinometer to sink to the figure 50, and the solution is said to be 'fifty grains strong.'"

In this attempt at authorship Mr. Tapley has no doubt succeeded *to his own satisfaction;* but then he has shown himself to be very easily satisfied. We have devoted so much space to the matter as a protest against the combination of ignorance and effrontery that induces a man after "a few months' practice" to set himself up as a teacher of his fellows. If the book be utterly worthless as an instructor we can, at least, recommend it to our numerous American subscribers as affording for its size a very large amount of comic reading, and, being well got up and profusely illustrated, the first edition may go off successfully. By that time, perhaps, Mr. Tapley will have begun to learn that neither photography nor book writing is quite so "easy as rolling off a log."

Meetings of Societies.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

AT the technical meeting of this Society, held on Tuesday, the 22nd inst., the chair was occupied by Mr. J. Spiller, F.C.S.

In the course of some observations upon the necessity of having correct reports of the transactions of the Society, the Chairman remarked that a curious instance of inaccurate reporting had recently occurred in an account contained in a technical scientific journal, where Professor Macleod had been described as having exhibited an apparatus for automatic registration of sunshine by means of a water lens, the fact being that no apparatus had been exhibited, and the lens which was described was an ordinary glass one, and not a globe of water, which would be unsuitable from its liability to burst with frost.

Mr. ANNAN (of the firm of T. and R. Annan, of Glasgow), on the invitation of the Chairman, exhibited a series of examples of the photo-engraving process (Klic's), as carried out by that firm. The prints were of a very varied character, including copies of paintings, engravings, landscapes, interiors, and portraits. Amongst the latter were some striking examples. One of the Duke of Buccleugh strongly recalled the fine prints on salted paper produced twenty-five years ago by Messrs. Hennah and Kent.

Mr. W. M. ASHMAN showed four negatives taken on plates of the same batch and similarly exposed, but developed by different methods. No. 1 was developed with pyro., sulphurous acid, and alkali, on the plan recommended by Mr. Monro in the April number of the *Photographic Times*. No. 2 was developed with the usual quantities of pyro., ammonia, and bromide. No. 3 was like No. 1, but with ammonia substituted for the alkali recommended. No. 4 was with Newton's latest formula containing formic acid. He (Mr. Ashman) thought that No. 1 gave the best result, and then No. 4. No. 3 he considered to be ten times over-exposed. As to the time occupied in developing: No. 1 had taken two minutes and No. 4 ten minutes.

Mr. W. E. DEBENHAM inquired whether he was to understand that the use of No. 3 developer would allow an image to be brought out with one-tenth the exposure required by the others.

Mr. ASHMAN said scarcely that, but that it was a mixture which required a restrainer, and did not work properly without it.

Mr. T. SEBASTIAN DAVIS thought that the image produced by No. 2, the ordinary developer, was the best. He found that be got the best results in developing from using twice as much bromide as pyro.; but in hot weather, such as that experienced recently, he considered four times as much bromide as pyro. better still.

Mr. ASHMAN inquired whether any other member had had any experience with formic acid in the developer.

Mr. T. BOLAS observed that with the small quantity used by Mr. Newton the effect was probably inappreciable.

The CHAIRMAN asked Mr. Ashman to give the formula in full.

Mr. ASHMAN did so. [It will be found in our issue of the 11th inst., in the report of a meeting of the London and Provincial Photographic Association.]

Mr. DAVIS said that M. Audra had recently recommended the use of a two-per-cent. solution of water-glass for a substratum for gelatine negatives, as a preventive of frilling, and as causing the emulsion to flow freely on the surface. He intended experimenting with it himself, and would report results at the next meeting.

Mr. A. COWAN knew of one commercial plate-maker who prepared his plates in that manner, and used no chrome alum in the emulsion. It was, therefore, probably efficacious in preventing frilling.

A question was read:—"What is the use and value of the addition of alkaline citrates to the developer?"

Mr. DEBENHAM remarked that when the use of citrate in the developer was introduced by Mr. G. Watmough Webster it was in order to overcome over-exposure. It seemed, therefore, probable that when it was employed a longer exposure was necessary.

Mr. COWAN had found that a plate exposed six times too much came up with citrate undistinguishable from one that had received the correct exposure.

Mr. F. W. DONKIN had found a similar effect with ten times the proper exposure.

It was arranged that the discussion of this question should be adjourned till the next meeting, and the Chairman expressed a hope that members would experiment in the meantime and report thereon.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION

AT the meeting of this Society, held on the 17th instant, the chair was occupied by Mr. A. Cowan.

Mr. J. H. HARE, on behalf of Messrs. J. and H. Dale and Co., showed a studio clock having a large seconds hand which, in the ordinary way, was out of gear, and did not move with the other hand, but stood at zero. By means of a Leclanche battery the clock was in electrical connection with one of Cowan's double drop-shutters. When the exposure was commenced by the fall of the first dropping piece, the seconds hand was thrown into gear and continued to move until the exposure was terminated by the fall of the second dropping piece, which closed the lens. This movement threw the hand out of gear again, and it returned to zero in readiness for the next exposure.

Mr. W. AYRES passed round some prints from negatives taken on gelatine plates during a recent professional tour through Scotland. The subjects were of the most varied character, including landscapes, interiors, and boats in motion, &c. Mr. Ayres also showed a tool made for cutting circles out of ebonite.

Mr. W. M. ASHMAN showed two pairs of prints made in April last. One of each had been kept covered up in envelopes; the others had been exposed in show cases. The latter, although not exactly faded, had changed in tone, becoming decidedly redder. This was attributed to the joint action of the light and exposure to atmospheric influences.

Mr. W. K. BURTON thought that so far the change was an improvement.

Other members spoke of having noticed a rapid change in prints that had been exposed in certain positions, such as railway stations, where damp had had access to them.

A question was asked as to whether particulars had been received of the method of producing gelatino-chloride opals employed in obtaining the one shown at the previous meeting.

The SECRETARY replied that they had not.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE members of this Society enjoyed an excursion in Shropshire last week, under the guidance of their Hon. Secretary, the Rev. H. J. Palmer.

Starting in carriages from Shrewsbury, the first stage of the journey ended at Condover. Here the centres of attraction were the church, the splendid Elizabethan mansion of Colonel Kennard, and Condover House—an extremely beautiful black and white building of the 13th century. Miss Carr very kindly showed the beauties and curiosities of the interior to the visitors, and large numbers of negatives were taken here and at the hall.

A drive of a few miles to Pitchford followed, and, with the permission of Colonel Cotes, very fine pictures were obtained of the old hall and church.

The next halting-place of the party was Acton Burnell, where there is a fine ruin of a building in which Edward I. held a parliament in 1283; but no negatives were taken, owing to the necessity of pushing on to Wenlock.

The drive over Wenlock edge, and the magnificent panorama from the ridge, were greatly enjoyed. But the culminating pleasure of the day was found in the ruins of Wenlock Abbey. These abound in artistic "bits," and the abbot's house, occupied by Mr. Gaskell, M.P., supplied as fine a subject of this class as could be found.

About a hundred negatives were taken during the day, and the only things to mar the enjoyment of the excursion were the necessarily short stays at each spot, and, last but not least, the difficulty of finding trains and places for Birkenhead in the terribly-congested state of the traffic at Shrewsbury. But, in spite of all the drawbacks of the day, it was considered to have been the pleasantest and most profitable, from a photographic point of view, of this season's excursions of the Association.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.

THE third of the current year's series of outdoor meetings of this Society was held on Saturday afternoon last, the 19th inst., at Dilston, near Corbridge-on-Tyne. The ruined Hall at this romantic spot was formerly one of the residences of the ill-fated Earl of Derwentwater, and it, together with its surrounding picturesque scenery, has oftentimes formed a happy subject for artists of all kinds—the wielders of pen, pencil, brush, and photographic lens alike.

Mr. E. Goold, of Elswick Lodge, Newcastle, was the leader of the expedition, and under a propitious sun and sky a fair number of plates were exposed, and have since turned out satisfactorily. Mr. J. P. Gibson, of Hexham, with characteristic hospitality, entertained the members to a substantial tea, and afterwards showed them through his large studio of photographic views, which for variety and good workmanship are equally admirable. Altogether the gathering was most agreeable.

The next outdoor meeting will be held at Bywell, on Wednesday, the 6th August, under the leadership of Mr. E. Dodds, Low Fell, Gateshead.

ST. HELENS ASSOCIATION FOR THE PURSUIT OF SCIENCE, LITERATURE, AND ART.

PHOTOGRAPHIC SECTION.

A MEETING of this Section was held on Wednesday, the 25th ult.,—Mr. Heather in the chair.

Mr. BROOK exhibited his new $8\frac{1}{2} \times 6\frac{1}{2}$ camera, by W. Watson and Sons, London, with Ross's symmetrical lens, which was very much admired.

Mr. LEES presented the Section with an illuminated copy of the rules. A cordial vote of thanks was accorded to Mr. Lees for his presentation.

Mr. BROOK showed about a dozen negatives of views taken at Lymm. Three of these, which should have been the best, were fogged. An inquisitive young lady at the above place opened the slides to see the pictures whilst Mr. Brook was in the next room. He (Mr. Brook) will lock the bag in future. The rest were very good, including two negatives of three St. Helens celebrities, namely, the most corpulent men in town, whose total weight was 980 pounds.

The CHAIRMAN described some experiments he had been making with boiled and cold emulsion-making. He was not very successful with the cold, and was now more than ever a disciple of the boiling process.

After the inspection of a number of prints and chemical photographs (not by Mr. Sherlock's new process) the meeting was adjourned.

BERLIN ASSOCIATION FOR THE CULTIVATION OF PHOTOGRAPHY.

THIS Society met on the 6th June,—Professor H. W. Vogel in the chair.

Dr. Liesegang forwarded a copy of his work *On Silver Printing and Enlarging, and the Collodion Process.*

The Chairman then read a circular received from the Northampton Museum authorities regarding the prospective International Photographic Exhibition, to be held there from the middle of December.

An unusually good photograph by electric light, by Herr Kurtz, of New York, was shown and favourably commented upon.

Herr QUIDDE inquired whether most light was lost through diffusion by Herr Kurtz's system of electric lighting, or by absorption by the paper reflector through Mr. Vanderweyde's system.

The CHAIRMAN replied that he thought Herr Kurtz's system was the better of the two; but that was merely his impression, as he had no exact data to go by.

Herr JOOP suggested replacing the tissue paper or ground glass which covers the aperture of the lantern directed towards the sitter by ribbed glass, which would absorb less light.

The CHAIRMAN showed some lichtdrucks of photographs, by his new process, of the colour scale, and then spoke of his endeavours to render gelatine plates sensitive to yellow, &c. He had prepared a new dye which, in consequence of its resemblance to the bloom of azaleas, he called "azalin." It had a very good effect upon gelatine plates and upon dry collodion; but, on the other hand, it was not very useable with wet collodion. Herr Obernetter had already tried it upon his emulsion, and had sent him (the Chairman) two sample plates stained with it. The plates were shown and were copies of oil paintings, which showed in the most striking manner the action of Professor Vogel's dye. Herr Obernetter wrote that he had also tried these stained plates when taking landscapes, and had secured surprising results. The superiority of the azalin plates was most striking in the case of red and also of green, the latter acting too powerfully upon cosine. Two sample negatives of the colour scale, taken upon a plate stained with eosine and with azalin, showed this strikingly.

Herr SCHULTZ-HENCKE showed a gelatine plate intensified with Herr Anders' blue intensifier. The intensification proceeded very smoothly, but he could not tell them what the formula was, as Herr Anders had applied for a patent, which had not yet been granted; but it was identical in principle with Dr. Eder's blue intensifier for collodion plates, so that the validity of a patent for it might be questioned.

Herr Roloff read a small pamphlet written by him and intended for the general public—*What One Should Do at the Photographer's.* It is intended for distribution, and contains hints as to the choice of a suitable costume, &c.

This concluded the business, and the meeting was adjourned.

Correspondence.

THE ETHOXO-LIME LIGHT.

To the EDITORS.

GENTLEMEN,—So far from the ether-oxygen lime light having been "popular" here at the time I applied for a patent in connection therewith, I believe it was not used by anyone in this country. I had never heard of it, and believed that I was the first to pass oxygen through any kind of chamber containing ether and connected with a blow-pipe.

The claims in my original application for a patent covered all this, and when I discovered my mistake (while looking over a file of THE BRITISH JOURNAL OF PHOTOGRAPHY at the Franklin Institute), I wrote to the patent office examiners, calling their attention to the publication, and amending my specification and claims to cover only what was unquestionably my own.

Anyone who visits the U.S. Patent Office may examine the record of proceedings in the case, and see that I did this before the examiners had taken any action on my application, and that they then allowed the patent without making a single objection to my claims. Even now, I have not heard of anybody in this country who uses the ether-oxygen light with any other than my patented apparatus. One who tried to use the "wash-bottle generator" had an explosion which frightened him so badly that he was afraid to try even my apparatus for some time; but he now uses it and praises it.

In view of these facts, I think you will agree with me it would be unkind to make it appear that I tried to secure for myself any credit which was justly due to the English inventor.—I am, yours, &c.,

702, *Chestnut-street, Philadelphia, U.S.A., July 11, 1884.* FRED. E. IVES.

ROYAL CORNWALL POLYTECHNIC SOCIETY'S EXHIBITION.

To the EDITORS.

GENTLEMEN,—Allow me to remind intending exhibitors at the above exhibition that pictures for exhibition must not arrive later than August 5th, at the Polytechnic Hall, Falmouth.

I shall be most happy to supply prospectuses and forms of entry, which must be filled up at once.—I am, yours, &c., WM. BROOKS.

Laurel Villa, Wray Park, Reigate, July 22, 1884.

OXYHYDROGEN EXPLOSIONS.

To the EDITORS.

GENTLEMEN,—Referring to Mr. Lewis Wright's observations, under the above heading, in last week's issue: he asks for a case in which an explosion has taken place through dust in the bag. I take the liberty of stating an incident which happened a short time back to a Mr. Dallen (whom I have not asked if he has any objection to my mentioning his name, but have no doubt for the information of those interested in the matter he has not).

The accident was peculiar. Shortly after commencing his lecture (say about ten minutes, more or less) he perceived the oxygen bag in flames, but nothing whatever to indicate the cause. Mr. Dallen asked me if I could tell him the cause, but I could only surmise the following:—The bag, when being placed between the pressure-boards, was shaken, so that the particles of dust or canvas were heaped, so to speak, before the tap. This dust would float or be blown up to the nipple, and there get lighted, the oxygen supporting its combustion. These particles of dust may be conceived (with the help of the oxygen) to have ignited each other, and thereby, as a train of gunpowder, carry the light from the jet to the bag, firing the latter (causing no explosion, there being insufficient dust floating), until the oxygen was consumed.

The pumice, or tin safety-chamber, if used in this case, would have screened the dust, and hence have saved the bag.—I am, yours, &c.,

33, Balaclava-road, Bermondsey, July, 21, 1884. R. R. BEARD.

THE PHOTOGRAPHIC SOCIETY: ITS REPORTS AND THE PHOTOGRAPHIC PRESS.

To the EDITORS.

GENTLEMEN,—I must once again beg to trespass upon the Editors' space in reference to this matter; and I also ask that they will not cut out any portion of *this* letter—the last* with which I shall probably trouble them for some time.

First, as regards the Editors' remarks. If at any time a statement should be published that the Editors think or wrote that which they did not think or write, should they expostulate and explain we shall all know that they are "airing" their "little grievances;" and we shall have been taught how to pity, no less than to despise, their weakness in so doing. But, of course, the Editors are above so great a display of weakness; they are above implications, and above caring for what any may think of them. They are above caring even for their own ideas. Large-minded Editors! If the Editors had not only referred to my original letter, published in the *Journal* of the Parent Society, but had also looked up what they had written in an article upon it, they might have seen in what the "misrepresentation" consisted.

Before I proceed let me, in answer to the Editors and Mr. W. E. Debenham, dispose of this word "misrepresentation." Mark, I have accused none of *wilfully* misrepresenting me. I wrote "misrepresented, or misread." Now, misrepresentation might be due either to misreading, to forgetfulness or inattention to what had been read, or to wilful misstatement. The latter, of course, would be highly culpable and dishonourable; the others are comparatively venial sins. If a man writes that which *is not the case*, does he not "*misrepresent*"—not wilfully it may be? However, I do not wish to discuss the precise meaning of the word, though I hold that my view is correct; and I shall not quarrel with any should they take a different view, but shall content myself by simply stating that I inferred no *wilful* "misrepresentation."

To return to the Editors, who cannot discover "the slightest ground for the charge *(sic)* of misrepresentation." The Editors, in their leading article (June 13th), unquestionably make it *appear* that I object to "condensation of a speaker's remarks while still retaining his sense," whereas I really object to *incorrect statements* and to *total omissions* of matter. My exact words are "errors and omissions."† If the Editors will quote verbally any portion of my letter they will fail to make it appear that I meant what they state or insinuate I meant. I lay no value on a general and loose statement; neither do I consider that those who "trail red herrings across the scent," as some of the writers do, are worthy of much attention. What do my readers think? Is it not most convincing and fairest to face *each statement* boldly, fairly, and squarely, burking nothing, avoiding nothing, and thinking nothing that has been put forward unworthy of comment? Do not my readers agree that the high-handed, "superior-to-that-kind-of-thing," style is but a poor substitute for solid argument?

Why I should ever have been represented as making an attack upon the "weekly periodicals" (it seems to me that this view has been taken) I am at a loss to conceive. In times past I have done my share in supporting the weekly periodicals—especially this Journal—with my pen; and I have been told that my contributions were valued, but, perhaps, this was "all humbug." I have received no remuneration; have accepted no remuneration when offered; and have, as events have shown, received but little credit or acknowledgment—at least from most quarters. I am sure my conduct towards the "weekly periodicals" has shown me anything but a detractor and attacker of them. I only value *truth*—more especially when the "truth" applies to *myself;* and in this I hope I shall not be blamed. I would have the reports of the Society correct, and I would have the photographic periodicals also correct. What sin is there in this? And what harm is there in pointing out how one honestly believes the end might be attained? One writer (I do not wonder he is ashamed of his name appearing) insinuates—or am I "misrepresenting" him?—that my "photographic ideas do not soar any higher than bartering or exchanging." What a mean "red herring" that sentence is! Of course it was apparent to any one than by "bartering" an *exchange of ideas* was meant. Was it likely that I could have intended to say that any of the members communed thus:—"If you will tell me how to do so and so, I will in return give you my method," &c.? Certainly not. "Ideas," whether "luminous" or otherwise, do not, however, generally emanate from one individual only at any photographic meeting; and sooner or later all members become givers and receivers to a greater or less degree. How eloquent in encouragement are these words of the anonymous gentleman to those who, knowing what I have freely given, intend to follow in my steps, or, indeed, to surpass me, which, of course, many may readily do! Now I may be wrong, and there may be generous spirits who are above so sordid (?) motives; but I am strongly of opinion, the said anonymous writer notwithstanding, that the great bulk of members attending meetings of societies do so quite as much with the object of learning as with the object of imparting knowledge to others. These value the meetings on account of the *interchange* of information. Though it is more gratifying or "blessed to give than to receive," still a little of both giving and receiving is generally conceded to be most beneficial. But I am sure some readers will blame me for wasting words upon so good a specimen of combined hair-splitter and herring-trailer.

I turn with greater pleasure to Mr. A. Pringle's letter. I am sure I did not intend to convey any such meaning as that Mr. Pringle played the twofold part—"paying his guinea with one hand and decrying the Society with the other." I did not refer to him. Were there not sufficient writers to whom I might allude without his finding the necessity for attaching my words to himself? On the contrary, I consider Mr. Pringle an honest and straightforward writer, who, like myself, when he thinks in a certain way and opportunity offers, states his ideas boldly and with courtesy. If Mr. Pringle differs from me, by all means let him—and others also; I am sure I shall have no complaint against him. I have no wish to thrust my ideas down people's throats; neither has Mr. Pringle. We only desire that each writer, who writes courteously, may receive courteous treatment and fair and open criticism. But Mr. Pringle will concede that I must defend myself; and when he "misrepresented," "misstated"—or what you will—my words, was it not most natural and proper that I should make the statement respecting his letter I did? Whatever may not have been plain in my original letter I have made plain since; and I do not understand why a simple suggestion, honestly and courteously expressed, should have raised so polemical a spirit in the Editors and in certain of their correspondents—more especially the latter; for the former have a certain literary *amour propre*, which is only natural after all. But I do think that the Editors might have discussed, or let alone, my proposal in a rather more amicable spirit.

As to Mr. W. E. Debenham: he is even more incorrigible than Mr. Pringle. I believe Mr. Debenham really *likes* someone to "tread on the tail of his coat." But no; I did not include Mr. Debenham among "the other writers." I did not write "all the other writers;" but I acknowledge it would have been better to have written "like most of the other writers." However, I may state also to Mr. Debenham that there are two kinds of "misrepresentation"—inadvertent and wilful. As we are getting into the stage of straw-splitting and etymology generally, I may remark, for the satisfaction of the exact and critical, that *Chambers' Etymological Dictionary* has it that "misrepresent" means *to represent incorrectly*, and that "represent" means *to describe*. According to *Chambers*, then, I have merely stated that my meaning was "incorrectly described," and that is what I meant.*

Will Mr. Debenham undertake to say that the reporters *always* "*do take down* the speaker's actual words," even so far as photographic gatherings are concerned? Of course, I know that sentences or a whole statement may sometimes be taken down *verbatim*. But, even then, we do not often see the result, as Mr. Debenham himself owns; the words are "condensed." What I thought my words would convey to the intelligent reader is this:—That since the present reports are seldom in the actual words of the speaker, but in those of the reporter, who "condenses" and prunes, so little harm could follow from permitting the *speaker* to use some words he did not actually utter, but which embody his meaning. I am quite at one with Mr. Debenham in acknowledging that the "slip system" is not perfect. Very few "systems" are so; but it seemed to me (and this, I presume, is also the opinion of those who inaugurated the system) that there is more chance of an indifferent or inaudible speaker knowing "what he said" than that the reporters should rightly divine his meaning. Mr. Debenham must not omit to take into consideration the fact that by *his* "system," if a speaker is incorrectly reported (I must not write *misreported!*), he must wait, as in the case to which Mr. Debenham so pertinently alludes, until the next number of the *Journal* before the error or omission can be put right. Which is the greater evil. Let us form our own opinions and state them, if we will, amicably.

Mr. Debenham will excuse me if I suggest that writing of the "appalling task of digesting and replying" to my letter does not come fitly from himself. He must remember that on the last occasion I had no fewer than *six* different writers' statements to deal with, and I did not appear to wish to pass over or to avoid replying to all the statements put forward. Does not Mr. Debenham write at nearly or quite as great length when dealing with a *single* writer or controversial subject? And I do not blame him. Most writers worth reading will like to make a complete statement satisfactory to themselves; it is hard to omit any point which may seem to elucidate one's meaning. Why is there not more forbearance and fellow-feeling? I do not advocate "honest statements" of *this kind;* the bluntness of the Quaker to me seems unnecessary. There are some things one may fitly think but cannot with civilised decency express. Still, the fault is but too common, and we are few of us *quite* free from it. Mr. Debenham raised another matter into which I have not space in this letter to enter.

I cannot for the life of me conceive why "A Member" finds fault with me for not leaving the main question and for not modifying my previous arguments. Surely "A Member" might perceive that I had enough to do to disentangle my words and to represent them clearly after the mauling they had received. Besides, surely a man with many or "new arguments" has often not *one* to stand upon. I take my stand upon my original statements, elucidated as they are by my subsequent letter to this Journal. I do not think "A Member" is just in writing that my letter is "an extension of what *was* said for the purpose of explaining what was *intended* to be said"—at least not in the sense he means. *My letter was plain enough and perfectly grammatical, and need not have been misunderstood.* I did not attempt to make it "plain enough for the meanest comprehension" until I found I had to waste space by doing so in these columns. "A Member" does not state how the Council could "come down" upon him had he backed his opinions by his name. Such a matter would be beyond the cognisance of the Council as a body, and I much doubt whether any member of it would attempt or wish to be "down on" any ordinary member

* I find I must reply to a portion of Mr. Debenham's letter.

† These words were explained most fully in my letter published in the same number (July 11th) in which the editorial note to which I refer appeared.

* Mr. Debenham *himself* states (June 20th) that "on more than one occasion" he has been *misrepresented* in the "corrected reports." Therefore "I thank thee, Mr. Debenham, 'for teaching me' the significance of 'this word.'" But ponder, Mr. Debenham: "misrepresentation is a *serious* charge." Thus are we "hoist" with our "own petard!"

who made general and perfectly legitimate proposals. Personal attacks would, of course, be resented; and some of the writers do seem to have been "sailing rather close to the wind." No wonder, under such conditions, they prefer to conceal their names! "Arguments" of the kind they bring forward may very fitly be classed with the action of those who—to use an "elegant expression"—quite as "elegant," though, as many of the anonymous ones—"heave half a brick" as a "clincher!"

And now, I hope, I have done. Whether I am alone in my views on this matter must remain an open question; since all with any knowledge of human nature will be aware that the tendency of men is to state their disagreements rather than their agreements. Many will combat the statements of a writer; scarcely any will back him up, even though of the same mind with him. However this may be in the present case, I have the satisfaction of having openly, honestly, and courteously stated what I thought. In my subsequent letters I have endeavoured not to be offensively personal (under rather strong provocation; those making attacks under cover of *noms de plume* must, I presume, expect something rather "muddy"). Let the same spirit guide others in controversies of this kind.—I am, yours, &c., HERBERT B. BERKELEY.

July 21, 1884.

[We gladly acknowledge Mr. Berkeley's kindness as a contributor in years gone by, and trust that in the future, when he may have the results of any practical experiments to communicate, he will do so with his old freedom.—EDS.]

Notes and Queries.

J. C. (Southport) makes a practical suggestion of considerable value. He says:—"I find that the mercury intensifier is greatly improved in my hands by using, instead of ammonia, a saturated solution of sulphite of soda diluted to one-half."

T. P. B. wishes information concerning the best means of recovering the silver from emulsion that has been fogged.——Let him convert it into thick pellicle and treat it with hyposulphite of soda, afterwards precipitating the silver by sulphide of potassium.

J. G. asks:—"How is it, when intensifying with bichloride of mercury and afterwards with ammonia, I get a very brown stain on the negative?"——In reply: The stain is caused by the mercury not having been removed from the film by washing previous to applying the ammonia.

S. D. L. inquires whether we have observed opal plates coated with chloride of silver emulsion for printing-out become discoloured after keeping two or three months.——In reply: We have seen plates of this class which contained a large excess of free nitrate of silver, and which, perhaps in consequence of this, did discolour. The remedy for or prevention of this must be relegated to the larger subject connected with permanent sensitised paper, to which it is analogous.

"Is there any way by which I can tone albumenised prints by sulphur, as an experiment?—R.S.A."——We reply: Let our correspondent fix the prints upon removing them from the printing-frame, and then immerse them in a solution of hyposulphite of soda to which have been added two or three drops of sulphuric acid. This will cause them to become rapidly toned, after which wash thoroughly. The prints treated in this manner are sulphur-toned. The same effect may be produced by transferring the print from the hyposulphite fixing bath to a solution of alum.

A CORRESPONDENT says:—"How can I test the water-resisting power of the following varnishes on gelatine negatives:—(1) Red shellac varnish, (2) white shellac varnish, (3) ordinary composite negative varnishes, (4) copal varnish, (5) the mixture, and in what proportions, of any of the preceding varnishes with collodion? Furthermore: why is it we never read of the use of gum copal in formulæ for negative varnishes? Is placing a drop of water on a varnished negative, and watching whether it makes a film swell up, or how long it takes to effect an elevation, a good test of the water-resisting power of a varnish? and what varnishes are known to bear this test?

J. GEORGE GIBSON inquires—"(1) What is the cause of central flare?"——Answer: A combination of reflection and refraction, in consequence of which an image of the diaphragm is formed on the plate directly opposite the lens.—"(2) What is the best camera (make and size) and lens (make and size) for an amateur to possess who wishes to do pictures for the photographic exhibitions?"——In reply: All depends upon the nature of the pictures our correspondent wishes to "do." If he decide upon *carte* portraits, a *carte* lens and camera will be the correct implement for him to employ; but if 12×10 landscapes be preferred, then the services of a 12×10 camera and landscape lens must be brought into requisition. In what department of photographic practice does Mr. Gibson think he possesses strength?

GEO. BARCLAY writes:—"In the novel, *Ready-Money Mortiboy*, by Walter Besant and James Rice, I find a somewhat interesting and far-from-uninstructive account of the manner in which oil paintings are treated so as to render them 'old.' But there is one secret that has not been divulged by the clever authors, which is the way by which the paint of even a new picture may be cracked all over in a few hours by the application of a certain something which is applied by a brush at night, and by which in the morning the picture is found to be a network of thin cracks. This substance, we are told, is one which we have 'all eaten times without number.' Can you, Messrs. Editors, inform me what is this substance?"——In reply: We are short of the necessary knowledge connected with this subject; but possibly some reader who knows will impart the information.

Exchange Column.

I will exchange a victoria camera and lenses, which takes four on a quarter-plate, for a good 5 × 4 or half-plate group or view lens.—Address, THE AMERICAN PHOTOGRAPHER, Swanage, Dorset.

Wanted, a landscape background, in exchange for three gem lenses, a *carte* cameo embossing press, a quarter-plate camera lens, and a tripod.—Address, FRED RUBRA, Stony Stratford, Bucks.

I will exchange a good bicycle, in perfect condition, for a good 8 × 5 view lens, Ross's rapid symmetrical preferred, or a good whole-plate camera.—Address, CYCLE, care of H. Greenwood, 2, York-street, Covent-garden, W.C.

I will exchange a good cabinet lens and camera (bellows-body) for a whole-plate lens and camera by a good maker and in perfect condition; difference in cash.—Address, ARTIST, care of Miss A. Ledgard, Lee Green, Mirfield, Yorks.

I will exchange a half-plate camera and lens of good make, also slides and stereoscopic camera and lens by Lerebours, and camera by J. J. Pyne, of Manchester, for a fifty- to fifty-two-inch bicycle or tricycle, with ball bearings, and in excellent condition.—Address, A. E. SMITH, 39, Trafalgar-road, Burnley, Lancashire.

I will exchange a studio tent, 12 × 8 feet, new condition, excellent half-plate portrait and view lens, about seven and a-half inch back focus, and a capital dark tent forming travelling-case or table. Wanted, Ross's portable symmetrical, No. 3 or 4, also cabinet or larger size rolling-press.—Address, PHOTOGRAPHER, Oxford Studio, High-street, Cheltenham.

Wanted, a camera, bellows-body, for plates 12 × 10 or 14 × 12, with two or three double backs, and rectilinear lens for plates 14 × 12, in exchange for a new rolling-machine, 20 × 16 or 24 × 18, compound gear, planed iron beds, mirror-polished steel plates, for hot or cold rolling, value £12 and £14 respectively.—Address, PERFECT BURNISHER WORKS, 14, St. Ignatius-square, Preston.

Wanted, a 10 × 8 or $8\frac{1}{2} \times 6\frac{1}{2}$ camera with double slides, and Dallmeyer's rectilinear or Ross's rapid symmetrical for size of above plates, in exchange for a Coventry rotary tricycle, in good condition, ball bearings to all parts, including pedals and all extras for carrying photographic apparatus, cost over £22; can be seen after six p.m. any day at the following address:—E. JAMES CHESTERMAN, The Rise, Endcliffe Vale-road, Sheffield.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPHS REGISTERED.—

Edwin Iddo Ellery, 96, Pydar-street, Truro.—*Four Photographs of Dr. Wilkinson, Lord Bishop of Truro:* also *One Photograph of Dr. Wilkinson with his Chaplain, the Rev. Maxwell-Lyte.*

NOTICE TO SECRETARIES OF SOCIETIES.—It is earnestly requested that when proofs of reports and papers read at the meetings of societies are forwarded to the Secretary they may be returned at once to our printing office, 43, Harrington Street, Liverpool, so that any corrections may be made before the report or paper is published. We last week received at the moment of going to press a proof of a paper which had appeared in our previous issue, and which bore a very large number of corrections (many of them of a trivial character), all due to the copyist of the original MS.—not one to the printer. We are at all times anxious to do our best to secure correctness; but when the proofs are sent out and not returned we are bound to assume that the original MS.—especially when plainly written as in this case—is accepted as accurate.

ROSS.—Yes; with very rapid plates the lens mentioned can be successfully employed with a drop shutter on tolerably well-lighted subjects.

W. G. GILES.—The remedy is very simple. Reduce the pyrogallic acid to one-half and increase the bromide to double. If you do this your difficulty will be overcome.

MISS LEVEN.—We know little or nothing of the process in question; but from the little we do know we cannot recommend you to have anything whatever to do with it.

A. Z.—Unless you are in possession of a lathe we fear you will completely fail. Why not take the apparatus to some working optician, who will, doubtless, do all you require, and properly too, for a very trifling sum?

H. W.—Good ordinary work—nothing more. The landscapes are, on the whole, better than the portraits. The latter lack refinement and artistic treatment. The lighting is not particularly good in the portrait subjects.

S. J. W.—The acetate of soda toning-bath will yield tones like the print forwarded; but the negative from which the print is made must be strong and vigorous. No toning-bath, by whatever formula it is made, will produce such tones unless the negative be suitable.

J. T. CUBBERLY.—Probably the new toning-bath was put into a dirty bottle, or the water with which it was made contained something that reduced the gold to the metallic state. The presence of a small quantity of iron would fully account for the bright, metalled particles.

R. F. W.—It is impossible to say the cause of the spots, inasmuch as you give no information whatever as to how the print was produced. From the appearance, however, of the picture it looks very much as if it had been splashed with something which has caused the print to fade when it has been touched.

J. J. H.—Received. In our next.

ANDREW MCCRAE.—We have not time to go through the whole of the calculations; but, from one or two that we have worked out, we judge that all are correct. If, therefore, your measurements are accurately taken the calculations with regard to the exposing will be fairly correct.

ROBT. J.—The proportion of chrome alum to the gelatine given is quite correct, but not for the particular description of gelatine you have used. For that kind two-thirds the quantity will be ample. The "clotting" is due to the excess of alum used for the particular sample of gelatine employed.

H. W. L.—You appear to have treated the fixing solution in the orthodox manner, unless you have added too great an excess of the sulphide. Of course the amount of silver recoverable is dependent upon the proportion of bromide of silver contained in the emulsion with which the plates are coated, and not upon the amount they cost.

T. W.—Judging from the appearance of the print, and having nothing further to guide us, we should say that your trouble arises from an insufficient quantity of gold in the toning-bath. However, the print is so badly sulphuretted, and shows other evidences of careless manipulation, that we cannot say for certain that this really is the source of the trouble.

W. H. B.—We, unfortunately, can afford you no assistance whatever. Your only remedy, if you think you have a good case, is to fight the matter out in the County Court. We are in no way responsible for the advertisements that appear in our pages. Possibly had your remonstrance been couched in different terms to those employed, the reply might have been of a different character.

J. LOCK.—The cause of the black spots in the carbon transparency is that the tissue has been splashed with some fluid which has induced insolubility in the gelatine. That it has been splashed with a liquid is clear, as in one or two places it can plainly be seen that it has run downward and produced a "tear." It is impossible to say at what stage the injury occurred; but we imagine it must have been between the sensitising of the tissue and the printing.

OMEGA (Leeds).—Many, like yourself, have experienced the same difficulty in sensitised carbon tissue during the recent hot weather. The reason of the "black coating" dissolving in the bichromate bath is that the solution was at too high a temperature. During very hot weather the sensitising bath must be cooled artificially by the addition of a few lumps of ice. The temperature of the solution should not exceed 55° or 60° for successful working. Several articles on hot-weather troubles in carbon printing have appeared in former volumes.

A LITTLE AMATEUR.—We can scarcely recommend you to purchase the apparatus in question, although the price is certainly very low. It will, doubtless, take good pictures, but it is very antiquated and heavy. It was considered very light and portable at the time it was made; but during the last twenty years great improvements have been made in portable outfits. Probably a modern camera of similar dimensions—or rather for the same size of picture—would not weigh more than one-half, be far less bulky, and be more efficient. The lenses also, being of the old landscape form, are very cumbersome. That the apparatus is really good the maker's name is a sufficient guarantee. If weight and portability be not an object with you, then the outfit will answer your purpose exceedingly well.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.—The first outdoor meeting of the season will be held at Hampstead Heath tomorrow (Saturday), the 26th instant. Tea at the "Bull and Bush Hotel" at six o'clock.

QUITE A TAKE IN.—Photographer: Well, Pat, will you have yourself "taken" today? We won't keep you more than five minutes. —Pat (with a lively recollection of a police cell): Begorra, thin, the last time I was taken, sure I was kept in all night, so I was.—*Fun.*

POPULARISING PHOTOGRAPHY.—We have received from Mr. F. A. Bridge his new prospectus of lectures discriptive of photographic tours and scenery illustrated by means of the "tridiaphanon"—a triple lantern by which the photographic illustrations will be exhibited as dissolving views by Mr. William Brooks, who in this acts as the colleague of Mr. Bridge. Some idea may be afforded of the character of the entertainment when we say that the series includes Antwerp, Brussels, Bruges, and Ghent; Holland and the Hollanders; the castles and abbeys of England; the lakes of England and Ireland; together with many examples of instantaneous photography. We have no doubt that our friends will secure during the forthcoming season all the public approval they so richly merit. We have a vivid recollection of the great attractiveness of the exhibition the same gentlemen recently gave in the large hall of the Society of Arts.

PHOTOGRAPHING ACTORS AND ACTRESSES.—Mr. Sarony, the famous New York photographer, has been giving his experiences of actors and actresses before the camera. The ordinary actress, he says, is the worst nuisance. She is never satisfied, and always has ideas of her own which are as a rule detestably inartistic. "Of all my sitters Bernhardt was the best. She was terrible in one way—always late for her appointments. She would rush in three hours after time, but apologise in such a pretty way that I had to forgive her. Then she not only knew how to pose, but when I got excited she felt the reflex of my emotion, and so would gradually assume the expression I desired, and a grand picture was the result." Mr. Irving was too busy to sit—much to the gushing photographer's sorrow. Booth has not cared to sit much. He seems bored always when the theatre is mentioned, and does not care to be photographed at all. Miss Terry's tantalising ways tried the ecstatic Mr. Sarony's patience sadly. "She is simply the best subject I have ever had, but the most tantalising. I was in despair when she was in my studio; every movement was a revelation of grace, every gesture a picture, and every expression a delight. I was crazy with pleasure. 'There, there! for Heaven's sake! stay in that position for three seconds'! I would cry; but the next instant she had moved, and some other lovely pose was the result. Her walk across the room was a succession of pictures, but no sooner did I implore her to remain for one moment in any of the positions she assumed than it was gone."

CURIOUS CASE.—At the Liverpool County Court, recently, before Mr. T. E. P. Thompson, judge, Mr. A. Vandyke, photographer, carrying on business at Bold-street, Liverpool, sued Mr. Geary, of Birkdale, Southport, to recover £3 3s., the agreed charges for an opal enlargement of the figure of a lady made from a glass picture at the defendant's request. Mr. H. F. Neale, who appeared for the plaintiff, stated that the picture was well executed, but the defendant rested his contention of the claim upon the fact that no proof had been supplied to him. Correspondence was then read in which the defendant alleged that he was dissatisfied with the picture, as he had bargained for a proof, and the plaintiff had agreed that he should not be bound to accept the finished portrait unless he (defendant) approved of it.—Evidence having been given for the plaintiff, Mr. Broadbridge, who appeared for the defendant, in cross-examination of Mrs. Vandyke, elicited that she might have said the defendant was not bound to take the portrait unless it was satisfactory.—Mr. Broadbridge then called the defendant, who said he objected to the picture because it seemed to show the lady represented as a sufferer from liver complaint—(laughter)—and there was a cadaverous expression about the face. (Renewed laughter.) He also said Mrs. Vandyke said he was not bound to accept it unless satisfied with it, and, being dissatisfied, he repudiated the contract.—Mr. Neale contended that the fact of a proof not having been delivered was not an indispensable condition to the bargain, and that the mere crotchet of the defendant would not entitle him to succeed in the absence of evidence that the picture was not a good production.—His Honour, in giving judgment for the defendant, said he was sorry for Mr. Vandyke, as he (the learned judge) was surprised that such an excellent picture could be produced from such a vague original; but as Mrs. Vandyke had admitted that the bargain with defendant was that he was not bound to accept unless satisfied with the picture, he was reluctantly compelled to give judgment for the defendant, at the same time expressing an opinion that Mr. Vandyke had been very badly used.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
July 29	Bolton Club	The Studio, Chancery-lane.
,, 30	Photographic Club	Anderton's Hotel, Fleet-street.
,, 31	London and Provincial	Masons' Hall, Basinghall-street.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. STEWARD, Optician,
For two Weeks ending July 16, 1884.
THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

July.	Barometer.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max Shade Temp.	Min. Tem.	Remarks.
3	30·02	W	69	63	117	85	61	Hazy.
4	29·92	E	74	65	126	86	63	Bright & Clear.
5	29·94	E	71	64	108	78	64	Hazy.
7	30·03	SW	65	60	119	78	57	Overcast.
8	29.94	SE	71	65	122	84	60	Hazy.
9	29·80	E	73	65	111	82	65	Hazy.
10	29·64	SE	67	61	108	75	63	Raining.
11	29·75	W	64	57	120	72	54	Cloudy.
12	29·84	W	66	60	118	80	58	Cloudy.
14	29·99	SW	64	60	121	75	56	Cloudy.
15	29·94	SW	66	61	112	73	58	Raining.
16	29·67	SW	65	63	112	71	62	Raining.

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THE BRITISH
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No. 1265. Vol. XXXI.—AUGUST 1, 1884.

STUDIOS WITH PREDOMINATING TOP LIGHT.

The best manner in which to ameliorate the effects of an overpowering top light in a studio is one of great importance to portrait photographers, and has at various times received much consideration. Many studios are surrounded in such a manner, and so compactly, by the dense, unreflecting walls of adjacent buildings as to have virtually all the side light shut out, thus permitting the top light to have an undue predominance, the result being portraits with heavy shadows. The evil in question is more prevalent when the studio is erected on the ground or parlour floor, or in a garden surrounded by trees, than when it is situated on the roof of a tall house.

A method which we have frequently recommended in order to diminish the relative intensities of the top and side lights under the circumstances at which we have hinted, and to tend to their equalisation, is the one, now well known, of glazing the sides of the studio with ground glass, by which the previously dark sides—dark in consequence of an unlighted side of a house extending upwards to a great altitude with the light at an angle of forty-five degrees—become lighted.

As to the angle at which the light should fall upon a sitter so as to illuminate him properly we shall not here advert, that being a little outside of our present inquiry, which strictly relates to the reducing of the contrast between top and side light, when the circumstances of the studio erection are such as to give a considerable preponderance of the former owing to there being very little of the latter. We are, however, very well aware that the angle of forty-five degrees to which we have made allusion is one which has been determined by artists as that from which the dominant light should come; but we now desire to increase the power of our side light, which, of course, is very much lower than the angle mentioned. It is not only well, but necessary, to have a "giant's power" in lighting, although it is not always necessary or wise that it should be so used.

We have spoken of the substitution of ground glass for plain glass as the medium through which side light should be admitted into the studio when the external surroundings are of a dark or non-reflecting colour, and when, without subsidiary aid, a portrait taken in such a studio would prove defective from the dominance of the top light. This the ground glass ameliorates by receiving light from that portion of the sky which overtops the obstructing medium, and giving it off by reflection or refraction from the innumerable rugosities composing its granulated surface. This constitutes a great gain in the illumination of the studio by side light; but from its very nature it is inferior in its power of deflecting light to any system in which reflection, pure and simple, from a polished surface is employed. The great value of a common mirror for this purpose has been recognised by many who employ what are termed "daylight reflectors" to illuminate places to which the access of light would otherwise be nearly impossible.

If in a side window looking upon a dark wall or house—which, from the sitter's point of view, would be seen as such, and consequently possess no value for illumination—if in such a side light a sheet of ground glass be fixed so as to prevent the wall from being seen, the obstruction of vision will be found accompanied by highly-illuminating properties. This, it may be remarked, is not peculiar to ground glass, as any diaphanous material, such as tissue-paper, will answer a similar purpose. But when, instead of such radiating agents, a silvered glass mirror is substituted, and placed at such an angle as to reflect the light of the sky, then the brilliancy of this portion of the side light is so greatly enhanced as to render it almost equal to the pure light of the sky.

In order to test this point we have had constructed a miniature studio glazed on the side as well as the roof, but having the side light obstructed to the degree of which we have already spoken by suitable erections. Upon placing a plaster bust inside we found that the top light was sufficiently powerful to give an altogether objectionable depth to the shadows. A sash previously filled with plates of ground glass was now inserted in the side instead of the plain glass. Under this arrangement, while the dominant top light was not interfered with or modified in itself, it became so in a marked degree by contrast; for the portions of the figure previously in deep and harsh shadow were now well lighted. Having carefully noted the effect obtained by the substitution of the ground-glass side for that of plain glass, we removed the former and substituted for it a number of slips of silvered glass mounted like the laths of a venetian blind, the arrangement being such as to cause them, as a whole, to form a screen by which no *direct* side light was admissible at all, but by which the light of the sky was reflected horizontally, or nearly so, in an apparently unbroken mass. The effect was not a little singular; for, whereas previously the top light dominated, it was now not only equalled in force by that from the side, but was even subordinated.

As a practical deduction from the experiment described, we would advise those whose studios have an excess of top light—and who, as a consequence, obtain portraits in which the shadows are heavy by contrast with the lights, which are somewhat "patchy"—to equalise the lighting first of all, and by way of experiment, by obtaining the thinnest white tissue-paper that is sold and fastening it upon the side lights at such a height as will shut out from the sitter's view all the dark wall, the presence of which we have assumed. This will effect a marked difference in the lighting. If it prove sufficient, it only remains to supply its place with sheets of ground glass when leisure or circumstances permit. If, however, the contrast be still too great, and it cannot be lessened by screening the top light without unduly increasing the exposure, recourse must be had to the venetian blind system of reflectors, the power of which is undoubted, as we have shown, and the cost very much less than could have been anticipated; for the cheapest quality of glass that is silvered will answer this purpose quite as well as a better and more expensive sample.

By way of varying the experiment described we have had constructed four thin boards, each about a foot wide, which we have had fastened together at the ends and slightly apart from each other, on the principle of hanging book shelves. These have been covered with sheets of tinfoil and suspended so as to form an angle, by which the non-effective light from the wall is debarred admission and the bright light from the sky reflected instead. This causes an admission of light into the studio very greatly in excess of that obtained by radiation from the ground-glass panes, and may, therefore, be recommended as more advantageous. Without, however, having made trial of it, we imagine that if the boards had been covered with white paper of perfect purity instead of tinfoil an amount of side light would still be obtained equal to that emitted by the ground glass.

PRINT-WASHER FOR *CARTE* AND CABINET PRINTS.

In accordance with our promise of last week we give drawings of a print-washer which, as we stated, we have seen in action on several occasions, and found the washing and draining to take place regularly and effectively, and evidently need no interference from the moment the pictures are placed in the apparatus and the tap turned on until the time arrives for them to be taken out and dried. It is upon this latter characteristic that so much of the value of such a machine depends. When a few hundred prints have daily to be put to wash there is every probability that when special hand-work has to be called into play the work will, if not usually, at anyrate occasionally, be shirked, to the detriment of the prints and the injury of the artist's reputation; while the thousands which must be the "output" of some establishments might well entail the necessity for one *employé* being detailed to the sole duty of washing prints.

Quite recently we saw a very striking instance of the difference in keeping powers of prints produced under different conditions. A gentleman who had spent four years in Ceylon since last we saw him told us that of two lots of *cartes de visite* which were taken by different firms a week or two before he started, and which he had taken out with him, one set faded before he had been in the country a month, while the other was as good when he left Ceylon after his four years' stay as when he first took them out. There is no question here as to which of the two houses would secure our friend's business orders whenever he required further pictures; and there is little question, also, that varying modes of washing was the most likely cause of the vast difference shown in the keeping powers of the two sets of pictures.

One important point must always be kept in view in using either the washer which we now bring before our readers, or one of any other construction: it is that in all cases it is most desirable not to allow the prints to remain for many moments in contact with a small quantity of water until the first (the greater) portion of the fixing solution is got rid of. Although a good washer will quickly bring about the desired end, it may be facilitated to a still greater extent by a proper treatment of the prints in the first stage. They should not be taken out of the hypo. in a mass and thrown in a heap into the washing water; but should be taken up one by one, dipped in a pre-

FIG. 1.

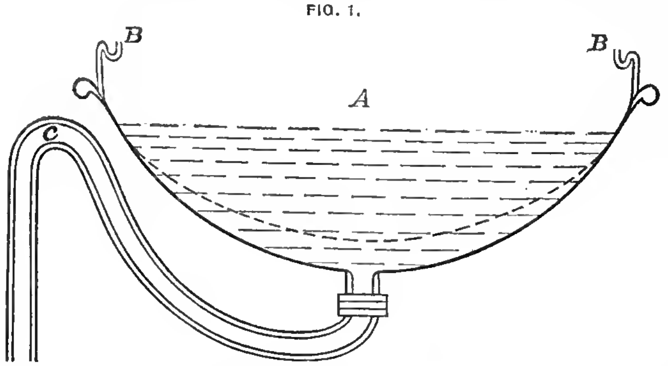


Fig. 1. Represents a section of the trough, the supports being left out to avoid confusion; a strong wooden framework of the simplest construction serves for this purpose. The trough A is made of zinc externally, and has an inner false bottom, shown by the dotted line, carefully fitted and soldered in its place, so as to form a continuous curved surface. To give stability the rim is strengthened by being curved over a thick iron wire in the usual manner. The syphon C is of three-quarter inch bore, is slightly flattened at the curve C, and its outer leg made to line a little from the perpendicular, the end being directed slightly inwards. These two points obviate the dribbling action which, with some forms of syphon, prevent any complete emptying, through merely acting as an overflow.

liminary washing water with a to-and-fro motion, and afterwards passed into the washing trough; then, if the trough be a good one, there need be little fear as to their permanency so far as can be effected by the mode of washing.

In the trough under consideration provision has been made for the following conditions:—First, a periodical change of the water in which the prints are immersed, so that whatever salts are taken from the prints may be removed at once from their vicinity. The action of washing water being chiefly osmotic it follows from the known law of diffusion—the greater the difference between the densities of two solutions the quicker will the diffusion take place—that the hypo., when slight in quantity, stands a far better chance of being removed from the paper when it is surrounded by water than by a weak solution of hypo. This change is effected by the well-known syphon method.

Secondly, such a mode of working as shall ensure the free penetration of fresh water to the surfaces of each print. This is brought about by the arrangement of the jets. When they are arranged as in the drawing it will be found that the water as it flows into the trough gradually assumes a rotary motion, and the prints are carried with it; but, instead of their forming a solid mass in the centre of the dish, as happens with a single jet, each print will be seen to pass along or over its neighbour, never adhering for long together. The jet *e* shown directly pointing to the centre is

FIG. 2.

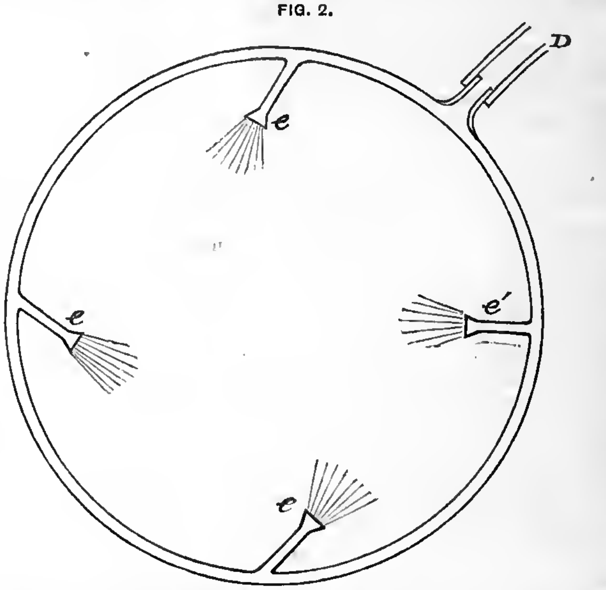


Fig. 2 shows the mode of conveying the water. It consists of a ring of metal tubing, out of which spring four jets, *e*, of narrow lead pipe, flattened at the exit end so as to spread the water out as a flat jet. The exact form of jet is not essential, nor the exactly flat shape; a little management with a pair of pliers and a pocket knife will enable anyone to adjust them for himself. D shows where the water enters the ring by a side pipe attached by a piece of strong rubber hose to the tap, where it may remain as a fixture or not, according to convenience. The jets being of soft metal, the angle at which they are placed can be easily altered if they are found to be not quite right. The straight-out jet *e'* should deliver the water a little past the centre of the trough. B B in *fig.* 1 are four supports formed of pieces of stout sheet lead, bent as shown, to receive the ring of jets. The washing is started by turning on the tap, when the water will flow from the jets and give a broken rotary motion to the water, the jet aperture being adjusted so as to avoid dashing too strongly on the prints.

mainly instrumental in producing this effect, and it is very interesting to note this change of action brought about by altering the pitch of the various jets. If they are all made to point in one direction the prints will go swirling round, but will soon collect in a heap, which will not readily, if at all, break up after hours of washing, whether the trough be filling or emptying.

It is evident that the pressure at which the water enters the washer will materially affect the mode of action; hence, to ensure the regular action of any automatic or syphon washer, it is evident that a water supply from a storage tank would be most regular in action. The drawings are almost self-explanatory, as the whole arrangement is so simple, and, indeed, as we have said, differs only in detail from a multitude of other similar pieces of apparatus. We may say that it is advised that the prints be taken from the water when the trough is filling or when the water is turned off while filling, as there is said to be a risk of tearing the prints when they are removed while the trough is empty or emptying.

Finally: we may state that we are informed that the particular apparatus here figured has been in use for over a dozen years, and has required no repairs beyond a fresh piece of perforated zinc for the false bottom.

COLD-AIR MACHINERY IN PHOTOGRAPHY.

At the conclusion of the article on *Cooling and Ventilating*, in last week's issue, we incidentally mentioned that it had been our intention on commencing it to make some allusion to the apparatus which is now so extensively employed for producing air of an intense coldness, and its application to purposes in connection with photography.

We, however, propose to do so now—not with the idea (as the summer has so far advanced, and the excessive heat we had at the commencement of it has considerably moderated) that our suggestion will be put into practice this year, but that it may possibly receive consideration for next season, or may, perhaps, be made available in tropical climates where ice is not procurable. Every dry-plate manufacturer on a large scale knows quite well the large expenditure that has been necessary for ice during the last few weeks. In some of the large establishments, we are informed, the consumption of ice has amounted to tons weekly. Of course this means a considerable addition to the ordinary cost of production. Apart from its costliness the method of cooling by ice is not altogether satisfactory, as it acts only locally, and the cold produced cannot be easily diffused through a considerable space unless, indeed, a very large quantity of ice be employed.

Hot-weather difficulties, be it understood, are not alone confined to dry-plate manufacture, as they are experienced to a similar extent in every branch of photography having gelatine as its base. Woodburytype, stannotype, collotype, carbon printing, and analogous processes have all been worked for some time past under the greatest difficulty and inconvenience—some of them, indeed, being only practicable during the night or the early hours of morning.

In the Health Exhibition are to be seen in operation several different forms of machines for producing intense cold—say a temperature from 40° to 90° below zero. These machines are being at the present time extensively employed on the vessels which transport fresh meat in a frozen condition from the Australian and New Zealand colonies. Now these machines can be made available for many purposes in connection with photography, which are now dependent upon ice as a refrigerating agent.

The theory of all "cold air" machines (it may be mentioned for the benefit of those readers who are not familiar with the subject) is based upon the fact that heat and work are convertible terms, and it is put in practice as follows:—Air is compressed into holders to the extent of some sixty to one hundred pounds to the square inch. This compression generates a considerable amount of heat, which is then absorbed by cold water circulating in tubes surrounding the holders. When, by this means, the air has been cooled down to the temperature of the water, it is allowed to expand. The work done in expanding absorbs all the heat left in the air, and, consequently, it is left in an intensely-cold condition. This cold air is discharged into closed chambers in which the meat, or whatever may require cooling, is placed. As soon as the requisite degree of coldness is produced in this chamber the machine is "slowed," so that the atmosphere is maintained at an equal temperature without an unnecessary expenditure of power.

It is easy to see that an apparatus of this description would be of immense service in a dry-plate manufactory during the summer season; in the cold chamber for rapidly cooling the emulsion after cooking—a great advantage during thundery weather—and for preserving it afterwards; also for supplying a current of cold air to a shallow chamber, which may be constructed to surround the slab upon which the plates are put to set. The rapid setting of the emulsion is, of course, a great desideratum, particularly when the plates are coated by machinery; for it is manifest that it is useless to coat the plates rapidly unless the setting of the emulsion can be effected at the same rate. Fortunately, for gelatine workers, it happens that when the gelatine has once set it requires considerably more heat to again liquefy it than would suffice to keep it fluid in the first instance. Hence, if the emulsion can be thoroughly gelatinised, there is little fear of its running afterwards.

A cold air machine would be invaluable in a Woodbury or stannotype printing establishment. If the presses be put into a chamber of the intensely-cold air supplied by these machines they will quickly become cooled down to such a temperature that it will take several hours, in a moderately-warm atmosphere, for them to regain sufficient heat to render them unworkable. By having two sets of presses, one set can of course be cooling while the other is in use. In collotype printing, too, they would be of service in a similar way; for if the plates were placed for a time in the refrigerating chamber they would soon become exceedingly cold. Glass being one of the best non-conductors of heat, and the plates thick, they would require a considerable time to regain sufficient heat to cause inconvenience in working. As in the Woodburytype process, so two sets of collotype plates might be kept in use—one cooling while the other was being printed from.

It can well be conceived that, in the manufacture of carbon tissue during excessively hot weather, these machines might prove of great service. The chief difficulty in the manufacture of carbon tissue in an elevated temperature, it is well known, is in getting the pigmented coating to gelatinise; but if the paper were made to pass through a shallow cold-air chamber immediately after being coated this difficulty would be surmounted.

Unfortunately these machines are, at present, somewhat expensive, the smallest size costing something like one hundred and twenty pounds; and it also requires a gas or other engine of two-horse power to work it. But the cost should not prevent its employment in large establishments, considering that excessive heat often completely stops operations as well as occasions considerable loss of material. When once the outlay is made and the apparatus installed it can be worked at a merely nominal expense, costing only about twopence or threepence per hour for gas, supposing a gas engine to be employed—a very different outlay to that for ice for refrigerating purposes, when large spaces have to be cooled.

The size of machine here alluded to is much larger than is actually required for the purpose suggested, it being really sufficient to preserve several tons of meat in a frozen condition; but at present it is the smallest in the market. It is quite possible, however, should a demand for them arise, that cold-air machines will eventually be constructed in smaller sizes, which will prove a great convenience for many purposes besides that of photography.

Truth has been offering a series of prizes for "Suggestions for Original Poses for Photographic Sitters," and recently treated its readers to a few dozen specimens, which are described as "good and otherwise." From one or two average examples it will not be difficult to believe that the bulk of the attempts are rather "otherwise" than good. "A lady on a tricycle, shooting over left shoulder a Parthean glance at a gentleman," &c., suggests one; "place the 'sitter' slightly in advance of a group of niggers (decently attired) in order to create a contrast," directs another; "asleep, as then there would be no bother in fixing oneself," is the idea of a third aspirant to honours. The only fairly decent suggestion is to photograph a professional beauty *with* her husband; but, on the whole, the efforts at amateur posing are singularly disappointing.

We perceive that the weekly Chicago *Eye*—one edition of which was formerly devoted to the interests of photography—has now become a photographic weekly paper altogether, under the control of Mr. Charles Gentilé, the previous editor of the photographic edition. This first weekly American photographic periodical has our best wishes for its continued success.

Those who desire to read a popular exposition of the effects of light upon the health should peruse Mr. R. F. B. Compton's lecture upon artificial lighting, delivered a short time since at the "Healtheries." There is much interesting matter in it, and the question of electricity *versus* gas is rather fully treated, naturally from the electrician's, rather than the gas engineer's, standpoint.

"The various artificial lights differ very widely from sunlight in this respect—that they are all more or less deficient in the rays at the violet end of the spectrum, commonly called the 'actinic' rays, and which most probably exercise a very powerful effect on the system." Again: "But still both classes of electric light are far superior to all others in nearest approaching the white light of daylight, and thus satisfying the actinic action which our bodies demand." So Mr. Compton states; but it will be observed that this portion of his lecture, from which we might have expected useful information as to the effect of the usual dark-room illumination, is all pure assumption, without a particle of proof or reference to authority, and is, further, quite contradicted by the latest investigations on the effect of the various rays of the spectrum upon life functions. The restricted application, too, of the term "actinism," which has long been shown to be a quality attaching to a particular chemical, rather than the property of a special portion of the spectrum, will not commend the lecture to thinking photographers. Still, as a whole, it is both instructive and readable.

It has often been stated that no light penetrates to the lowermost depths of the ocean where the plummet will indicate thousands of feet; but recent investigations must cause that opinion to be modified, and we may expect even yet to have photographs of submarine life of a very interesting character. A writer in *Science* has lately shown in a very conclusive manner, from the observations made upon marine animals drawn up from the bottom of the ocean, that the power of seeing must be possessed by these beings, and as a matter of course there must be light to see by. Most of the fish inhabiting these great depths, to leave which and ascend to shallow water would involve their death, are provided with eyes—some larger than, and others similar in size to, their brethren of the upper circles. Many of them are very bright in colour—a brightness which the writer referred to ingeniously shows is protective. The fauna of those portions of the earth with which we are brought into more intimate contact are usually dull grey and brown in colour, but these deep sea fish are brilliant orange and orange-red. "These facts indicate that the deep sea is illuminated by sunlight that has passed through a long stratum of water, and therefore lost all the red and orange rays by absorption. The transmitted rays of light could not be reflected by the animals referred to, and therefore they would be rendered invisible. Their bright colours only become visible when they are brought up into white sunlight." Hence, though these depths appear so dark to the eye, it is possible that they may possess a power of light that would render the production of photographs with quick exposures by no means improbable. Why should not a camera be let down and panoramic views secured? Who knows what valuable information the camera might be the means of revealing!

What a check on the exuberant imaginations which guide the artists who depict the wonders of the deep such a series of views would be! Photography has played a prominent part in keeping within bounds the travellers' tales of *terra firma*, and the *savants* are at present deeply interested in the photographs brought home by Mr. Joseph Thomson, the leader of the Geographical Society's expedition to East Africa, who has secured many pictures of unusual interest. We may feel quite sure, in advance, that they will depict none of the tailed men, the pigmies, the dwarf troglodytes, or the multitude of other monstrosities with which the early travellers peopled those regions.

The well-known, if not well understood, action of oxygen upon india-rubber bags is touched upon in an article referring to certain occlusion phenomena by Schutzenberger. He says that when the gas is prepared in the common manner, by heating chlorate of potash and oxide of manganese, a considerable quantity of chlorine and oxides of chlorine are carried over from the retort with it, and are not entirely eliminated though well washed with water and stored for a period of two or three weeks in a metallic reservoir in the presence of large quantities of water. Although oxygen so stored may be passed through solution of nitrate of silver, or litmus, or indigo water, and produce no reaction whatever, such as chlorine or its oxides would give, it will yet act upon caoutchouc like ozone. But a very singular effect is seen when this oxygen is passed through a narrow platinum tube at one point; the presence of chlorine is then distinctly shown, the indigo or litmus is bleached, and the silver precipitated.

Our readers may be interested in learning some theories regarding silver held by the Chinese, as set forth in their medical works. Cinnabar (vermilion) takes two hundred years to produce; in three hundred years it becomes lead; in two hundred years more it becomes silver; and then, by obtaining a transforming substance termed "vapour of harmony," it becomes gold! So that if any of our readers would try this marvellous piece of alchemy they can lay down packets of cinnabar instead of pipes of wine to ripen and mature!

Few things are more serviceable in the laboratory than iron vessels lined or coated with glass; but most of the evaporating basins, trays, saucepans, &c., hitherto produced have been glazed with a material so porous and brittle that they have scarcely been worth purchasing. It is, however, stated that a really-serviceable glaze can be produced in the following manner:—125 parts by weight of flint glass fragments, twenty parts of carbonate of soda, and twelve parts of boracic acid are melted together, the fused mass poured on a stone slab, and powdered when cold. This powder is to be made into a thick cream, with silicate of soda solution of 50°. Baumé, and the vessels coated therewith and heated in a muffle till the glaze is melted. This glass is said to adhere firmly to iron or steel.

It is often asked why lens tubes are not made of aluminium instead of the usual heavy brass. As one cause the high price of the aluminium may be quoted, for, though the actual weight of metal required is small in comparison with brass, the actual cost is even then by no means light. Another important objection is the difficulty of soldering the metal together. This difficulty, however, has been recently overcome, according to a statement in the *Comptes Rendus*, by M. Bourbouze. He uses alloys of zinc and tin, or preferably of tin, bismuth, and aluminium, which, he says, "take" upon the surface of aluminium as ordinary solder does upon other metals. He therefore coats the aluminium with these, and any other metal with tin, and then the surfaces may be soldered as usual.

LIME-LIGHT EXPLOSIONS AND THEIR PREVENTION.

The account which lately appeared in the Journal of the explosion at the Drury-lane Theatre determined me to repeat my experiments with the safety tubes or flame extinguishers, in order that there might be no possibility of any mistake in a matter so seriously affecting human life. The result was in every way confirmatory of the conclusions before arrived at, namely, that the protection given by these tubes is complete if they are used in the way directed. A man may easily say that he has succeeded in driving an oxy-hydrogen flame through a slab of plaster of Paris; but this is not to the point, unless he can show that the conditions were the same as those which obtain in the lime light.

Since writing my last paper I have experimented with four different sorts of granules which resist any test I can apply, namely, pumice, binoxide of manganese, slate, and white clay tobacco pipe. I have also again tried two others which stand well with a moderate pressure of the exploding gases, but fail when the pressure is purposely made extreme and the tube shortened to half-an-inch. These are metal filings and rounded particles of flared glass. Why they fail it is not easy to say, unless it be that the filings lie too loosely together and the shape of the beads of glass is not so favourable to resistance; or possibly the *porous* character of pumice and clay may have something to do with their superior efficiency as flame extinguishers.

Of the four first-mentioned substances pumice has this advantage—that it is sold in commerce in the granulated form. Black oxide of manganese is very hard (especially if you choose a sample of the vitreous kind, which breaks with a conchoidal fracture), and it is also comparatively free from dust. Slate and tobacco pipe are both ready to hand, and can be crushed in a few minutes in a Wedgwood mortar.

I obtained from Messrs. Bedford and Steer, wire workers, of Long-lane, Bermondsey, London, a set of all the numbers of wire gauze which they manufacture, from twenty to sixty meshes to the inch, in order to ascertain the best sizes for the screening of the granules. The effect on the pressure of the gas was not so marked as I expected, within certain limits, nor was the difference so great in the power of extinguishing flame. Granules screened by Nos. 30 and 40 stood sufficiently well under a moderate forcing action, without allowing the flame to pass. Taking everything into account I am inclined to select Nos. 40 and 50 as the best sizes. Commercial granulated pumice screened by these two sieves passes almost entirely through the former, and leaves about two-thirds of its weight upon the latter. The remaining third, which passes through

No. 50, contains very minute particles mixed with dust, which would be likely to blow into the burner and choke it up.

I do not find granules screened by the same sieves to correspond exactly in their effect upon the pressure. The flared glass reduces it somewhat more than the slate, and the slate a little more than metal filings or pumice. Again: a perceptible difference can be detected between slate granules produced by scraping with a knife and others got by crushing in a mortar. The former are *scaly*, and lie more closely together than the latter.

Taking pumice as one of the best in reference to the pressure, I find that a hundred-weight and a-quarter on the bag, with a safety tube of three-quarters of an inch long, corresponds very nearly to one hundred weight when no safety tube is used.

The plan which I adopt in determining the pressure is to count the number of seconds a given volume of gas takes in passing through the jet. After a little experience, however, it can be estimated roughly by drawing air through the tube with the breath.

Mr. Broughton's original safety chambers were about half-an-inch long, and this appears to be sufficient when they are full; but if the granules sink down I have known the flame to pass, and hence I prefer making the column of pumice a little longer.

On looking over my last communication I see that the directions for extemporising a safety tube are not sufficiently explicit. The screw caps at the end of the tube are intended to keep the discs of wire gauze from shifting, and if these caps are dispensed with the discs must either be soldered on or fixed by a ring of wire. Unless this be done the explosion in the jet will be liable to force forward the whole of the contents of the tube. Also, it will be advisable to strengthen the disc of sixty meshes by a second disc of twenty meshes immediately in contact with it. If the discs be pushed into the tube to keep the granules in position care must be taken not to push them in too far, or the passage of the gas will be much impeded. A better plan will be to shake the granules well down by tapping, and then to scrape off the excess with a knife, placing the disc of wire gauze on the top or fixing it into the cap.

Only experience can decide how often the tubes will need repairing and refilling. Mine have rusted very quickly; but, then, I have been constantly sending explosions through them, and the after-gas of these ether explosions is very sour and corrosive. The combustion appears to stop short of carbonic acid, and to generate an acid much stronger and containing less oxygen. I advise that the contents of the tube should always be changed after an explosion—not only from this cause, but also to avoid *dust* from the shattered granules, which finds its way into the burner.

I am afraid that my experiments with hydrogen and coal gas are not entirely beyond the reach of criticism, seeing that the gases were not absolutely pure. Yet I think we may conclude, beyond a doubt, that the extinguishing of the ethoxo flame is the more difficult, and that any safety tube sufficient for this will answer also for the oxyhydrogen.

Lantern exhibitors who have ether tanks in which the oxygen passes *through* the ether will do well to change them for tanks with the oxygen passing over the surface of the ether, if they wish to work the safety tubes to the greatest advantage. Not only is there a gain of over thirty per cent. in the pressure, but the light is more steady and free from what Mr. Baker terms "waving." In the old form of tank, when the safety-tube is attached, you can see the flame rise and fall each time a bubble of gas passes through the liquid, exactly as it does in a common gas jet when water has found its way into the pipes. T. Frederick Hardwich.

PHOTOGRAPHY IN THE METEOROLOGICAL OBSERVATORY.

Some months ago I had the pleasure of sending to The British Journal of Photography an account of the waxed-paper process as it is carried out at Stonyhurst Observatory; and today I propose to supplement the previous account by a few words on the argentic gelatino-bromide paper, which has lately been tried here with very promising results.

Having to print two copies of the curves for the barograph and thermograph, one under the other, I found that, when using two waxed papers, the curve on the paper next the cylinder was not very satisfactory, from under-exposure; so I substituted in its place a sheet of argentic gelatino-bromide paper, still retaining the waxed-paper for the outer sheet. This arrangement is very satisfactory, and gives excellent curves in both cases, as the strong light which falls on the outer waxed-paper is sufficiently moderated before reaching the argentic gelatino-bromide paper by passing through the waxed envelope.

The under curve is required in the case of the meteorological instruments, as duplicates have to be sent by this Observatory to the Meteorological Office of the Board of Trade; but, only wanting a single trace for the magnetograms, we adopt a different method in their case. The old waxed-paper process with strong lights answers very well; but we find that a large amount of gas can be saved by substituting the argentic gelatino-bromide paper and diminishing the lights. With lights low, and a narrow slit between light and paper, we find the curves sharp and the ground white. Blue glass has been tried in front of the slit without producing any apparent change in the curve.

The developing solution recommended by the firm is two ounces of saturated solution of oxalate of potash to half-an-ounce of saturated solution of protosulphate of iron and six minims of a sixty-grain solution of bromide of potassium. With this developer the barograms and thermograms are faint, but come out well when the bromide is omitted. The magnetograms, on the contrary, which are exposed directly to the gaslight, come out too quickly with the original developer; so we use ten minims of bromide instead of six, and the curves are perfectly under control. S. J. Perry.

Stonyhurst Observatory.

ALBUMEN AND GELATINE PLATES.

From a couple of articles which have recently appeared I notice that the Editors have been experimenting with albumen in connection with gelatine emulsion, in which direction I have myself worked, though not exactly on the same lines as the editorial experiments.

My object and intention in the introduction of albumen into the film was rather to secure certain mechanical or physical advantages than to emulate the fine quality of image attainable with the old collodio-albumen plate; and I think, so far as my experiments went, my mode of working is likely to bring about as full a degree of success as that given by the Editors.

My first experiments were made, with the object of preventing frilling, with a sample of gelatine otherwise so good that I scarcely liked to discard it on account of its one fault. The albumen was applied to the glass as a substratum, just as was formerly done in the case of collodion plates; but I found under these circumstances it had very little effect—at least of a beneficial character. I tried the simply dried and also the coagulated albumen substratum without much difference in result.

I next turned my attention to the application of an albumen solution to the gelatine film after it had thoroughly set. For this purpose I used a solution consisting of two parts of albumen to one of water, thoroughly beaten, and, in fact, treated in the manner usual in the preparation of albumen. Ammonia and acetic acid were both tried as additions for the purpose of facilitating the clarification of the albumen; but eventually I concluded to discard all such additions as being not only useless but actually injurious, inasmuch as they introduce some amount of uncertainty as regards sensitiveness. The plain albumen diluted with half its bulk of water was simply beaten, left to itself for some hours, then strained through cambric, and applied in the ordinary manner of a dry plate preservative.

In order to produce a marked result I found it necessary to submit the gelatine surface for a somewhat extended time to the action of the albumen. The film, being saturated with water, does not readily absorb the albumen; and if the plate be removed too soon from the solution a mere surface coating results, which is removed in the first washing of the plate previous to development. If, however, the plate be permitted to remain in the albumen for a period of about five minutes the "preservative" penetrates into the pores of the film by diffusion, and the result is a very considerable hardening of the surface.

If, after the plates have been dried—or even when but partially (or surface) dry—they are immersed in methylated alcohol the albumen is coagulated, and a still further hardening is the result. But there is a slight tendency to irregularity in this action, especially if the application of the albumen has been brief, and its penetration into the film not complete. It need not be feared that the hardening of the film by the coagulation of the albumen will render it impenetrable to the developer, as the alkalinity of the latter suffices by its solvent action to counteract any waterproofing effect that might be thus produced. I am speaking now solely of alkaline pyro., for I have never used ferrous oxalate with albumen plates.

The primary effect of such an application of albumen is to remove *almost* all chance of frilling from plates made with even the softest and most expensive of gelatines. I say "almost," because if in pushing an under-exposed plate a sufficient quantity of ammonia be used, or its application be sufficiently prolonged to remove the albumen, then the gelatine film is obviously left in much the same condition as it would have been in without any use of albumen. But even then I am inclined to think there is a less tendency to frill and blister than would have been the case without the albumen.

With regard to sensitiveness and other qualities I can say but little, having given no attention to that part of the subject. That the presence of the albumen brings about a difference in the colour of the developed image—a beneficial difference—is beyond dispute; but whether it affects the sensitiveness or the rapidity of development I am not prepared to say.

So far as the direct addition of albumen to the emulsion is concerned, I can scarcely see in what manner it can act differently from my mode of applying it to the film. In neither case is there any chemical action between the albumen and the silver salts, but merely a mechanical action, which can scarcely differ in effect whether the albumen be dissolved in the emulsion or diffused throughout the film by soaking. C. Beckett Lloyd.

ON CHOOSING A SIZE FOR *CARTE* AND CABINET NEGATIVES.

It is not always that one can choose a size for our *carte* and cabinet negatives. It is often done for us. Businesses are bought with all cameras, printing-frames, negative racks, &c., standing, or a favourable opportunity occurs in commencing business to purchase a lot of good apparatus, and the accustomed proportions are adhered to. Sometimes a size has been chosen to combine as many conveniences as possible—landscape and portraits; and as businesses have grown it has been found too inconvenient to change when the benefit to be obtained is, apparently, slight.

To all, however, who contemplate launching out in business for themselves, I would suggest the desirability of a very careful calculation of this question from all points of view before deciding upon the size to be adopted for the negatives they expect to take in largest number. Such a weighing of the subject involves many more considerations than at first might be thought likely. Not only is there cost and economy, general adaptability and suitability, convenience of working and convenience of storing, but it has to be considered how readily a damaged piece of apparatus can be replaced or the stock increased without delay when the requirements of business call for it.

My own experience dates from a period some years before the introduction of the *carte de visite*, when the stock sizes of the photographer were few—quarter, third, half, and whole plate being the dimensions then used, with stereoscopic and the large stereoscopic, or seven and a-quarter by four and a-half. I first used the quarter size, and afterwards regretted its adoption, as there was not sufficient margin in case of stains; I then changed to the large stereoscopic, and to that size doubled when it became customary to take several pictures on one plate and print from them all. These double stereo. plates I cut into two for convenience of storage, and to fit the large stock of printing-frames of the first-named size which the printing-room was provided with.

I found this a very handy size. It gave me a-quarter of an inch more margin at the top than did the quarter plate, and allowed full scope for adjustment if the sitter did not happen to be placed exactly in the middle of the plate, as often will happen, especially with children's portraits. As years rolled on and business grew I worked with my usual plates, rarely, if ever, giving further thought as to whether it was the most suitable. But upon the gradual introduction of gelatine plates into my dark room—I must confess to having been very conservative; I would not let go my hold upon collodion till I was quite sure of gelatine, and I have no reason to regret my slowness—as I began to run up large bills for dry plates, I reopened this old question. I found that by using for a double *carte* negative the old half plate—which, as my readers will remember, was six and a-half by four and three-quarters—I should save, at the prices then prevailing for the best plates, almost a penny upon each one used, and this, as I need not say, represented a very large sum at the end of twelve months. I estimated the saving would cover all the cost I should be put to if I made a change in my stock size.

This change would enable me to make another important alteration. For cabinet pictures I had a special arrangement, so as to take two on a large plate; I always have chosen to have plenty of margin on my negatives of all sizes, so as to be sure of clean pictures under every contingency, and for cabinet portraits I used 10×8 plates. Dry plates do not, as a matter of safety, require so much waste area—no oyster-shell markings, no comets, and no split films. I felt certain that a half-plate would answer all my requirements—would be cheaper, lighter, and occupy much less space in my negative-room, while with a sufficient number of dark slides there would be no need to use double plates; in fact, for any but very small sizes double plates are a mistake with gelatine, in my opinion.

I decided to use the same size of plate for *carte* and cabinets, and thus made a very great saving of cost and added greatly to the general convenience of working arrangements. One size of plate instead of two to keep in stock and one size of dark slide were only required. I may here state that I had my slides altered so as to take a half-plate either vertically or horizontally for *cartes* or cabinets, which led to another convenience. The double cabinet plate did not permit groups, or, indeed, any subject, to be taken lengthwise, while the single plate permits either one or the other indifferently to be used—an arrangement which, of itself, shows the inadvisability of the double plate, the actual usefulness of which is gone by now, seeing that plates can be piled at one's elbow in grosses, if necessary, ready sensitised.

I had every reason to be satisfied with making the change, but the most pressing necessity for alterations lay in the negative room. I preserve all my portrait negatives, and their ever-increasing number began to cause anxiety as to the stability of the floor and walls. Taking average photographic glass to be "21 oz.," it requires little calculation to show that it only needs seven or eight thousand negatives to weigh a ton, ordinary-built houses not being calculated to sustain many tons on one floor. This question was a very grave one, for I had heard of one photographer with a large stock of negatives stored in the upper part of the premises having to rebuild a portion through the walls giving way, the defect being discovered only just in time to avoid a great disaster. After careful weighing of the matter in all its bearings—the subject being one that could not with any convenience be reopened unless some radical change in processes took place—I arrived at a further decision about the working sizes of my *carte* negatives; and though from the remarkable falling off in the demand for *cartes*, owing to the preference given to cabinets, the subject of storage of *carte* negatives assumes a less prominent position, I propose in another number to describe how I rearranged *carte* sizes, both as to printing and storage.

G. Watmough Webster.

CAMERA PRINTING.

It may, perhaps, prove interesting to some readers of the Journal if I record a trial I have made of the system of producing transparencies by artificial light described in a leading article in last week's issue. I preface what I have to say by remarking that from the nature of my avocations it is frequently very inconvenient for me to practise this branch of photography during the daytime, and hence the great value to me of any system in which artificial light may be employed.

Following the general line of directions given, I have employed a pamphengos lantern of the usual four-wick class as the source of light. The condenser is formed of two plano-convex lenses mounted with their convex surfaces towards each other. Not having a large objective of the kind recommended in the article I made use of that belonging to the lantern, which is to all intents and purposes a portrait combination of quarter-plate dimensions, with this exception—that the back lens somewhat exceeds in diameter the front one.

The camera was fitted with a No. 1B *carte* lens, having an aperture of one inch and seven-eighths, with a back focus of four inches and an eighth, the equivalent focus being six and a-quarter inches. After various stops had been tried I selected one having an aperture of three-quarters of an inch as that to be utilised in all my future experiments. The process I employed was wet collodion, and the developer one containing fifteen grains of ferrous sulphate to the ounce of water.

Having interposed a plate of ground glass (the focussing-screen of a 10×8 camera) between the lantern and the negative, which was one of average density, I directed the light upon it with all the power of which four wicks are capable, obtaining a disc of about eight inches in diameter upon the ground glass. I then exposed the plate in the camera for thirty seconds, but this proved insufficient to bring out an image which was at all effective. Another plate was prepared and exposed for one minute. This afforded an image which in the centre was all that could be desired as regards vigour, but fell off very much towards the margin. Thinking this might be accidental another plate was exposed for the same time, a different sample of collodion being employed. Like the former this, too, showed a falling-off towards the edges, although the middle of the plate, for the space of about two inches across, was quite intense.

What was to be done? It was evident that the ground glass did not act the part of a perfect diffuser of such rays as fell upon it from a direction greatly differing from that in which it was desirable they should be transmitted. I was aware that the illumination would be more equalised if I interposed a second plate of ground glass in the manner directed; but, alas! I had no second plate in my house.

Recollecting that in an article in your last ALMANAC there was a suggestion for slightly deflecting rays of light under circumstances nearly similar to those existing in this case, I at once dismembered a large graphoscope and transferred the large lens, which exceeded six inches in diameter, from its place as the all-important factor in the mechanism of the "peep show" (as some one once designated a graphoscope) to a position close up to the ground glass, placing it on the lantern side at first, although subsequent experiment satisfied me that any special side was of little consequence. This immediately caused such a concentration of light upon the negative that not only was the previous weakness of the marginal illumination entirely overcome, but the *quantum* of light transmitted to the object-glass from the negative so great as to compel a shortening of the exposure in a most material degree. The transparency obtained by the aid of the graphoscope lens was simply perfect as regards equality of illumination, the extreme margin being quite equal to the centre in vigour.

I offer the above as an addendum to the suggestive article to which I have made reference. J. HOUSTON.

EXPERIENCES ON THE THAMES.*

FROM Shillingford the scenery becomes more flat, and, although we made one or two "shots" at Benson Village, we got nothing of interest until we reached Wallingford. Wallingford has the aspect of a well-to-do country town, and, like many another place of interest on the Thames, can boast of a "hoary antiquity." The Saxons, the Danes, and the Romans have each in their turn settled there. It was a borough in the days of Edward the Confessor, and there was a mint there before the Conquest. We learnt we might still see traces of the ruined old castle—the same castle which stood a deal of battering about by General Fairfax during the Civil War, and there learn how—

"Time's gradual touch
Has moulder'd into beauty many a tower,
Which, when it frown'd with all its battlements,
Was only terrible."

We did not make a detour to the castle, for we understood it would not form a suitable subject for the camera. It was also at Wallingford where Stephen besieged Matilda and finally arranged with her that he should reign for his lifetime, and that her son, afterwards Henry II., should succeed him. We had a few "shots" at the old churches of Wallingford, and also at the curious Town Hall ("Town 'all," the natives call it), the latter possessing no great attraction for the camera. However, it faithfully records how we kept those good rules we formulated before starting, for its clock-face marks ten minutes to ten o'clock. It was the first view we had taken that morning. By the river we got several pictures of the bridge with the church on the opposite side, and also of cattle along the banks, with distant Thames scenery.

Leaving Wallingford we next came to the village of Newnham-Murrell, with its old church and gabled belfry peeping out of a cluster of trees. A short distance further on we came to Mongewell, with a handsome country seat and beautifully-laid-out gardens; and then, after passing Cholsey, we came to the picturesque village of Moulsford, which lies close to the river. It has a pretty rustic church with a farm-house beside it, half hidden amongst luxuriant foliage. About the banks, on the Moulsford side, are many clumps of fine trees, through which we could catch glimpses of the distant downs above the village of Streatley, which we were nearing. We spent several plates in securing views of this prettily-situated village and antiquated church, which dates from the fourteenth century. Moulsford Ferry, a short distance lower down, was the next spot which afforded interest for our cameras.

Resuming our voyage and passing by South Stoke we arrived at Cleeve, with its picturesque overfall and lock. The best view of the latter is on the up side of it, with the Streatley Hills in the distance as a suitable background. There are many pretty "bits" about Cleeve, and especially around the old mill. We investigated, at some risk, the stream around the mill, often nearly getting into trouble through being too curious. However, we got a "shot" at that "antiquated structure," being probably the first photograph ever taken of it. These old mills, as a rule, form suitable subjects for the camera, and this would have been no exception had we had a wider-angle lens. We experienced considerable difficulty in selecting a spot to get this view; in fact, I had about given it up when I remarked to the Philosopher—"This is the spot we ought to take it from." "Then, why not?" he at once asked; and when I argued it would be rather difficult to pose the camera in a boat, and almost as difficult in the stream, he quietly asked me—"Why not the latter? It is but a question of depth and strength of current." We ascertained the depth and found it did not come much above the middle of the stand, and with care we could manage the current. I manipulated whilst the Philosopher poised himself so as to form a suitable balance on the other side of "our lugger." We obtained that view, and christened it the "Philosopher's bold idea!" We were charmed with the environs of Cleeve Mill and with the whole route from Cleeve as we came nearer those gently-rising hills above Streatley, at the base of which the twin villages of Streatley and Goring are situated, on either bank of the river—the former in Berkshire and the latter in Oxfordshire—and both joined by a wooden bridge, whence we could obtain one of the finest views of the river, with its silvery windings at length lost in the distant hilly ranges above and below. The river is wide here, and encloses a series of islands clothed with a bountiful supply of foliage. One view at Goring particularly charmed us, and that was its pretty church, which forms the subject of the first illustration. It is dedicated to St. Thomas à Becket, and is of Norman foundation, though the tower alone preserves

the peculiar features of that style. It stands close by the water's edge, and beside it is a graceful cottage. The whole is most picturesquely situated and surrounded with over-hanging foliage. We considered a picture of this church well repaid our visit to Goring. The houses at Goring reminded us very much of those at Clifton Hampden, and, with

* Concluded from page 424.

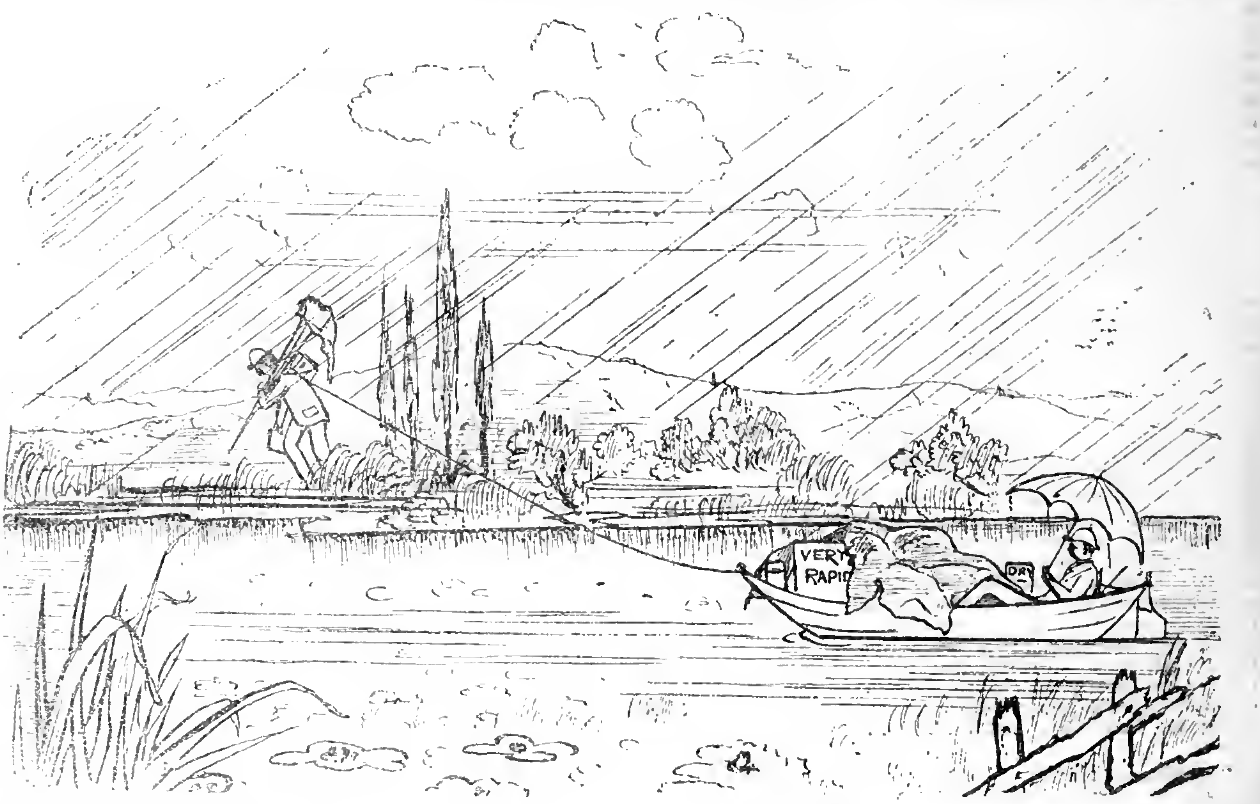
their trim and neat gardens and generally-comfortable look, they form an excellent example of the "peasant homes" of Old England.

The good people at Goring are somewhat unsophisticated and rural. We had occasion to visit one of their village inns—"hotels" they now call them. We inquired what we could have to satisfy our hungry cravings, and found that it was a choice between eggs or our being the innocent cause of the murder of a chicken and having him cooked, which would require time. We decided on the former alternative. Now, the Philosopher has a morbid horror of French eggs, and I can sympathise with him. The Philosopher at once asked—"Are they French?" (Mine host understood "fresh.") "Certainly," was the ready answer. We were a little annoyed and worried when on more carefully pronouncing the word "French" mine host understood, and at once rising to the occasion replied—"Why, sir, I'm surprised at your asking me such a question; I've never seen a French egg, and my eggs have 'growed' on the spot." We at once asked him to let us have a few of his "home-grown" eggs without further delay. We eventually made friends with that man and stayed at his "hotel" that night, and had no reason to complain of the somewhat rural treatment we received.

Pangbourne was another of those beautiful spots on the Thames we left with regret. Pangbourne has many attractions, and all around the neighbourhood there is much to interest the art-lover. The village, moreover, has a long history. It is mentioned in the *Domesday Book*. Its manor and church were afterwards given to the Abbot of Reading by Henry II., whilst later on it formed a part of the possessions of the Duke of Somerset, who was executed in 1553.

Continuing our route from Pangbourne, through Whitchurch lock, we meet with rather flat scenery on our right, with undulating chalk hills on our left. Then we reach Hardwicke House, which is beautifully situated amidst luxuriant foliage on the slope of a wooded hill rising from the river. Hardwicke House is a specimen of a manor house of the Tudor period—a large, gabled structure of red brick placed on a terrace of earth raised considerably above the river. Here Charles I. spent much of his time during the troublous period of the civil war; and Charles II. is also said to have made the mansion his hiding-place. Needless to say, Hardwicke House forms an interesting subject for the camera from the opposite bank.

Our next point of interest *en route* was at Mapledurham, with its old, mossy mill, church, and manor house, which for centuries has been, and



Streatley is also worthy of a visit, and next morning we obtained two or three photographs of this pretty village, with a background of gently-undulating hills, from the summits of which many magnificent views of the Thames can be obtained. The next view that occupied the camera was the "Grotto"—a prettily-situated mansion about half-a-mile or so farther down the river. The "Grotto" derives its name from at one time possessing a fine grotto, which does not at present exist. The mansion is prettily surrounded with handsome trees, and forms a suitable subject for the camera. Thence we hastened onwards until we reached the villages of Pangbourne and Whitchurch, which, like those of Goring and Streatley, are joined together by a bridge. The chief interest at Pangbourne centres in its weir and charming surroundings. Many interesting views may be obtained about here; the weir, rustic cottages, and overfall, with a background of wooded, rising slopes, all form subjects more or less suitable for the camera. Greville Fennel, in his book, *The Rail and Road*, gives the following description of Pangbourne:—"Pangbourne is another of those pearls of English landscape which our river threads; no sweeter spot is within many miles. The Thames seems especially fond of disporting itself here; and loth, indeed, to leave, it loiters in the great depth of the pools, creeps slyly under the banks, frolics as a kitten after its tail in the eddies, and then dashes hurriedly off beneath the far-stretching wooden bridge, as if to make up for time truantly lost." The village of Whitchurch is also interesting, and we obtained good views from the opposite bank of the church and mill peeping out of a mass of dense foliage.

still is, the seat of the Blount family. It is a fine combination of pointed gables, tall roofs, ornamented chimneys, and porches—a regular Elizabethan mansion in the richest style. We obtained good views on the up side, with the mill and church in the far distance, the monotony of the placid water being broken by the reflection of the fine trees on both sides of the river, which here is deep and broad, reminding us of those beautiful lines of the poet:—

> "Though deep, yet clear; though gentle, yet not dull;
> Strong without rage; without o'erflowing, full."

We had not sufficient time to do justice to Mapledurham, as we wished to hurry onwards; so, passing by the interesting village of Purley, we at length reached Caversham, where we left our boat, deciding to finish our course down to Windsor on another occasion. There were many reasons why we decided to give up, one chief reason being the shocking weather we had had, and the general uncertainty of results in consequence. A facetious friend sent us the above illustration as a silent and laconic explanation—"Why we came home."

J. J. Acworth, F.I.C., F.C.S.

IN THE LABORATORY.

To many it would seem as if gelatine plate treatment had been so exhaustively written upon that nothing more were left to be said on the subject. Are not excellent specimens by the now almost universally-used forms of treatment of the plate after exposure to be met with all over the land? True it is there are still two modes of development—the ammoniacal and the ferrous oxalate: but this last has now so very few votaries that it may be said to be fast dying out. To its celerity and energy mainly the ammonia owes its hold in the professional room. As to amateurs, they give it preference because of its, to them, scientific treatment. Many hold to scorn anything that is done in a simple and direct manner, so long as a more complicated mode of treatment exists. Now, the very opposite should be the thing—absolute simplicity combined with perfection of results. This will leave more time for something far more useful—the due consideration of the artistic aspect of photography.

In view of all this it may not be too bold to say that a reaction must take place in the manipulations the plate has to undergo after exposure. Ammoniacal development may in fact be made to yield to its more modern competitor—washing soda. I have no idea of who was its original introducer, but, whoever he was, he rendered a most signal service to photography. There is no substance in the laboratory more valuable than this simple and modest agent, and, probably because of its simplicity, it is readily pushed on one side to make room for inferior agents. And yet medical opinions have clearly proved ammoniacal fumes not only unsuitable but positively dangerous to some constitutions. Men with delicate organisations, after even a brief period in the dark room, under the influence of ammoniacal effluvia meet with sleeplessness, restlessness, nervousness, and irritation. They should no longer. Let them heed carefully what is to follow, and they may for ever after discard that baneful agent—ammonia.

It is not at all improbable they may think management in cases of over- or under-exposures an impossibility with soda. Let them discard this idea from their thoughts altogether. Soda is just as manageable as ammonia, and it may be asserted that the former will in many cases give passable results when the ammonia will prove utterly useless. I shall call the system I am now advocating

Modern Development:—

Formula for Winter.

Ordinary washing soda	5 ounces.
Bromide of potassium	15 grains.
Water	50 ounces.

Formula for Summer.

Ordinary washing soda	5 ounces.
Bromide of potassium	40 grains.
Water	50 ounces.

The simple difference between the two formulæ consists in an increase of the bromide of potassium in the winter formula on to that of the summer. In both spring and autumn twenty to twenty-five grains would suffice.

To each ounce of the above about one grain of dry pyro. is required, and it is only put in with the solution when about to develope. You then have energy to any amount.

In using large plates—as I never use any plate whatever but those I make, and as they are very repellent owing to the quantity of chrome alum they contain to counteract frilling—I make it a practice to first soak my plate a couple of minutes in water and then apply the developer. By that means uniform action is obtained, and no marks or marbling are encountered. Half-a-minute or so after the developer is on the plate the picture makes its appearance very faintly; it goes on slowly but steadily growing in density, and, if exposure be correct, in three to four minutes development is complete. The whole time it has been under absolute control, for the building up is one that can be most easily followed and stopped directly it is seen the picture has acquired the proper density. Of this last any amount can be got without the least trouble; if there be a danger, it is to get too great a density, and chalky pictures nowadays are rightly looked upon as worthless. But, supposing the negative somehow or other has got a little too dense, there is nothing easier than to bring it down to a suitable state. All you have in the world to do is to leave it in the fixing bath until the desired reduction has taken place; this may take half-an-hour, it may take an hour, or it may take several hours, but the desired end will be attained. There is nothing better yet than a twenty-five-per-cent. solution of hypo. as a fixing bath. Eight ounces of hypo. to thirty-two ounces of water make a fair quantity of solution and will last some time.

But if, on taking the plate out of the fixing bath and giving it a rinse to examine it, the picture prove rather thin, merely give it a slight additional rinse and lay the plate by. It will now, thus left, gain in density, the hypo. in the film and the oxygen of the air working together to bring about the desired end. How the reaction really takes place I would be at a loss to explain, and as the matter is only valuable to me in its actual bearings I do not intend to take further trouble about it. By the time the plate has acquired the desired opacity it will also have gained a yellow colour most unpleasant to many, but it will print splendidly. Of course the plate has to be thoroughly washed when it has once acquired the requisite density.

A great eyesore to some is the colour of a plate developed with soda. All the rubbish that can be urged on that score I have heard *ad nauseam*. Let the sensible man discard all such nonsense; the colour of the deposit of a soda-developed plate, left intact, is simply printing perfection and nothing short of it. Should it, however, occur that you have to retouch the negative, and are at a loss as to its value so as to be able to retouch adequately, here is the simplest of all means to bring the negative at once to the lead-pencil tone. Swill your plate with the following solution:—

Alum	3 ounces.
Water	20 „

The reaction is very rapid in this solution, and any yellow deposit will disappear with this alone. If alum be not at hand take and swill your plate with the following solution, which, by the way, is not mine:—

Sulphuric acid	1 drachm.
Water	20 ounces.

The effect with this is magical; but care must be taken that this solution remains but the briefest of time on the film, for it is also a great reducer. Moreover, a thorough washing of the negative is necessary to ensure its ultimate safety. This must be an answer to those who always urge colour, for lack of other objections, when speaking of the soda developer.

That the system now advocated is absolutely sound, and in every way satisfactory, I have sufficient proof of in the experience of a professional photographer to whom I communicated it, and who has now had it exclusively in use for the last twelve months. The results he obtains with it are second to none whatever. There is a rich vigour and bloom on his negatives I never saw surpassed even in the wet process, and the transparency of the shadows is of the very purest. This stands to reason, if one but consider the relative proportions of bromide used to the soda, and the character of this last. There is no abnormal reduction with this method of working; no shadows veiled from an inordinate quantity of the obnoxious ammonia, used, mayhap, on some make of plate that lacks the power to withstand this rough and over-severe treatment. You may hear that in summer there is a greater tendency to frilling with the use of the soda developer. This may be counteracted most easily by the mere addition of alum to it; no fear then of frilling, and a certain quality not to be despised will be imparted to the negative.

For ordinary studio work, where constant practice reduces exposure to a certainty, the above will be found all-sufficient; but for abnormal cases—such as happen not unfrequently when out of doors and under trying circumstances, when exposures are forcibly guess work, or when they suddenly have to be brought to a close because of unexpected movement in foliage or otherwise—means must be provided to counteract ill effects as far as possible, to partly make up for under-exposure, or accommodate cases of over-exposure. Of the two, under-exposure is by far the more trying, and, when very pronounced, it is not to be got over, work which way one may. When the case is not very bad, however, the use of an absolutely-saturated solution of soda without any bromide whatever, and an increase of pyro., will restore things or, at anyrate, make the most of them.

When presumable over-exposure has to be dealt with double the quantity of bromide should be used, or a drop or two of citric acid solution added to the normal developer. Should the picture, notwithstanding, come out too quickly the developer were best washed off, a new one taken with three or four drops of the citric acid solution (strength, ten per cent.)—and things would proceed satisfactorily. To those whose experience is limited it is astonishing how much may be done to overcome the ills attendant on incorrect exposures. What is most wanted in such cases is to keep perfectly cool and collected; meditate on the mishap, and well weigh the *pros* and *cons* of the case with all its bearings, and the chances are ten to one in favour of your mastering the difficulty. It has happened to me to forget to revolve the small stop after focussing, and to consequently have a much over-exposed picture. As it invariably strikes one after the thing is done I merely bore the fact in mind, and on getting home easily balanced things and made them work quite smoothly notwithstanding, save the slight want of sharpness attendant in such a case.

All this summarises what might be called a comparatively-new line of working, and one for which I venture to predict a steady spread and a bright future, which it well merits. All I will now add is—fairly try it.

A. F. Genlain.

Addendum.—Even in the professional laboratory it is advisable to always have at hand a bottle of well-saturated solution of soda when, by some means, exposure proves to have been rather short, as it is a ready remedy. In the same way for over-exposures: it is wise to have a bottle of a solution containing double the quantity of bromide (say):—Water, twenty ounces; soda, two ounces; bromide, thirty-five grains. A drachm or more of this last quickly added to the solution in the developing dish will at once retard development and make things work harmoniously.—A. F. G.

ON THE TREATMENT OF HUSNIK'S PHOTOLITHOGRAPHIC TRANSFER PAPER.

Dissolve one part of bichromate of potash in sixteen parts of water, and add four parts of alcohol. The solution is reddish yellow; add caustic ammonia until the colour turns light yellow. An excess of ammonia does no harm. This bath is poured into a shallow zinc vessel, into which the photolithographic paper is dipped with the prepared side up; after a few minutes it is taken out again and hung up to dry at an ordinary temperature, and in the dark.

When dry the paper is well burnished and exposed to sunlight for a few minutes, or in the shade for half-an-hour to an hour, under a negative in line or stipple. The paper is then coated with fatty printing ink, thinned with oil of turpentine until it is of the consistency of syrup, and rubbed with fine cotton wool until only a thin surface coating remains. After a few minutes, during which the oil of turpentine has evaporated, the print is laid in cold water and left to soak for half-an-hour before proceeding to develope with a soft sponge. The development proceeds by placing the paper on a firm, flat, smooth support and working the sponge with a circular motion, yet without too strong a pressure. The ink easily washes from the whites, but remains adherent to the lines of the drawing. The print is next washed in clean water, then dried first with blotting-paper, and afterwards hung up to become perfectly dry. The back of the paper is then moistened with a sponge, and pressed as usual upon the zinc plate or stone.

DETAILS OF SEPARATE OPERATIONS.

The Bichromate Bath.—This should keep and still answer its purpose. As is well known, our photolithographic transfer paper is prepared so that the fundamental film is insoluble in cold water, while the uppermost film is soluble in cold water. If one were to use a bichromate bath dissolved in water only the upper film would be dissolved off and float away in the bath. For this reason alcohol is added to the bath, which many theorists often seek to avoid because they would like to understand it better. In alcohol, also, the upper preparation of the paper is especially insoluble, and this addition alone hinders the complete washing away of the uppermost film.

The chrome salt bath may, indeed, work for some time well enough without the addition of caustic ammonia; but in a few weeks a reduction of the chromium salt into brown chromic acid and chrome oxide will take place, because the alcohol and the organic substances dissolved off from the paper while lying in the bath have a reducing action upon the chrome salt even in the dark, which makes it necessary to maintain the sensitiveness of the bichromate in the bath by neutralising it by the addition of caustic ammonia into monochromate of potassium and ammonia, for which an excess of ammonia should be present. Thus a neutral or alkaline chromate salt bath is perfectly durable, and also does not decompose when exposed to light (because all monochromate salts are insensitive to light) and it always works with certainty, which cannot be said of a bath subject to decomposition, as a decomposed bath itself acts more weakly; and the product of the decomposition—namely, tho chrome acid chrome oxide—has a tanning effect upon the gelatine of the paper, by which its development is partly or wholly affected.

It may be thought that a neutral chrome salt bath should render paper saturated with it insensitive to light; but it must be remembered that the bichromate was neutralised by a volatile base, namely, ammonia, which evaporates away completely during the drying of the paper and leaves behind it the original double salt—bichromate of potassium. Even if instead of this salt the double ammoniacal salt of chromium were originally used for the bath, its neutralisation would not in the slightest affect the sensitiveness to light of paper saturated in it; because the yellow crystals of monochromate of ammonia do not resist the action of the air, but lose one combining proportion of the ammonia, would be decomposed into reddish dust, and leave behind the bichromate of ammonia.

One may also observe a distinct change of colour in the paper which, before drying, is light yellow, but afterwards appears a reddish-yellow, and, therefore, latterly only contains bichromate.

The question as to which salt of chromium is best suited for the bath is easy to answer when one knows whether in asking the question most stress is laid upon the greatest sensitiveness to light or upon the price. If price be taken into account then bichromate of potassium is preferable; if sensitiveness is to decide the matter then monochromate of ammonia is to be recommended.

As I have already shown in my work on *Lichtdruck*, the chromate of ammonia is considerably more sensitive because all the chromic acid present in it may be decomposed by the light, since by the decomposition of one equivalent of the chromic acid monocarbonate of ammonia is formed, which, not being able to resist the influence of the atmosphere, loses part of its ammonia and leaves behind the sensitive double salt, which can again be reduced one-half by light, and so on until all the chromic acid is decomposed. When stable metallic salts are used only one equivalent of the chromic acid is decomposed, leaving behind the monochromate, which is then no longer reducible by light.

I myself prefer the potassic salt, as it is quite sensitive enough for what I want, or, at most, it may have to be replaced in the winter months of November, December, January, and February by the ammoniac salt; but only where there is a great deal of work to be done, and where it, therefore, seems advisable to accelerate the exposure.

It is best to have a zinc trough for a bath quite as large as the size of paper to be used (porcelain or other vessels may also be employed, but are neither so cheap nor so durable). The solution itself should be kept in stock in two bottles. The large one (which is the store bottle) should contain a solution of half a kilogramme of bichromate of potassium in seven and a-half litres of water, and should contain as much caustic ammonia as to make the solution appear yellowish and make it smell very slightly of ammonia after being shaken up. If there be already a slight excess of ammonia present one should take care not to add a great excess of caustic ammonia, as this corrosive base has the property of rendering the gelatine softer and depriving it of the power of setting. It may happen that in summer a bath rich in ammonia may soften the gelatine of the paper so much that when developing the gelatine shall loosen off, even in cold water. The gelatine, however, forms a protection to the paper from the rubbing of the sponge, and by the smoothness of its upper surface gives much sharper lines and dots than a merely albumenised paper would. But even if the softening of the gelatine should not have proceeded so far as to render it soluble in cold water, a far less degree of softening is very disagreeable and injurious in the various operations. For example: the paper after being transferred adheres tightly to the zinc plate, and cannot be removed from it without injury to the picture. J. HUSNIK.

—*Notizen.* *(To be continued.)*

ENGINEERING PHOTOGRAPHY.

[A communication to the Engineers' Club, St. Louis., U.S.A.]

IN discussing photography this evening I wish what I have to say to be taken rather as a progress report than as the dictum of an expert, which I certainly do not claim to be, my own knowledge of the subject having been gained chiefly during the last six months in the leisure moments I have had at my disposal, while actively engaged in my regular work. Having so recently passed through the primary department I suppose I can give good advice to the beginner.

The object which I have in view this evening is to give the principles on which the art depends, with some of the chief uses to which it can be applied, which, I hope, will be instructive or interesting to all; and, at the same time, to give such practical suggestions and formulæ as will be of value to anyone who desires to learn to take photographs.

My own knowledge on the subject has been got from books, experiments, and talks with other amateurs, having learned but little from the regular profession, who, to a greater or less extent, regard it as a secret trade, where all information should be paid for. A beginner would probably save time and money by taking a few lessons in a good photographic establishment. That you may understand the change brought about by the introduction of the gelatino-bromide dry plates, which have only been on the market for a few years, some statement of the principles on which photography depends is necessary.

No engineer who has been successively tanned and bleached by field and office work need be told of the power of the sun to greatly modify the colour of many substances. The salts of silver are those mostly used, being the only ones known to be capable of use in the camera, while the compounds of iron and chromium are extensively used in sun printing. Silver chloride, iodide, and bromide are the salts used, the action of light being nearly the same on each. If light is allowed to fall on the chloride under favourable conditions it is reduced to the subchloride. As is well known, it is the short vibrations of light which so synchronise with the vibrations of the molecules as to throw off one atom of chlorine, while the longer vibrations have no effect. The opposite of this occurs when light falls on the eye; so a photographer, by using blue glass and blue curtains, can admit most of the chemical rays into his studio while excluding much of the heat and blinding light, thus enabling his subject to keep cool and to have his eyes wide open. The chemical change is very slight in the silver salt, so that very little energy is necessary, the result depending solely on the vibrations being of the right length, just as the trotting dog may have thrown down a bridge which allowed a four-horse waggon to safely pass over it. Captain Abney states that chloride of silver may be heated to that point at which it will itself give off chemical rays without being decomposed. The action of light on silver chloride is as follows:—

$$2\ AgCl = Ag_2Cl + Cl.$$

This change takes place much more readily if some substance is present to absorb the chlorine. In the presence of moisture we have

$$4\ AgCl + H_2O = 2\ Ag_2Cl + HCl + HClO.$$

If silver iodide be used in the presence of free silver nitrate, as in the wet-plate process, we have—

$$12\ AgI + 6\ AgNO_3 + 3\ H_2O = 6\ Ag_2I + O + 6\ AgI + 6\ HNO_3.$$

The nitrate, being capable of absorbing the freed iodine, is called a sensitiser. If silver bromide had been used in the above reaction, on account of its greater sensitiveness to light, the following reaction takes place after exposure—

$$4\ Ag_2Br + 6\ HNO_3 = 4\ AgBr + 4\ AgNO_3 + N_2O_3 + 3\ H_2O,$$

which, with the aid of the nitrous acid set free, soon destroys the latent image. This accounts for the disappearance of the latent image in the so-called tannin dry plates when they are kept after exposure before developing.

With the gelatino-bromide plate the case is quite different. The gelatine acts as a sensitiser, absorbing the liberated bromine without setting free any injurious acid, so that such a plate will keep as well after as before exposure, which seems to be indefinitely, if properly made and not allowed to get too hot.

Some manufacturers claim that the plates, like whisky, improve with age. They probably become more sensitive on account of an increase in the size of the grains of bromide. This property of the gelatino-bromide plates, taken in connection with the fact that they are the most sensitive compound known, make them so superior to all others for engineering purposes that I do not consider it worth while to mention any others, referring you to books on the subject.

The Lens.

The lens is the most important thing in the outfit, and, while the character of this paper does not admit of a full discussion, a few remarks may not be out of place.

Makers should, and usually do, state in describing a lens the size of the objective, the equivalent focal length, and the size of the plate covered. Lenses are usually compounded to overcome spherical aberration and other obstacles to making a correct picture, and the equivalent focal length is the distance from the optical centre of a compound lens to the ground glass, when the rays striking the objective are parallel. The following equation gives the relation between the conjugate foci of a lens:—

$$\frac{1}{v} = \frac{1}{f} - \frac{1}{u}.$$

Where v is the distance from the optical centre to the image, u the distance to the object, and f the equivalent focal length, it is evident that if u is infinite $v = f$. If the image is to be $\frac{1}{n}$ the size of the object we have:—

$$\frac{1}{v} = \frac{1}{f} - \frac{1}{n\,v} \text{ or } v = \frac{f\,(n+1)}{n}.$$

The quickness of a lens depends on the size of the objective and the shortness of the equivalent focal length. If r be the radius of the lens and f the focal length then the time of exposure is given by the equation—

$$t = C\,\frac{r^2}{f},$$

where C is independent of the lens, depending on the value of the light and the quickness of the plates. By means of this equation the quickness of the different lenses can be readily compared.

The Camera Box.

The camera box which I have is made by Anthony, and is called "The Novel." I selected it after looking at all I could see in the St. Louis supply stores, and, taking its cheapness into consideration, it is probably as well suited to an engineer as any. The important points are that the plate can be used with its longest dimension either vertical or horizontal, that it can be turned about a horizontal axis so as to make the plane of the picture vertical when the camera is pointed up or down, and that the lens should be capable of being moved vertically.

The tripod should be light and portable, folding up so that it can be easily carried.

Dry-Plate Holders.

Of these there are a great variety; but by far the most convenient for an engineer are the paper holders, which add very little either in bulk or weight, making them suitable for field work. They are patented, not very well made, and sold high, because one cannot get along well without them.

Time of Exposure.

The question of how long to make the exposure is the most difficult one connected with photography, since it depends on so many things, such as the lens, the diaphragm, the quantity and quality of the light, and the colour of the object. The time varies from the instantaneous—when the object is white and in bright sunlight—to hours in enlarging or in photographing microscopic objects.

To give a beginner some idea: if he wish to photograph a landscape with a Darlot lens, medium size stop, and in bright sunlight, two seconds will suffice, while I have never succeeded in taking a portrait in an ordinary room with less than thirty seconds' exposure when no stop is used. A good way is to expose different parts of the same plate unequally, then notice which exposure gives the best result. The only way to learn is by experiment; and after spoiling many plates the learner will know by intuition how long to keep the cap off. A professional hardly ever looks at his watch, though a beginner should not only observe the time, but record it also.

D. C. Humphreys, C.E.

(To be concluded in our next.)

WHERE TO GO WITH THE CAMERA.

[It is hoped that this series of articles will be continued at regular and frequent intervals during the vacation months, and we shall be glad to receive contributions to the series from any friends able to treat of new and interesting ground.]

A FEW DAYS IN BOULOGNE AND AMIENS.

"Why don't you exhaust the beauties of your own country before going abroad to visit others?" is the question one sometimes hears asked; and, if all you want can be summed up in beautiful country scenery and familiar surroundings, then you may certainly do worse than stay at home and spend your holiday among leafy lanes and shady woods, chattering brooks and brawling rivers, or at some spot along the coast where you may divide the time between the enjoyments offered by land and sea. But what some of us frequently want is a complete change from our ordinary routine and usual habits, and this may be got by a continental trip of a very modest description, without going very far afield or making any great demands on either time or purse.

Crossing the "silver streak," on holiday thoughts intent, is an experience which happily falls to the lot of many amateur photographers, and the day I chose for it was one to rejoice the heart of anyone who could appreciate delightfully genial and warm weather, with just sufficient breeze to temper the seasonable heat. From Folkestone to Boulogne, on a glowing, sunshiny day in the middle of June, is a pleasant preparation for the holiday which the photographic "Syntax in search of the picturesque" may have in anticipation. About halfway across the channel we find ourselves in the middle of the competing yachts in the Cinque Ports Yacht Race from Dover to Boulogne, and very beautiful they look in all their glory of outspread canvas—a good chance to get a flying shot; however, I had taken none but slow plates of my own make, so that the opportunity must be lost.

Expecting no difficulty in getting my luggage through the Boulogne "Customs" my hopes were rudely shattered by one of the gentlemen gorgeously arrayed in all the dignity of uniform, who, passing several other passengers, quietly fastened on my packages and led me off in triumph to the inquisitors, or, to speak correctly, the officials, who for a consideration condescend to overhaul your belongings and generally turn them topsy-turvy. These gentlemen, with the perverseness of human nature in general and French human nature in particular, carefully overlooked all my packages except that one containing my precious plates, which they were particularly anxious to see. It was of no use explaining in the best French I could muster that the little brown paper parcels contained photographic plates, "sensitive to light," for in weight and shape they were too suspiciously like dynamite to be lightly passed over. "Messieurs" must *see* them, and as there was no help for it I had to undo one of the packets and spoil a few plates. Fortunately they were well packed in fours in orange paper, and, although several of the loose packets were handled in a bright light, I did not find upon development that any of them were fogged.

While some of the brethren of the camera go further afield for their pictures I thought I would see what there was within a few miles of Boulogne which would make pictures. Anyone who knows the town fairly well will remember the large cemetery on the St. Omer road. From the eastern and higher end a capital general view, with the cathedral in the distance, can be got, and one which well repays the expenditure of a pair of plates. Passing from the cemetery gate along the avenue of trees (known as "Des petits Arbres") under the ramparts one has a charming peep of the cathedral dome across the moat, with the citadel (in which you are told Napoleon III. was confined) for middle distance. This requires to be taken in the afternoon, when the light is so placed as to bring into relief the roundness of the circular stonework. By the way, enthusiastic amateurs who desire this picture must beware of the ubiquitous gendarme; for, though the Boulogne fortifications are of the medieval description, the consequences might be unpleasant if he were inclined to be "cantankerous." A little lower down is the Porte Gayole—a picturesque old gateway, and making a very characteristic picture. Let us go through and we shall find ourselves in the "Haute Ville," where, from the end of the Rue de Lille, one gets a very attractive street view typical of French town architecture. The ramparts enclosing the old town contain a series of pictures for the eye to feast on, but not, alas! for the camera, the distances being too great. One or two plates are, however, exposed on quaint "bits" of old-world building, which force themselves into notice.

Leaving Boulogne itself, the little fishing village of Le Portel affords abundance of opportunities to the photographer in search of the picturesque. The quaint fisher dwellings with their appurtenances—nets and sundry other gear—would give material for an unlimited number of pictures.

But, after all, a day or two at Boulogne will be all that a casual visitor will care for. In my own case, after being there a few days, I began to look around for the most promising place in which to spend the few more days which would terminate my holiday for 1884. It occurred to me that I had heard something of Amiens as a photographable town, so to Amiens I started; and I may say at once that from the point of view of an amateur who wishes to spend three or four days picture-making I cannot conceive a more enjoyable town. Pictures positively force themselves on one, the difficulty being not what to take, but what *not* to take. Here we have a town of 60,000 inhabitants full of busy life, containing in its midst a magnificent gothic cathedral, and passing through the most picturesque part of it a river which sometime in the middle ages was built over and about in such a way that it is made to form a sort of network of canals, over which are innumerable bridges of stone and of wood of all shapes and of all sizes. From these points of vantage one gets an infinite variety of glimpses of quaint, old, gabled houses perfectly mirrored in the placid water beneath, and odd-looking, flat-bottomed boats like something between a gondola and a fishing punt, the said boats being among the most useful, as they are certainly most characteristic, objects of the town. Go to the banks of the Somme on a market day and you will see for what purpose they are used. Piled up with vegetables and fruit of all kinds they are so evidently part of the furniture of the place that one begins to wonder how it is that we in England have no use for them. Useful as is the river Somme to the picture-maker, the natives find in it literally their means of subsistence. Many of the mills in the manufacturing portion of the town are worked by water power, and one has only to wander about by the banks to see what a large number of the leisure hours of the Amienois are devoted to the mystery and art of angling. There you may see them of all ages, sizes, and classes, and at all hours, doing their utmost to lure the finny tribe to destruction. Very handy in the foregrounds are these gentle anglers. They come in very appropriately, and, from the exigencies of their craft, make the best of sitters; neither do they raise their eyes from the important occupation of watching the float to stare point blank at the camera.

The great feature of Amiens is its grand cathedral, which, seen from almost all points, towers far above all other buildings—a veritable giant of architecture. No fear of losing your way in Amiens, as you have only to take the bearings of your "diggings" in relation to the giant, and when you are at a loss steer for it. The magnificent west front at about 3.30 on a bright summer afternoon is a sight to rejoice anyone who can appreciate the richness of detail and harmony of design displayed by the old builders in this superb poem in stone. Every niche with its statue, every grinning gargoyle and grotesque head, is thrown into relief and endowed with a beauty which nothing but direct sunlight can give. The interior of the edifice is in keeping with the expectations raised by the view of the outside front. Entering at the great west door and looking from end to end of the building one beholds a sight always full of significance as being in keeping with its solemn uses. One of the greatest treasures of the cathedral is the well-known statuette, *The Weeping Angel*—a charming little work, apparently not more than two feet in height, and placed somewhat too high for its great merit. Placing ourselves under the care of the sacristan's son, a smart little lad, we proceed to explore the towers and upper portion of the cathedral, ascending countless steps, and finding ourselves at last just over the great west door, and behind some colossal statues. Now we pass along the outside of the lower portion of the roof under the flying buttresses. What a view of the fair town at our feet! What glimpses between the buttresses, suggesting gigantic photographs in Brobdignagian frames! Inside the building, again, what a picture from one transept to the other!—both adorned with beautiful rose windows of gloriously stained glass. Then over the roof itself, where our young friend slyly opens a trap door and bids us look down, "quarante-quatre mètres" below, where we see sundry insects crawling about, said insects turning out to be human beings viewed "end on" from above.

Photographs of the cathedral are, of course, to be obtained by purchase, and some of them are very good. All the views of the west front, however, give a false idea of the place, owing to the short-focus lenses necessarily employed in their production. They show the south tower taller than the north, which is just the opposite of the fact; so we content ourselves with producing a picture including a moderate angle, and leave the more ambitious to "Messieurs" the shopkeepers. A fair idea of the vastness and great height of the cathedral may be got in the view from the north end of the Pont du Don, as from that point there is a greater sense of proportion in the relative heights of the great building and those of the surrounding houses. It is difficult to photograph, however, as the light, except in the early morning, is dead against the camera.

The day on which I left Amiens was Saturday and a market day, with plenty of chances for groups of market women, &c. That sort of thing, however, requires rapid plates; and as I am one of the "slow" men I exposed my last films on the less ambitious but equally-picturesque subjects by the river side which I have attempted to describe.

J. J. Hollway.

FOREIGN NOTES AND NEWS.

A Photographic Method of Producing a Lithographic or Zinc Plate Printing Plate in High Relief.—Dr. Kayser's New Changing-Box, Dark Slide, and Dry Plates on a Flexible, Transparent Support.

Herren Benecke and Fischer, of St. Louis, and Herr Frank, of Frankfort-on-Main, have patented a process for obtaining relief plates for printing in relief in a photographic manner, regarding which, the *Correspondenz* says, we see here a practical application of a long-known fact, and especially of the researches of Rottier and Waldack, in which* the influence, first, of the concentration of a solution of ferrous sulphate; secondly, of the acids added to the developer; and, thirdly, of the influence of different iron salts upon the result of the development process, were discussed. The patentees have confined themselves to utilising the results which can be obtained by varying the concentration of the developer; yet the specification speaks of the preparation of a small positive transparency and of a subsequent enlargement as the real part of their discovery. [The *Correspondenz* then takes the opportunity of remarking on the irregular manner in which the specifications are issued from the Patent Office, and the consequent inconvenience arising from not being able to arrange them, or to have them bound in order, and the difficulty of referring to them. It seems that, though this patent is numbered 26,242, the patent office had not yet published the specification of No. 26,222, which was granted on the same day!]

"The process is intended for the production in the photographic manner of a picture the outline and shadows of which shall be formed of small dots placed more or less closely together, and for the transference of this picture by etching upon a zinc or other plate and of rendering it suitable for multiplication by high relief. The production of the picture is done by first taking from a negative in the ordinary photographic manner as small a transparency as possible. The latter is then enlarged, and thus a picture is produced that consists of a great number of small dots, and which, when transferred by etching upon a zinc or other plate, is suitable for giving off a print in relief. In the preparation of pictures suitable for this purpose it is necessary that the collodion which is employed for the preparation of the transparency should be as thin as possible and but slightly iodised, as that affects the size and the distance between the dots which compose the picture. By using a stronger or weaker developer it is in one's power to give the plate a finer or coarser grain. The following proportions are suitable for the production of the small transparency:—Alcohol, 30 grammes; ether, 30 grammes; guncotton, 0·8 gramme; iodide of ammonium, 0·8 gramme. To develope the picture a fluid of the following composition is most suitable:—Water, 480 grammes; ferrous sulphate, 30 grammes; acetic acid, 60 grammes; alcohol, 30 grammes. By using a stronger solution a coarser, and by using a weaker solution a finer, grain is obtained; thus it can be made coarse or fine at pleasure. Also the impression from the enlarged negative may be transferred to stone in any known way, and then the picture multiplied by lithography."

In the *Mittheilungen* Dr. Kayser gives an account of his unbreakable transparent substitutes for glass as a substratum for negatives, and of his substitute for the changing-box. These have already been referred to in our columns, though not fully described. The drawbacks accompanying the use of gelatine dry plates for landscape photography are—1, their weight; 2, the amount of space they occupy; 3, their fragility; and, 4, the danger of their being spoilt by damp. The most usual substitute for glass is a paper support, which is rendered transparent either before or after the production of the picture. Dr. Kayser has adopted as his support a mixture of collodion and gelatine, which, he says, fulfils all the requirements of transparency, firmness, and unbreakableness, and is very easily made. The plates can be made of any desired thickness, from one millimetre to a-quarter of a millimetre, and of any desired size. Although, generally speaking, they are unsuitable for very large sizes—say not much above twenty by thirty centimetres—yet he has produced films thirty centimetres wide by two metres long. The picture may be taken upon the film in two ways:—The film may either be placed on rollers in a dark slide, as Mr. Warnerke does; or it may be cut to the size of a plate, and during the exposure be pressed back against a glass plate in the dark slide. Dr. Kayser has chosen the latter mode, and finds that when properly focussed the pictures are quite sharp, although the sensitive film is behind a sheet of glass. In order to be able to change these substitute plates easily, when on a journey, Dr. Kayser has constructed a particular dark slide with sleeves (which he has also patented), so that the changing of the plate takes place in the dark slide itself. For use in this dark slide each film is loosely fixed with wafers into a piece of black cardboard, by which the necessary stiffness is imparted to the film, and, at the same time, the light is prevented from penetrating to the films behind that which is being exposed. The manner of working is that, after each exposure, the operator inserts his hand into the light-tight sleeve, and, drawing the exposed plate and its accompanying piece of card out into the sleeve, places it in the dark slide again behind all the other films. A dark slide of this sort some six centimetres in thickness is said to hold easily fifty films loosely mounted upon the pieces of black cardboard, and with films of eighteen by twenty-four centimetres the whole hardly weighs two kilogrammes—say in round numbers less than four pounds. The manner in which these films fulfil the requirements already enumerated Dr. Kayser gives as follows:—1. *Lightness.*—Each 18 : 24 c.m. plate on cardboard weighs fifteen to twenty grammes. 2. *Space.*—Fifty films without cardboard form a thickness of about a centimetre and a-half; with cardboard backing three centimetres. 3. *Liability to Break* is completely done away with. 4. *Greater Keeping Qualities.*—On long

* *Bulletin de l'Association Belge de Photographie* vol 1., p. 119.

journeys, where hundreds of plates have been carried, each set of fifty or one hundred plates may be soldered into a thin tin case, and are thus perfectly protected from the influence of moisture, air, and dust. It is also a real advantage in the photographic printing process that, owing to their thinness, the plates may be printed from either side.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 10,226.—"Apparatus for Dissolving and Changing Pictures in the Magic Lantern." B. J. Edwards, The Grove, Hackney.—*Dated July* 16, 1884 (complete).

No. 10,567.—"Circular Drop Shutter for Taking Instantaneous Photographs." F. W. Monsell, Eglantine, Leeson Park, Dublin.—*Dated July* 25, 1884.

No. 10,680.—"Gelatine Plates for Use in Photography, Manufacturing and Using the Same." A. J. Boult; communicated by G. Eastman and W. H. Walker, gentlemen, both of Rochester, Munroe, New York.—*Dated July* 28, 1884.

Production of Photographic Negatives for Photolithography, Photozincography, &c. By Alexander Borland.

(This invention received provisional protection only.)

My invention has for its object the production of photographic negatives having suitable transparent lines, dots, or stipple, so that such negatives may be used in the processes of photography, photozincography, photo-engraving, photo-etching, or phototype productions, such negatives being either portraits, views of buildings, machinery, or landscapes or other objects.

Hitherto the means employed in making such negatives has been to take a paper photograph and stipple the same by hand, or by impressing the same with any rough substance, such as sand-paper, glass-cloth, or muslin made hard by steeping in glue, or by fine wire gauze, and, after being so impressed, filling the indentations with some kind of soft and dark pigment and then making a negative of the same.

In my process I obtain a like result by placing a screen of wire or hair gauze, or perforated metal, or paper, or other substance having suitable perforations, or by means of a screen of muslin, net, or crape, or other suitable fabric, in front of the sensitive plate inside the camera, and then exposing to the object to be photographed in the usual way.

The screen may be placed as nearly as possible in close contact with the sensitive plate, or at a distance therefrom if a modified result is desired.

Where a reverse of any of the above kinds of grain or texture is required I expose a sensitive plate with the wire or other screen to a uniform white surface, the pattern negative so produced being used instead of the wire or other screen; or a pattern negative may be made by photographing a grain or pattern that has been drawn on white paper.

The wire or other screen or pattern negative may and can be used either in the process of photographing paper prints or in photographing the objects themselves, as before stated.

Our Editorial Table.

Messinesi's Changing-Box.

We have been shown an ingenious improvement or extension of the principle of the well-known automatic changing-box introduced some years ago by Mr. George Hare, the novelty consisting in the use of inner boxes, by means of which relays of fresh plates can be introduced when the first dozen have been exposed. In outward appearance the changing-box is precisely similar to the ordinary Hare's changing-box; but this shell is unprovided with grooves, the interior being perfectly plain. The plate-box proper, which contains the grooves, slides accurately into the outer casing, and when in position the simple withdrawal of a flexible shutter similar in character to that in connection with the sliding jaws of the outer box, opens the communication with the dark slide. After exposure of the plates this shutter is re-closed and the films are perfectly protected from light. There is, further, an ingenious arrangement by which plates of smaller sizes can be used in the same slide.

As a matter of course, the dimensions of the box are larger in proportion to the size of plate than is the case under ordinary circumstances; but the difference is not great, a box for half-plates being about the size of the ordinary $7\frac{1}{2} \times 5$ apparatus.

We believe the instrument is not yet fully ready for the market. When it is we recommend an inspection of the arrangement, which, by means of one or more comparatively inexpensive inner boxes, renders the travelling photographer totally independent of a dark room.

Redding's Improved Pocket Ruby Lantern.

London: J. Robinson and Sons, 172, Regent-street.

This is an exceedingly convenient and portable lantern for travelling purposes, folding flat and fitting into a sliding case, which may be comfortably carried in the coat pocket. The body of the lantern is composed of coloured fabric, which renders it at once light and unbreakable. The top and bottom are of japanned tin, each being provided with a "cut off" which, while permitting the free ingress of air and egress of the products of combustion, effectually prevent the escape of actinic light. The source of illumination may be any ordinary night light; but a special light, made in tin boxes, is recommended by the manufacturers as possessing certain advantages over other forms.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
August 5	Sheffield	Freemasons' Hall, Surrey-street.
" 5	Halifax	*Courier* Office, Regent-street.
" 5	Bolton Club	The Studio, Chancery-lane.
" 5	Glossop Dale	Glossop Coffee Palace, High-street.
" 6	Benevolent	181, Aldersgate-street.
" 6	North Staffordshire	Town Hall, Hanley.
" 6	Photographic Club	Anderton's Hotel, Fleet-street.
" 7	London and Provincial	Masons' Hall, Basinghall-street.
" 7	Bolton	The Baths.
" 7	Leeds	Philosophical Hall.
" 7	Coventry	Coventry Dispensary.
" 7	Yorkshire College	College, Cookridge-street, Leeds.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society, held on the 24th ult., the chair was occupied by Mr. J. H. Hare.

Mr. A. Cowan showed a cutter for making circles such as those in diaphragms, when these were made of card or ebonite. The cutter was made from a pair of steel compasses, the legs of which had been forged into bow-like form, and one finished with a point for centering, the other with a cutting point.

Mr. H. S. Starnes exhibited a camera for operating with small-sized plates, without carrying separate dark slides or changing-box. The bottom of the camera contained two wells—one for plates before, and the other for plates after, exposure. At the back was an opening through which the focussing-screen could be examined, and a sleeve of black cloth allowed the hand to enter and place the plate in position.

Mr. J. B. B. Wellington showed a plate from a portion of which green fog had been removed with a weak solution of ferridcyanide and hypo., similar to Mr. Farmer's reducer, but much weaker. The amount of ferridcyanide found sufficient for the purpose was four grains in ten ounces of hypo. solution, and when employed at this strength no perceptible reduction of the intensity of the negative had taken place during the time necessary to get rid of the green fog.

Mr. W. Cobb thought that green fog was an improvement to any negative, and that it was a pity to remove it. He (Mr. Cobb) then mentioned having recently had an experience of fogging with a dark slide having a revolving shutter. He had satisfied himself that this fogging was not due to light, but to some emanation from the leather of the revolving door. He had remedied it by coating the leather with a solution of thymol in alcohol, and exposing it for some days to the air.

Mr. Cowan said that there had lately been some correspondence on the subject; and as recently as the preceding evening, he had seen plates upon which insensitive marks had appeared where they had been nearly in contact with American cloth.

The Chairman remarked that it was a matter of great importance to camera makers, who now generally used leather for the hinges of dark slides.

Mr. W. Coles inquired whether the leather referred to by Mr. Cobb was black.

Mr. Cobb replied that it was.

Mr. Cowan said that black mixed with an oil medium would cause fogging, but not when used with a spirit medium.

Mr. Coles said that asphalte black had sufficed to produce complete fogging.

Mr. J. Barker mentioned a curious experience that he had had recently. A plate had been developed in the evening, but, as after a quarter of an hour no image appeared, it was stood up on a shelf as useless. In the morning, however, the image was found to have become developed.

Mr. J. J. Briginshaw had met with a similar occurrence.

Mr. Ashman showed some prints upon opal coated with citro-chloride of silver, and gave the following formula, differing slightly from one previously given:—

A.

Nelson's No. 1 gelatine	60 grains.
Water	$1\frac{1}{2}$ ounce.

B.

Chloride of sodium	40 grains.
Citrate of potash	40 "
Water	1 ounce.

C.

Nitrate of silver	150 grains.
Water	1 ounce.

B is added to A and the temperature raised to 150° Fahr. C, also at a heat of 150°, is then slowly added. Boil for ten minutes, allow to cool down to 150°, then add 100 grains of Heinrich's gelatine previously soaked in two ounces of water, and stir till dissolved. After setting and washing add one ounce of alcohol in which one grain of salicylic acid had been dissolved.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

On Saturday last, the 26th ultimo, the annual outdoor meeting of the above Society took place at Hampstead Heath. Owing to the unpropitious state of the weather throughout the day cameras, on this occasion, were "conspicuous by their absence." The weather, no doubt, also prevented a much larger gathering, as long before the hour of meeting it had settled down to a steady downpour of rain, compelling those who came early in the afternoon on purpose to enjoy the beauties of the Heath to seek shelter at the rendezvous—the Bull and Bush Hotel.

Here a substantial tea had been provided. The chair was occupied by Mr. William Ackland, the vice-chair being filled by Mr. William Brooks; about a dozen members were present. After tea the remainder of the evening was pleasantly spent under the influence of the fragrant weed, when some capital jokes were cracked and many amusing anecdotes related.

MANCHESTER PHOTOGRAPHIC SOCIETY.

The sixth outdoor meeting of the above Society took place on Saturday, the 26th ultimo, Speke Hall and its vicinity having been fixed upon as the rendezvous for the day. The party was timed to leave London-road Station at 10.20 a.m., arriving at Speke at 12.45.

Considering that special arrangements had been made, and permission obtained to visit Speke Hall as well as the park and grounds of Hale Hall, it was surprising how few members had given in their names to the leader prior to the date of the excursion. Had the weather been fine it would no doubt have proved one of the most attractive meetings of the present season; but, notwithstanding the adverse conditions, the few members who took part in it had no reason to regret it, but felt themselves well repaid for the temporary inconvenience which they encountered.

Speke Hall is one of the most beautiful and perfect specimens of the domestic style of architecture peculiar to the Elizabethan period. The present building occupies the site of a much older foundation, and was the work of one Edward Norreys, who commemorates the fact by an inscription over the principal gateway:—"This worke, 25 yards long, was wolly built by Edw. N. Esq., anno 1598." A broad moat once surrounded the house, but this has long been superseded by well-kept greensward, out of which, except where crossed by the bridge, the Hall seems to rise like a rock out of the sea. The situation is charming, and the surroundings are highly picturesque.

From one side a noble avenue of tree leads down to the estuary of the Mersey, which is here at its broadest; and its proximity doubtless contributes to the luxuriant growth of the trees and shrubs, which would otherwise suffer from their vicinity to Widnes and kindred places, the emanations from which are so inimical to the surrounding vegetation.

A remarkable feature presents itself in the construction of the Hall, consisting of an interior court in which two fine old yew trees grow, much older than the building itself, and it is evident that the architect in the arrangement of his ground plan has been guided by the wish to preserve these trees. Unfortunately it was too cloudy for the members to attempt much in this part of the building; but the external faces of the Hall offered plenty of scope, and many were the points of view from which the members could obtain excellent results, of which they were by no means slow in availing themselves. Had the weather been brighter some excellent studies of foliage would have been secured.

To Miss Watt, the present owner of the mansion, the members were indebted for the privilege of access to the Hall and grounds. The rest of the programme was unavoidably curtailed by the weather, which compelled the party, after a fruitless attempt to reach Hale, to hasten back to Speke station for the return journey.

A wish was unanimously expressed that this visit should be repeated under more favourable conditions at some future day, coupled with the hope that the members of the Society generally would avail themselves more freely of opportunities of this kind to visit places which are interesting in so many ways, and to which access can be gained only by special permission.

BERLIN ASSOCIATION FOR THE CULTIVATION OF PHOTOGRAPHY.

This Society met on the 20th June, Professor H. W. Vogel in the chair.

The Chairman presented the guest of the evening, Mr. Kilburn, of Littleton (New Hampshire), who had at different times sent interesting collections of stereographs to the Society. Mr. Kilburn is at present engaged in taking stereoscopic views of Europe and particularly of Germany, which command a ready sale in America amongst the Germans who have settled there. In the course of the week he had been in Berlin, and had already exposed 200 plates. He (the Chairman) then laid upon the table Dr. Schnaus's *Photographic Lexicon* and Dr. Eder's *Instantaneous Photography*, presented by the authors. The circular of the Photographic Society of Ireland, inviting exhibits, was then read.

Herr Rudolf, of Darmstadt, said a case had been brought against him in the law courts for imitating a work of art, in so far that he photographed a monument in a churchyard and sold copies of it. He contended that a churchyard was a public place, and he had a right to photograph it and all the monuments it contained. The complainant contended that it was an infringement of his copyright, and that a churchyard was not a public place. The court decided in his (Herr Rudolf's) favour.

Dr. Ehrmann, of New York, wrote to say that Notman, of Boston, and not Falk, of New York, had taken the first group upon the stage of a theatre by electric light, when, in 1881, in Sander's Theatre, Boston, he photographed several groups in the representation of the tragedy of Œdipus the tyrant, by a Brush light of 6,000 candle power, with a Dallmeyer's A 3 portrait lens, a No. 3 stop, and an exposure of twenty seconds.

A very interesting letter was next read from Herr Schoene, of San Francisco, in which he described another way of photographing in a theatre by electric light. Herr Schoene sent a number of instantaneous views, mostly marine pieces.

Dr. Kayser showed a number of landscapes taken at San Remo with his sleeved changing-box. This time he did not use films, but glass plates, and changed them while the sun was shining brightly upon the apparatus; yet there was no trace of fog on the plates. The glass plates were packed flat upon each other, and only separated by a sheet of black paper. Both negatives and proofs were unretouched.

Mr. Kilburn exhibited a very simple plate-box for dry plates. It simply consists of a box the length and breadth of the plates to be packed. Inside, across the bottom, two long white cords are laid so that the greater part of their length lies outside the box. The plates are laid down one by one, and the cords passed across the end of each one before the next one is laid down, and so on until the box is full.

The Chairman showed some new samples of his sensitive-to-colour process, namely—1. A colour scale photographed upon eosine-collodion, eosine-gelatine emulsion, and azaline-gelatine emulsion, from which it appeared that eosine worked better in collodion than in gelatine emulsion, while the azaline-gelatine emulsion did better than either. The second exhibit was two reproductions, thirty c.m., of Herr Menzel's newest and celebrated picture of the *Market Place at Verona*—one taken with an ordinary gelatine plate, the other on azaline-gelatine. In the former plate the white lights were light and unmodulated and the shadows pitchy black and without detail. Some parts of the picture did not come out at all, but formed broad, flat surfaces; other parts, such as the blue of the sky and the distance, appeared much over-exposed. In the photograph upon the plate stained with azaline the lights had the proper tone and were full of gradations, while the shadows were also properly graduated and full of detail. The place of the black spots in the first was taken in the second by well-exposed heads; the sharpness and purity left nothing to be desired.

The meeting was concluded with a description, by the Chairman, of the part of the new building of the Technical High School at Charlottenburg devoted to photography.

Correspondence.

THE ETHOXO LIGHT AND GAS EXPLOSIONS.

To the Editors.

Gentlemen,—In a letter, in your issue of the 25th inst., from Mr. Ives, of Philadelphia, the writer seems to insinuate that it has been said that the ethoxo light was *popular* in the United States at the time he took out the patent in that country for it. Your remarks (and it is to these that I think Mr. Ives refers) were, as far as memory serves me, to the effect that shortly after my publication in The British Journal of Photography of the generation of ethoxo gas a patent was taken out in the United States for a similar purpose.

I grant that he may not have seen or heard of it before he took out his specification, but still it always looks suspicious when a patent is taken out directly after the process has been made public in another country. If his discovery of the use of ether antedates the year 1879, and can prove it, then I willingly give him the credit of priority of invention. I worked it in public in the autumn of that year, and have continued to use it without a single failure ever since.

That Mr. Ives's generator is not altogether free from liability to explode is apparent from the directions given (if this should occur) in the catalogue published by the manufacturers of the apparatus; and this has occurred in more cases than one, if I am rightly informed.

My first apparatus was made on the saturator principle, but not with caps on the end to blow off, as I prevented this by a better plan, namely, the pumice chamber, and with which the Rev. T. F. Hardwich has recently made exhaustive trials, proving its undoubted efficiency to arrest flame.

Whilst upon the subject of lime light I may say that, in my opinion, cylinders will eventually supersede gas bags, particularly when we have them under a less pressure of gas with automatic gas regulators to regulate the flow and pressure. This, I believe, has been accomplished and will ere long be a marketable commodity. Whether we shall be able to purchase oxygen by the pound remains to be seen. Recent experiments seem to prove it possible; but the probabilities as to cost at present are against it.—I am, yours, &c., W. Broughton.

Eccles, Manchester, July 26, 1884.

"FREE LANCE" AND THE CILIARY MUSCLES.

To the Editors.

Gentlemen,—I think my meaning as to the contraction of the pupil of the eye by the ciliary muscles was quite clear. As far as I can see, the only word "Free Lance" could take exception to was the word "muscles." Strictly speaking there are no ciliary muscles at all, but there *is* a ciliary *ligament*. Strictly speaking the words I ought to have used should have been "ciliary *processes*." I chose to use the words "ciliary muscles" to make my meaning clear to persons who might not be so well up in the definitions of anatomical science as is "Free Lance."

In Erasmus Wilson's *Anatomists' Vade Mecum* will be found the following passage:—"The iris is composed of two layers—an anterior or *muscular*, consisting of *radiating* fibres which converge from the circumference towards the centre, having the power of dilating the pupil; and a *circular*, which surround the pupil like a sphincter, and by their action produce contraction of the area." Now this layer is connected by its periphery with the ciliary *ligament;* and, being muscular in its character, I took the liberty of naming it—being the apparatus for opening or contracting the pupil of the eye—the "ciliary muscles."

With all respect for "Free Lance," I venture to differ from him as to the rapidity of the action of these muscular fibres. Anyone who has seen a cat basking in the sunlight, and lazily blinking her eyes, will have noticed how comparatively slowly the pupil is contracted to a mere slit when the eye is opened. Again: if, standing before a window with a mirror in your hand, you alternately throw light and shadow into your eyes, the contraction and expansion of the pupils can be readily seen. These facts lead me to believe that the muscles of the ciliary processes do not act with great rapidity, but rather the contrary.—I am, yours, &c.,

July 28, 1884. J. R. Sawyer.

THE SOCIETIES' REPORTS.

To the Editors.

Gentlemen,—Mr. Herbert B. Berkeley, in your last issue, professes to "dispose of the word 'misrepresentation'" with which he had taxed me and other writers, yourselves included. He goes on to ask—"If a man writes that which is not the case does he not '*misrepresent*'—not wilfully it may be?" Of course the answer is obvious, that he does; but, to give relevancy to the question, he should have supplied some instance of my writing "that which is not the case," and this he has omitted to do.

Mr. Berkeley further put it that I have no right to object to being accused of misrepresentation, because I had stated that I had been misrepresented in certain reports in the Society's *Journal*, and says that I am thus "hoist with my own petard." What has this to do with it? I have given instances, and am prepared to furnish any further details, if required, fully bearing out my complaint. Mr. Berkeley, when called upon to point out any misrepresentation on my part, omits to do so, for the simple reason, as I am now entitled to submit, that none exist in what I have written.

Mr. Berkeley says that I am incorrigible—"even more incorrigible than Mr. Pringle." I will not in turn descend to personalities and the use of epithets, but will leave the reader to supply the one appropriate to the conduct of a writer who brings a charge of misrepresentation, and, when challenged to point out wherein it consists or withdraw the charge, does neither.—I am, yours, &c., W. E. Debenham.

July 28, 1884.

A CURIOUS PHENOMENON.

To the Editors.

Gentlemen,—A few nights ago I was developing a negative when the light in the dark room was very dull. After I had developed and alumed the plate I noticed that the developing tray I had been using was strongly luminous. On closer examination it was found that some developer still remained in the tray, and the addition of a few drops of the alum bath had caused the phosphorescence.

Being rather struck by the circumstances, I tried the effect of adding a strong solution of citric acid and alum to some of the used developer, and found the phosphorescence much more strongly marked.—I am, yours, &c.,

Salisbury, July 25, 1884. Nemo.

P.S.—The developer mentioned above was the ordinary pyro. without sulphite (Wratten's formula), and the alum bath contained a little citric acid.—N.

THE PHOTOGRAPHIC SOCIETY: ITS REPORTS AND THE PHOTOGRAPHIC PRESS.

To the Editors.

Gentlemen,—I do not intend to enter into the discussion between Mr. H. B. Berkeley and your other correspondents, but to make a suggestion that, I think, will remove several of the evils which he points out; and that is, let the Photographic Society of Great Britain appoint someone to report *what is actually said* by the various speakers, and his reports be sent to the photographic journals. Then let the editors, or someone whom they appoint (who has not taken part in the discussion), condense the report for publication; and the committee of the Parent Society might appoint someone to condense the report for their journal.

If the person who reports the various meetings but seldom takes part in the discussions, he has time to condense the arguments of the various speakers as the meeting goes on, and the report is perhaps as satisfactory as one can be. But if he be one of the principal speakers he is unable to put down what he *says* himself, and, when others are speaking, his thoughts are probably so centered on what he is going to say in reply that he is often unable to catch the whole force of their argument, and his report is, in consequence (I do not mean to say for one moment wilfully), not quite satisfactory to the other speakers or to the readers of the journals.

I am convinced that the gentlemen who report the meetings for the journals are far too high-minded to wilfully misreport anyone; all I contend is that it is impossible for anyone to correctly report a meeting in which he is one of the principal speakers. He is not doing justice to either himself or his report, because if he give the whole of his attention to reporting what is said he cannot think how to arrange his arguments in reply, and both himself and his hearers suffer in consequence—they because they lose the benefit of his knowledge, as he has not had time to think of the whole of the points bearing on the subject.—I am, yours, &c., An On-Looker.

July 29, 1884.

Notes and Queries.

Novice says:—"Will some kind reader inform me the remedy for the following:—After I have sensitised my albumen paper I find that all the gloss is gone and my prints are spoilt. My silver bath is sixty-five grains to the ounce of water, and I have only added a few drops of a saturated solution of carbonate of soda to neutralise any free acid."

Rev. P. B. says:—"I am about to take a photographic trip in North Wales. Can you offer any suggestion concerning apparatus?"——In reply: Seeing that there are so many attractive waterfalls and ravines in Wales, it will be well for our correspondent to have his camera and stand so adapted to each other as to enable him to place the plate in either a vertical or horizontal position. The camera stand, too, should be rather taller than is frequently the case.

G. A. writes:—"If I register a retouching desk which I manufacture can I take proceedings against anyone who copies my design? If so, please let me know the cost of registering."——We reply: A retouching desk is what is designated in patent phraseology "a configuration of parts," and is not a subject for registration, but for patenting. No registration that could be effected would prove of any utility in preventing imitation. The obvious course open to our correspondent is to patent his invention, and he must take this step previous to issuing any specimens of his invention by way of sale or otherwise.

"Is there any work or article published on the subject of microphotography as applied to the transmission of messages in pellicular form by the agency of carrier pigeons?—J. B. H."——In reply: One pamphlet, at least, was devoted to this subject soon after the close of the Franco-German War; but we cannot at present give particulars of its publication beyond this—that the name of M. Dagron was connected with it. It is probable that in a chapter in Tissandier's *History and Handbook of Photography* (published by Sampson Low and Co.), on "Microscopic Researches During the Siege of Paris," all the information required will be found.

In reply to "Amateur," who wishes to know why a sample of varnish made with methylated alcohol dissolves the collodion film from his negatives, whereas one prepared with the same ingredients (sandarac and seed lac) dissolved in common non-methylated spirits of wine has not the same effect, we would remark that, first of all, it is possible that in the former varnish the methylated alcohol may be much stronger than the other, and the stronger the alcohol the more likely is it to dissolve the collodion film. But, secondly, as methylic alcohol (wood naphtha) is in itself a solvent of pyroxyline, and as methylated spirits of wine contains a certain proportion of this naphtha, it is not difficult to account for the solvent action of one class of varnish as contrasted with the other.

Argol says:—"Will you kindly inform me as to the following:—If you wanted to copy a silver print which would you prefer—to make the negative with a gelatine plate or with collodion? If with collodion, is there a collodion manufactured especially for copying, or would ordinary negative portrait collodion do? Of course I wish to get all the fine gradations that the best gelatine negative will give, and the best results in every respect. Also, would you tone the print from which such negative is made with the acetate bath, or tone it black with the lime bath?"——In reply: If the special brand of plates with which we happened to be working at the time gave results of an unexceptionable character we would make use of one of them for the purpose mentioned; but, if these were in any way defective, then we would employ ordinary good negative collodion, such as that adapted for portraiture. We should not be at all particular how the print was toned, provided the details were well made out.

F. S. (Somerset House) wishes to know if there are ready and inexpensive means by which an intense degree of cold can be produced.——We reply: Not knowing what is meant in this query by an "*intense* degree of cold," a reply of a somewhat indefinite character must be given. For example: if our correspondent desires to cool a fluid or anything else down to the freezing-point of water, crushed ice will effect the desired end. If, however, to crushed ice common salt be added in the proportion of one part to two parts of the ice, and both be well mixed together, a degree of cold will then be produced exceeding by 35° Fahr. that obtained by the ice alone, or a few degrees below zero. But a still further descent of twenty degrees below the cold produced by the ice and salt may be secured by mixing nitrate of ammonia with the chloride of sodium, which is to be stirred up among the particles of crushed ice. The proportions suitable may be stated as five parts each of the sodium and ammonium salts with twelve parts of the ice.

"I have heard of the reproduction of negatives by a single operation, by which I mean that the first impression obtained is not a positive or transparency, but a negative. Is there any reality in this? and, if there be, will you afford a clue as to how it is done? It will greatly oblige,—Abies."——We reply: There are two methods by which a negative may be reproduced by a single operation. One of these is as follows:—Direct the lens of a camera containing a bromised collodion plate to the negative to be reproduced, and develope the image thus impressed by alkaline pyro. This ought to give a strong positive. Now, without fixing, apply diluted nitric acid (equal parts of acid and water) to the surface, by means of which the image will be removed, leaving the unaltered bromide still in the film. Wash, expose to light for a few seconds, and re-apply the alkaline developer, by which the bromide will be reduced, the result this time being a negative. A second method consists in an application of the dusting-on process, several formulæ for which are given in our Almanac.

AMERICUS inquires—"What are the names of American photographic newspapers, and rates of advertising for (say) twenty words?"——In reply: No list of American photographic journals has been published; hence we cannot reply to the querist. Let him communicate with the publisher of this Journal, stating precisely what he wishes.

Exchange Column.

No charge is made for inserting these announcements; but in no case do we insert any article merely OFFERED FOR SALE, *that being done at a small cost in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a* NOM DE PLUME *be thought desirable), otherwise the notice will not appear.*

I will exchange some new 12 × 10 and 15 × 12 plate carriers, in case, for some good photographs of English actresses.—Address, L. W. GREEN, 25, Marsland-road, Walworth, London.

Wanted to exchange a whole-plate Lerebours and Secretan lens, in good condition, for a quick-acting *carte* lens by any good maker.—Address, F. WHEELER, 18, Commercial-road, Hereford.

I will exchange a gem camera, twelve lenses, one quarter-plate lens, and a cabinet burnisher, all or any, for an 8 × 5 rectilinear.—Address, H. R. C. NAISMITH, photographer, 345, New City-road, Glasgow.

I will exchange Ross's No. 2A extra-rapid *carte* lens for Dallmeyer's No. 2B or offers. Also, camera, by Fallowfield, for two cards on $7\frac{1}{4} \times 4\frac{1}{2}$ plate; offers in accessories.—Address, C. ROWBOTHAM, Burton, Westmoreland.

I will exchange a Dallmeyer's No. 2B patent and a Ross's whole-plate universal lens, both perfect, for a Dallmeyer's No. 2A or Ross's No. 3 cabinet lens; mutual approval.—Address, W. DAKIN, Holly Bank, Nether Edge, Sheffield.

I will exchange a biunial lantern, dissolving tap, bag, boards, about 150 slides, &c., everything complete, light waggon to carry the above. What offers in good view apparatus to value of £20? Also a first-class cabinet lens, gem camera, lens, &c.—Address, 283, ABBEYDALE-ROAD, Sheffield.

I will exchange a gem camera, four lenses, repeating-back, good as new, 10 ounces each of silver bath and collodion, bottle of varnish, quantity of ferrotype plates, envelopes and preservers, also student's microscope, for backgrounds (exterior) or anything useful in photography.—Address, J. BOWLER, Jun., Oxford-street, Oakengates, Salop.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPHS REGISTERED.—

William Pankhurst Marsh, Norfolk Cottage, Bognor.—*Photographs of Fish Lane and Sands, Aldwick, near Bognor,* also *Bersted Church.*

William Rochard, Sea View Terrace, Bagillt, North Wales.—*Photograph of Interior of St. Winifred's Church.*

John George Gibson, The "Priory," Higher Grade School, Tynemouth. —*Photograph of Boat, "A Centenarian."*

Thomas Ball, 7, Clarendon-place, Kidderminster.—*Photograph of Old Locomotive Built in 1827.*

NOTICE.—*Each Correspondent is required to enclose his name and address, although not necessarily for publication. Communications may, when thought desirable, appear under a* NOM DE PLUME *as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.*

NOTICE TO SECRETARIES OF SOCIETIES.—It is earnestly requested that when proofs of reports and papers read at the meetings of societies are forwarded to the Secretary they may be returned at once to our printing office, 43, Harrington Street, Liverpool, so that any corrections may be made before the report or paper is published. Last week but one we received at the moment of going to press a proof of a paper which had appeared in our previous issue, and which bore a very large number of corrections (many of them of a trivial character), all due to the copyist of the original MS.—not one to the printer. We are at all times anxious to do our best to secure correctness; but when the proofs are sent out and not returned we are bound to assume that the original MS.—especially when plainly written as in this case—is accepted as accurate.

RECEIVED.—Herbert S. Starnes; W. H. Harrison. In our next.

W. A. WEBSTER (Waltham, U.S.A.).—No further details were given than those published in the Journal.

STEEL ENGRAVING.—See an article on the subject by Mr. Wm. Brooks on page 244 of our volume for 1882.

Z. A.—Make the bichromate solution still colder by the addition of a little ice. All will then go well, we have little doubt.

W. W.—Not so good as the old-fashioned method. You should bear in mind that novelty does not always ensure excellence.

AMATEUR OPTICIAN.—The stops, as you suggest, would be better between the lenses than in front. The alteration *is* certainly worth making.

LOTUS.—Certainly make the silver bath decidedly alkaline before exposing it to the light. It is much better to expose the solution in a flat dish than in a bottle, as then the ether and alcohol with which it is contaminated can better be evaporated.

N. SIMMONS.—Under the circumstances you were certainly justified in refusing a re-sitting; but whether you were wise in doing so is questionable from a business point of view. Bear in mind that giving offence to a sitter often entails loss of business.

S. B. J. (Ceylon).—If the sample of gelatine be a really good one there is no necessity, in practice, of clarifying it with white of egg for enamelling silver prints; but if you use an opaque kind, or some of the commoner qualities, a decided advantage will accrue by your so doing.

W. B. C.—Do not discard the bath used for sensitising albumen plates because it has "gone black." All you have to do is to shake it up with a little kaolin and filter, when it will be rendered as good as new. The solution being even somewhat strongly discoloured will not injure its working properties.

A. B.—As your studio is situated we can scarcely recommend you to glaze it with ground glass. The white muslin curtains, or blinds, will enable you to soften the light sufficiently during the short working period the sun is shining upon it. Except when the sun is shining on the studio ground glass might possibly prove a disadvantage.

A. C. YOUNGHUSBAND.—If the hyposulphite of soda show a decidedly acid reaction to test paper you should not employ it for fixing paper prints, as it certainly shows it is an inferior sample. True, you may neutralise the acid; but, on the whole, you had better discard it altogether, and so be on the safe side. Good and reliable hyposulphite of soda is surely cheap enough.

GIAGGIOLO.—The specks in the enclosed portion of film are not such as we judged them to be from your previous description. They appear to us to be the result of some foreign matter—probably insoluble lime salts in the emulsion. If you make your emulsion with *hard* water—especially if you employ any form of ammonia emulsification—this is likely to occur from precipitation of the lime by the ammonia.

S. DEWDNEY.—If the bath worked well before it was filtered and fogged badly afterwards it is a fair assumption that the filtering-paper was the cause of the injury. As two different solutions behave in the same way, we think the matter is conclusive. Ordinary blotting-paper, although it is usually a good filtering medium, cannot be relied upon for chemical purity. You had better procure some good filtering-paper from your photographic chemist.

GALLOWAY C. MORRIS (Philadelphia).—The method of locally reducing the density of gelatine negatives by abrasion is by no means new in this country; it was described three or four years back by Mr. Barber, of Sheffield, who recommended cuttle-fish powder. Pumice powder is also used for the purpose; indeed, any abrasive material will answer. We do not think any advantage will accrue from the employment of either rouge or emery over those other substances mentioned.

W. G. GARCIA.—The cause of the flatness—want of rotundity in your portrait—is that you have used by far too much front light, and the retouching you have so elaborately done has only made matters worse. The untouched negatives certainly have yielded the roundest prints. It is difficult, without knowing the kind of studio you work in, to give you advice. However, stop off all the direct front light you are now using, and illuminate the sitter from the side, softening the shadows, if necessary, with the aid of a reflector.

J. J. H.—1. If the defects are not caused by dust, and, as you say, are not connected with the subsequent treatment of the plate, they can only arise from the presence of some foreign matter in the emulsion. Your data are, however, insufficient to enable us even to make a guess at the precise cause. See reply to "Giaggiolo."—2. Read what we said a few weeks back on the subject of iodide in rapid emulsions.—3. Alum is the more convenient eliminator, while *eau de javelle* is the more theoretically perfect. The strength of the former is not very material.—4. If the substance be really chloride of calcium it should not behave in the manner you describe. Drying by the method you have adopted should "restore" it perfectly.—5. We fear you will find some difficulty in securing a reducer that will behave as you wish. *The* difficulty with all reducers is that the tendency is quite in the opposite direction.

PHOTOGRAPHIC CLUB.—At the forthcoming meeting of this Club, at Anderton's Hotel, Fleet-street, on Wednesday next, the 6th inst., the subject will be the adjourned discussion *On the Effect of Coloured Media on Silver Prints.* On Bank Holiday an outing has been arranged to Watford. Meeting at Watford Station at 10.47; train leaves Euston at 10.15. Afterwards at the Essex Arms.

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1266. Vol. XXXI.—AUGUST 8, 1884.

ALBUMEN IN GELATINE EMULSIONS.

Reverting to this subject, we commence with a few remarks on Mr. C. Beckett Lloyd's communication in our last issue. That gentleman, we think, is labouring under a slight misapprehension in imagining that the application of albumen to the surface of the film will have the same effect as mixing it with the emulsion. In the latter case there can be no doubt whatever as to the presence of albumen in every portion of the film; but in the former, we think, it is extremely doubtful whether it is present in any but the very smallest traces, except on the surface.

Albumen, it should be borne in mind, is a colloid substance, and will not, therefore, readily penetrate such a film as one of gelatine. With collodion the matter is altogether different, the spongy and porous character of the film permitting the albumen to penetrate easily—not, however, by diffusion, but by mechanically filling the pores and interstices. By such an application of albumen to a perfectly-washed sensitive collodion film we secure merely the mechanical advantages sought to be gained by its addition to gelatine emulsion.

Some of our earliest experiments with albumen were made by soaking the shredded emulsion, after the removal of the salts, in solutions of albumen of various degrees of concentration, but the results were not satisfactory. The slight effect produced was due, in all probability, to the small quantity of albumen left clinging to the shreds of "pellicle," and not to any absorption—the same, in fact, as in Mr. Beckett Lloyd's case. The fact that he found five minutes' immersion to produce a result where shorter time did not will not in the slightest degree affect this argument.

Albumen, like all viscous solutions, takes time to mix thoroughly with water; and if, therefore, applied to a *wet* gelatine plate a certain period must elapse before the surface water is completely replaced by albumen. If removed from the solution before that point is reached then the film carries away with it a proportionately more dilute coating of albumen. If the application be made to a *dry* film a similar result accrues in the end. The absorption of water by the gelatine film from the albumen solution produces a concentration of the latter, or, at least, of the layer in immediate contact with the plate; and the increase of viscosity thus brought about causes a larger quantity of albumen to remain adherent to the film. Naturally, the longer the gelatine is permitted to soak (up to a certain period) the further will this concentration be carried, and thus the cumulative effect of prolonged soaking can be accounted for.

As to the value of a mere surface application of albumen to a gelatine plate: we cannot see that any great advantage is obtainable that is not more readily secured by other means. In the case of collodion, as we have pointed out, the conditions are altogether different, the albumen there penetrating into the film and conferring special benefits which we imagine to be altogether absent in the case of a gelatine film. In the latter instance—supposing, as we do, that the layer of albumen is completely external to the surface of the film—it is merely dissolved off by the developer, and any alteration in the character or quality of the image is in all probability due solely to its presence in the developer, and might more easily be produced by adding albumen to the developer instead of applying it to the film.

Many of the older dry-plate workers will be familiar with what has been written in past years on the subject of modifying the alkaline developer by the addition of apparently neutral or inert substances, with the object of securing variations in the colour of the image. Mr. William Brooks was the first, we believe, to put the matter in practical form, by his recommendation to employ acetate of soda and similar salts as additions to the developer in order to obtain pleasing tones for transparencies. Later the same gentleman, and more recently again Dr. R. L. Maddox, have recommended albumen for the specific purpose of modifying and improving the character of the image. Sugar and a variety of other substances have been used; indeed, practically, any addition—organic or inorganic—which can be made to the developer without interfering with its action will produce some special modification in the character of the developed image.

These considerations lead us to the conclusion that Mr. Beckett Lloyd is under a misapprehension as to the value of his application of albumen—which, by the way, is infinitely more tedious and troublesome than the plan of mixing the substance with the emulsion as we suggested. That a difference—probably an improvement in the character of the image—may be the result we shall not for one moment contest; but such difference or improvement, we contend, could be as effectually and far more easily secured by simply adding the albumen to the developer. One advantage Mr. Lloyd's plan would have over the albumen developer would be in the protective action of the albumen film when plates have to be kept; but here again our own plan possesses the advantage that the whole film is impregnated with the protective medium—not merely covered by a thin varnish.

It is in this thorough impregnation of the film with albumen that its chief advantages of a physical or mechanical character rest, while its chemical advantages, if any, cannot at anyrate be less than in Mr. Lloyd's plan. For hardening the film, for preventing its frilling and blistering, for rendering it permeable to the developer, it is absolutely necessary that the albumen should pervade its whole thickness; and, if we turn to the alleged advantages of that substance as a "bromine-absolver," it is obvious that it must be in contact with each individual particle of silver bromide. If, on the other hand, the question be narrowed down to the action of albumen as an adjunct to development, its action when diffused throughout the mass can, at least, be no less uniform and no less complete than when applied to the surface, while far less trouble is involved. In fact, so far as concerns the attainment of any physical benefits that albumen may confer, we think the plan we have already described is the simplest and, so far as we can yet see, the best to adopt.

We had intended touching upon the other portion of the albumen question—namely, its chemica presence in the form of silver albumenate, in the emulsion—but our remarks have already run out to the limit of our space. Since we wrote last we have entered upon a series of experiments, which lead us to hope that the problem of the introduction of albumenate of silver into an emulsion is not an insoluble one; but for the present we are not in a position to lay anything definite before our readers.

GRAIN OR STIPPLE IN PHOTO-MECHANICAL PROCESSES.

Perhaps in no one branch of photography has so much ingenuity been displayed as in the production of an ink-holding grain, or stipple, in connection with the different photo-mechanical printing processes. It is well known, that in all photo-mechanical processes in half-tones, in fatty ink, it is necessary to break up the different tints of the negative into a grain or stipple, more or less fine as the case may be; and various indeed have been the devices for accomplishing this end. As early as 1852 Talbot, in one of his patents, claims the use of fine gauze or net for the purpose. Since then it is surprising the amount of ingenuity that has been expended in "ringing the changes" on this and analogous methods, and the number of patents which have been taken out at different times in connection with this object.

Grain, or stipple, may be described as of two classes—one produced by mechanical means, and the other chemically. Amongst the former may be classed the variety of methods of utilising gauze net, or similar plans. The method employed by Talbot, in his etching process, was that of dusting the picture over with a resinous powder; and that of Goupil of combining gritty matter with the tissues with which the relief is made. There is also the process of Waterhouse, in which the grain is obtained by dusting over with a gritty powder a wet carbon print. Amongst the chemical methods we have that of Pretsch, in which the grain is produced in the film of gelatine; the collotype, in which the gelatine film is, so to speak, puckered up—a kind of reticulation; also the method of Messrs. Sprague and Co., of which we have presented our readers so many fine examples during the last year or two. In this process a grain is produced, very similar to that of the collotype, except that it is larger—more resembling reticulation in a carbon print. It would occupy far too much space even to briefly notice the numerous modifications for producing grain in either class, our present object being to direct attention to a plan which, so far as we recollect of what has been done before, possesses a certain degree of novelty. Whether in practice it will prove of much value remains to be seen.

In *Foreign Notes and News*, in our last issue, we gave a translation from the *Correspondenz* of a patent for securing a grain in a negative. The patent, however, is, as patents frequently are, very vaguely worded; but, so far as we can gather, the method is based upon utilising the granularity of the silver forming the image for producing the printing grain. The process appears to be this:—From a negative a transparency is made "as small as possible." This is then enlarged and a picture obtained, which "consists of a great number of small dots." Then follows a formula for the collodion and developer to be used.

Now, it is tolerably well known, in the collodion process, that the developer employed to bring out the picture has a marked influence on the size of the particles of silver which form the image. If we use pyrogallic acid we have them very fine indeed, and by using gallic acid we can get them finer still; indeed, it is quite possible to produce the particles so fine that the image partakes more of the character of a stain or dye than an actual deposit. But if iron be employed to develope the picture, then we get the image much coarser; and the more iron and the less restraining acid there are in the developer the coarser will be the particles.

On this fact is based the method of Herren Benecke and Fischer. They propose to produce from the negative a very small transparency, the image of which is composed of large particles of silver. Then when this image is again enlarged the particles will become very apparent, and so they claim to produce a grained or stippled negative suitable for producing prints with a grained surface. We have no details as to the degree of reduction necessary to obtain a useful grain, except that the transparency must be made as small as possible. From this, and what we know of the character of the particles composing an iron-developed image or collodion, we assume that microscopic proportions are meant. Now, it appears to us that if the reduction be so very great—for it must be in order to get a decided grain in the enlarged negative—and the particles of silver composing the image are large, when the picture is amplified much of the fine detail of the photograph will necessarily be sacrificed, however sharply it may be focussed in the enlargement. The patentees mention only collodion, but it appears to us that a much better result might well be expected to accrue if the gelatine process be employed in preference—at least for making the small transparency.

It is well known that emulsion may be prepared to yield an image with almost any degree of coarseness. Now, if the plate upon which the transparency is made be prepared with an emulsion in which the particles of bromide are coarse, the same degree of reduction will not be required as in the case of collodion in order to obtain the same degree of granularity when it is enlarged. That is to say, a comparatively large gelatine transparency, when enlarged to a given size, will yield a negative with as coarse a stipple as will be obtained when a very small collodion one is used. Hence we may expect from the former to obtain a negative the details of which, while the stipple is as coarse, will be much finer. We all know that an iron-developed collodion image, in which the particles of silver are far from fine, may be enlarged a dozen diameters or more without their becoming apparent. Not so, however, with gelatine; for, if the emulsion be coarse—as it usually is with highly-sensitive plates—it is often impossible to enlarge the image four or five diameters without the particles becoming painfully conspicuous.

An objection may possibly be raised to the stipple obtained from gelatine plates, which is that the grain will not be so even and regular as with collodion. This may be so, but we imagine the advantage of being able to use a transparency of moderate instead of microscopical dimensions to enlarge from will more than compensate for this, by the greater sharpness and crispness which will be secured in the resulting picture.

THE ECONOMIC PRODUCTION OF COLD.

It is unnecessary here to dwell upon the advantages to photographers and others of being able to obtain a degree of cold in any fluid or solid substance rivalling that produced by the agency of ice. We are all aware that ice, whether produced naturally or artificially, is the frigorific agent with which photography must ever remain economically associated. So temperate, however, is our English climate that ice is here a luxury—not a necessity; and it is only in the larger towns or cities, and not always in those, that it can be procured by purchase. The opportunities for its being obtained by those residing at a distance from such centres are, consequently, extremely limited, and this will continue so until the manufacturers of ice-making machines realise the fact that in the production of those of a small, low-priced class, suitable for domestic use, lies a great and lucrative future.

In the "machinery in motion," or western, gallery of the Health Exhibition there is a stall, presided over by a young lady, who invites the attention of the visitor to certain small machines for the almost immediate manufacture of ices. To this attendant we, in the course of conversation, started the difficulty of blocks of ice being an initiatory and continuous factor in the production of the ices. This was not a necessity, she said, as the firm which she represented supplied a freezing crystal or powder which, when placed in the machine and mixed with water, answered a similar purpose to ice in lowering the temperature.

The readers of The British Journal of Photography are well aware that by the solution of certain crystalline bodies a considerable degree of cold is produced. Hyposulphite of soda, for example—which we cite as a salt with which all photographers are familiar—when dissolved in water reduces the temperature to a very material extent. To give point to what we say we have in an ordinary four-ounce graduate placed water a little below the temperature of the atmosphere, the thermometer at the time of making the experiment registering 69° Fahr. On being immersed in the water the thermometer fell two degrees, denoting a water temperature of 67° Fahr. Upon throwing in a handful of crushed hyposulphite of soda the thermometer rapidly sunk to 44° Fahr., at which it remained for some time, indicating a reduction of the heat to the extent of 23° Fahr. as the result of this simple action. Having removed the thermometer and washed the bulb we immersed it in a second graduate containing water as before, and found that the degree of temperature indicated on the stem was 67° Fahr., as in the previous instance. This fact noted, we next took up a small handful of crushed nitrate of ammonia, the reputation of which as a cold-producing agent is well known, and scarcely was it in until its potency was recognised and shown by the thermometer, the mercury having made a rapid descent until it reached 27° Fahr., or five degrees below the freezing point of water, representing a reduction of the temperature of the water to the extent of forty degrees.

Here, therefore, is a gain of a tangible character. If it be inquired at what cost it has been obtained, we reply "at no cost whatever," the first expenditure incurred in obtaining the salt being relegated to one side at present; for, upon decanting the solution of the ammonium nitrate into a metallic tray and exposing it to heat—that from the sun sufficing—the water evaporates, leaving the crystals hard and dry, and in readiness to be again dissolved and produce cold as before; and this may be repeated times without number. Here, therefore, by an initiatory expenditure of a small sum, we have always at hand an enduring means by which we can invariably ensure the production of a degree of cold below the freezing-point; and this without any cost of labour or appliances, if we except the means which we shall now describe, and which we have adopted on account of the ease and small cost of production, not being insensible to the fact that there may, although at present unknown to us, be other and better means for effecting the same end.

In a circular wooden vessel of any required dimensions is fixed a coil of tin gaspipe of large diameter, made in form like the worm of a still. In bending this in a sharp turn it will be apt to "kink," but this may be prevented by previously filling the tube with sand, after which it is capable of receiving even the sharpest bend. The sand is, of course, emptied out when this operation is terminated. The lower end of this worm is attached to a tap which passes through the vessel near the bottom. The upper end is soldered to the bottom of a small tank formed of zinc which is fixed in the upper part of the wooden vessel, yet in such a manner as not to prevent the nitrate of ammonia and water from being easily thrown or poured into the vessel. The capacity of the tank may be such as to contain any quantity of liquid required to be cooled, from a quart to a gallon or upwards.

Whatever the nature of the liquid be from which the heat is to be withdrawn it is poured into the tank, from which it immediately descends into and fills the worm. A charge of the freezing powder is now thrown in by means of a suitable scoop, after which sufficient water is added to more than cover the powdered nitrate. After being allowed to stand for a very brief period the liquid may be drawn off by the tap, when it will be found to be in a state of icy coldness. When the refrigerating solution has served its purpose it is drawn off from the vessel into a flat metallic tray by means of a second tap quite close to the bottom of the vessel, and, as we have stated, when the water has evaporated from the solution the crystals are ready for either being used again immediately or for storage in a wide-mouthed bottle for employment at some future period.

By adopting a non-conducting casing, on the principle of the Norwegian cooking-stove, any article or fluid which has been made cold in the manner described may be retained at or near the freezing-point for several days; and, if precaution be taken to have it surrounded by a non-conducting body—such as felt, cloth, lime, or a mixture composed of them all—the vessel in which the solution is made may consist advantageously of tin or thin zinc. It must, however, be encased in a wooden shell, the space between the two being packed with the non-conducting material described. A cover, rendered non-conductive by similar means, should also be procured; and to render the apparatus quite perfect the taps must be formed, not of metal, but of ebonite.

The logical reader will at once say—"If this apparatus prove such a perfect means for conserving cold or acting as a refrigerator, would it not answer equally well for a purpose directly the opposite, namely, for retaining heat in its interior?" Certainly it will; and by way of experiment we have warmed an emulsion to nearly the boiling-point and locked the vessel containing it in the refrigerator. At the end of twenty-four hours it was found to be still hot.

We are aware of several additions that may be made to the ammonium nitrate by which its efficacy may be promoted; but as with such additions its power for being used "over and over again" becomes impaired, we recommend its employment pure and simple. If a greater degree of cold be desired than that we mentioned as the result of the first experiment, it is easily secured by employing, as the solvent of the salt, water much colder than the temperature of which we have already spoken as having tried.

PHOTOGRAPHY AND PHYSIOLOGICAL OPTICS.

In the keen discussion—which, happily, has escaped mere disputation—that has been carried on for a considerable period by various writers, and a smaller number of experimenters, very little attention has been drawn to the individual peculiarities of the eye itself. That such peculiarities do exist is well understood by those who have made a study of such matters; but the extent to which variations from what might be termed the "normal eye" do occur is popularly less known than almost any important fact connected with the vital economy. These particular characteristics have an important bearing upon photography, and we now purpose to treat of them as briefly as is necessary in the limits of a short article.

Let us turn first to the important operation of focussing, which, it is a matter of common experience, some persons never do perform correctly. This, be it observed, is not necessarily through any want of skill, though many photographers are provokingly careless over it, as it may arise from a want of power in the eyes not thoroughly appreciated. Few persons will acknowledge the necessity for the use of spectacles when they really have long been in need of them, and they may be seen "tromboning" their newspapers in a painful manner all the while they are declaring their eyes are as good as ever. But it is difficult to "trombone" the focussing-glass, and, as they will not adopt any optical assistance, their focussing is, as a matter of course, imperfect. If it were more generally understood that very soon after adult years are reached almost all eyes gradually become less near-sighted—or, in other words, lose their power of accommodation for near objects, until the average closest distance at which objects can be seen clearly defined is increased by degrees from five inches to two feet or more—there would be less false shame on this point.

It is commonly observed how large a number of Americans wear glasses, and must, therefore, have inferior sight to that enjoyed by Englishmen; but such a conclusion is by no means necessarily correct. The chances are all the other way—that the Americans wear glasses when they can be benefited by them, while English people wait till their eyes are injured before adopting spectacles. With the head under the focussing-cloth the ground glass can rarely be seen comfortably beyond six or eight inches away: and we are bold enough to say that clear vision is by no means common at that distance. The photographer, in many cases, should either wear spectacles—eye-glasses if he like—or make use of a focussing-glass: there would be better focussing and greater comfort.

We may here note that it is by no means uncommon for the eyes in one individual to be of different foci. A well-known contributor to these pages can see objects quite clearly when brought within six inches of one eye, while with the other he cannot see clearly at a nearer point than eighteen inches: hence, when he desires to examine a negative, he only makes use of one eye—that with the shorter focus. Others, again, suffer from astigmatism—an exceedingly common peculiarity; in fact, few persons are entirely free from it. This is another fault which, when existing in a pronounced form, would interfere with the power of discriminating the good qualities of a lens rather than with that of correctly focussing. All of these defects, however, may be turned or counteracted by the use of suitable optical aids; and if our remarks should only cause one single photographer to cease straining his eyes and use glasses to help him we shall be well repaid.

In no case are they more needed than with the retoucher. Many are the instances where the eyes have prematurely broken down, and the cause attributed to the strain of retouching, when all such strain could have been removed by the use of spectacles. A strain is put upon the internal muscles of the eye when they are continuously employed in looking at near objects; and where, for the sake of obtaining a larger image, the face is brought near to the negative the strain is so great that the muscles relax and gradually lose their power of accommodating the eye for near objects. We assume our readers to be aware of the fact that the eye has to be focussed for near or distant objects just as has the landscape or portrait lens; but, unlike the latter, the ocular focussing is self-acting within its own limits. This focussing, as a valued contributor once suggested, would be awkward if it had to be performed by a rack-and-pinion placed across the nose, and it is done in a far more wonderful manner.

The lens itself, which lies within the eye, just at the back of the iris which forms the stop or diaphragm, the small black circle or centre termed the pupil being the aperture of this diaphragm, is self-acting, elastic, and, according to the requirements of the case, capable of becoming more or less convex, automatically. This is done by certain muscles which are only at rest during sleep or when distant objects are being viewed, and the nearer the object the greater the extent to which these muscles are brought into play. There is a point beyond which they cannot work, just as by the muscles of the limbs a certain weight can be lifted; though no strain whatever can enable them to lift any heavier weight. If a persistent attempt is made to push their action beyond that point they suffer, though when it is not too frequently or continuously approached, and the eye used for distances where it is not greatly exerted, no evil can result unless there are hidden defects calling for the physician's services.

We feel very strongly on this point, for we have seen so many cases where the eyes have been injured in an utterly needless manner. Some may object to our advice and say that the way to strengthen muscles is to exercise them; to which we reply that it is only true up to a certain point. Many young would-be athletes attempt to strengthen their muscles by wielding immense dumb bells or Indian clubs; but any professor of athletics can tell such experimenters that they would obtain greater power by practising for a longer time with lighter instruments, while many a physician can show the actual bodily injury done by such practising. So it is with the eye. Let it be used much and often, as indeed it is intended evidently to be, but let it not be strained. At retouching, and all other work requiring the eye to be brought near to the object, let spectacles be used, the gain will be as great in comfort of working as in avoiding an injurious strain.

We have dwelt so long upon this phase of the subject that we have not left ourselves space to treat of the interesting topic of colour-blindness, so closely connected with dark-room illumination. This we propose dealing with in our next issue.

The pass list and examiners' reports of the recent City and Guilds of London Technical Examinations have just been issued. Photography again plays a prominent part, and it is satisfactory to learn from Captain Abney's report that systematic teaching has brought about a great improvement in the standard of knowledge. In 1884 there were altogether sixty-one candidates as against fifty-four in 1883. Of these twenty-two passed for the first time, while a large number improved the positions gained in previous examinations. The great majority of the candidates in photography belong to London, where the special facilities offered by the Technical Institute and the Polytechnic form an encouragement to enter on the study of photography.

The presence of a plumber in the photographer's dark room or in his studio is always attended with a considerable amount of inconvenience, not to speak of the inevitable bill for workman and apprentice—charged at least half-a-day each for work which to the uninitiated would seem not more than could be comfortably accomplished by one man in a few minutes. Mr. Fletcher's laboratory taps, which one can apply himself by means of a short length of india-rubber, without calling in the aid of a workman, are most useful and should be more widely known. Still another convenience appears to be now in course of manufacture in America in the shape of paper tubes, which are made by passing bands of paper through melted asphalte, winding them on a roller, submitting them to pressure, cooling in water, and, finally, removing them from the roller and coating the interior with an impermeable substance. These tubes are absolutely watertight, very resisting, and much less costly than metal.

We hear, too, of another American invention which, if it approach in usefulness the promises made for it, ought to find a place in every photographer's studio. It is a "hand grenade fire extinguisher." Every photographer knows the risks supposed to underlie the use of photographic chemicals, as witness the heavy charges of the insurances companies; hence a portable and always available fire extinguisher would, if effectual, be of incalculable value. The "hand grenade" consists of a glass flask of somewhat ornamental appearance which contains a pint of the extinguishing fluid. This fluid (a chemical mixture) is of such a nature, it is stated, that on being distributed over a fire carbonic acid is generated, whereby the fire is rapidly extinguished. The contents are explained to be entirely harmless to flesh and fabric. A trial was lately made on a vacant piece of ground near Farringdon-road, and the results were highly successful. We shall, no doubt, hear more of this invention ere long.

We have often referred to the solubility of glass in water, and we may here give the results of some experiments of Herren U. Kreusler and O. Henzold on the subject. Finding the results of some experiments they were carrying on vitiated by some unknown error, they found the cause to be the solubility of the glass, and in investigating the matter thoroughly they found much variation in the solubility of different kinds of glass. It is easy to see how the results of a photographic experiment might be similarly affected, a solution supposed to be neutral giving decidedly alkaline reactions owing to the dissolved glass. They tried (1) readily-fusible Thuringian glass; (2) less fusible Thuringian glass; (3) combustion tubing of very refractory Bohemian glass; and (4) more readily-fusible Bohemian glass. Of these the first was far the most readily attacked by water, the third being the least attacked. The fourth was nearly as good as the third, while the second was much more readily acted upon. The alkaline reaction of glass, they state, may be readily seen by boiling red litmus solution in a test-tube, and by other such simple experiments.

"An ounce of chrome alum, quarter of an ounce of citric acid, half-a-gallon of water, according to the suggestions of a leading article in your Journal, form an invaluable bath after developing. Give the merest rinse under the tap, drop the negatives in this solution, leave them there for a few minutes or an hour, and I am confident that they will not frill. They will not, either, if left unfixed, go on developing till they become too dense; and, further, they will not have a trace of yellowness, and will possess all the wet-plate character you may think necessary." So writes a correspondent, and a continued series of trials of the bath in question enables us to endorse all he says. We may give one caution, and that is to give a full washing after the dip or the sulphur may be precipitated in the film when the negative is placed in the hypo. Most photographers are aware of the continued action of the developer which takes place if a negative is left long unfixed, even if water be left running upon it for the whole time. Those, therefore, who try this plan—and may have been in the habit of leaving their negatives for some time after developing before placing them in the hypo.—must make due allowance for the fact that this bath arrests development at once. We point this out lest we may be told that the solution reduces the strength of the negative. It does not touch the image in the slightest.

Melted snow is supposed to be one of the purest forms of water when collected under suitable conditions; but the following particulars of the analysis of snow collected with every precaution will show that snow water is not necessarily an article of complete purity, The sample was collected in the yard at Columbia College after it had been snowing for three or four hours and snow was still falling. It was taken up without being touched with the hands, and was placed in a large stoppered bottle, which was then closed and placed on a laboratory shelf till the snow was melted. The water was slightly turbid, and, after being allowed to settle, was examined, every precaution being thus taken to ensure the absence of contamination of any kind. The results (in parts per 100,000) were—

Chlorine	Trace.
Phosphates	None.
Nitrates	„
Nitrogen in nitrates	·0494
Free ammonia	·0396
Albumenoid ammonia	·0318
Hardness	·91
Total solids	6·3

It will thus be seen that this would be by no means suitable for experiments where pure water formed a basis of working.

GALLIC ACID IN THE DEVELOPER.—A NEW RESTRAINER.

The intimate connection between pyrogallic, gallic, and tannic acids, from a chemical point of view, would suggest that their behaviour as developers should be in some manner similar. But surely this latter is not the case. True, both gallic and pyrogallic acids have found their use in the old form of silver development ("physical" development is it not called?), and tannin has been put forward as a "sensitiser" of previously insensitive iodide of silver. Yet, on the other hand, when we turn to chemical development, tannin is not only useless but has years ago been shown to be a restrainer, and gallic acid has not apparently proved much more effective, if we may judge from its pretty general disappearance from the photographic laboratory, while pyrogallic reigns supreme.

In the course of some experiments with tannin and gallic acid as additions to the ordinary pyro. and ammonia developer, for the purpose of altering the colour of the image, I found certain peculiarities belonging to each. I commenced these experiments remembering the variety of beautiful colours occasionally obtained under certain conditions of exposure and development with plates prepared by Major Russell's rapid dry process. These colours varied from all and every shade of brown, through different grades of red and purple, to the purest crimson or magenta ever produced by the dyer. Major Russell himself, in his *Tannin Process*, published, I think, in 1863 or 1864, called attention to the colour effects produced by the admixture of the three substances I have named—gallic, pyrogallic, and tannic acids—when present together during development (whether originally employed in the preservative or in the developer matters not) the coalition of the three—or two of them—sufficed to give effects that could not be obtained with any one singly.

But I may at once say that with gelatine plates I have had no success whatever in my attempt to secure tones not obtainable with pyro. alone. Why this should be in the case of gelatine plates I cannot pretend to say, especially when I know from actual practice that with dry collodion plates and the same, or very similar, development particular tones could be got with almost certainty when tannin and pyro. were present during development. The result depended chiefly upon the exposure, as seems to be the case with the modern gelatino-chloride plates and ferrous citro-oxalate development. At anyrate, the fact to me is pretty plain that gelatine and collodion plates are quite different in their behaviour under similar treatment.

While engaged on these experiments I happened to come across, in a back volume of the Journal, some editorial remarks on the use of gallic acid and ammonia as a developer for collodion dry plates. Seeing the relative prices of pyro. and gallic acid are very different, and with the prospect that the vagaries of gelatino-bromide might possibly result in my discovering that gallic acid was a more powerful and valuable developing agent than pyro., I "prospected the ground." With what result? Well, astonishment at least. I may as well detail my experiments.

A plate of known value as to sensitiveness was exposed for the normal time, and a developer of the ordinary character, only substituting gallic for pyrogallic acid, applied. Saturated solution of gallic acid was used instead of pyro., and ammonia and bromide added in usual quantities. The result as regards image was absolutely *nil*, though the ammonia was "piled on" until it would have fogged any decently-ordered plate if pyro. had been used instead of gallic acid. I thought I must have made some simple omission in the process of exposure—probably had not drawn the shutter; so I repeated the experiment, exposing a plate, cutting it in halves and developing one with pyro., and *failing* to develope the other with gallic acid. The latter half of the plate was washed and treated with the ordinary pyro. developer, when a clean, under-exposed negative resulted, though the other portion of the plate had been fully if not overdone.

This result set me thinking as to the possibility of gallic acid proving a practical restrainer for over-exposed plates; and in the end, to cut a rather long description short, I found it to be not only that but more. It is a restrainer of a very powerful character, and it may be used *in conjunction with pyro.* to give vigour and density with a very small proportion of pyro., if time be no object. Thus, half-a-grain to the ounce of pyro., supplemented by gallic acid, will give a negative of far greater vigour than a three-grain pyro. solution if a little time be allowed for its action. This, however, is not an important application.

In cases of known over-exposure the addition of a certain quantity of gallic acid to the ordinary developer will prove as effectual as citric acid; or the plate may be soaked first in gallic acid and then developed in the ordinary manner. As an instance: I today exposed a plate very fully, cut it into three portions, developing one in the ordinary manner, treating it as a case of *known* over-exposure; the second with half the quantity of pyro. with the addition of gallic acid; the third was soaked in gallic acid first, washed, and developed in the ordinary manner. The first is thin and feeble from over-exposure; the second and third, though five or six times the quantity of ammonia had to be used, are strong, vigorous negatives, without a trace or symptom of over-exposure.

H. Y. E. Cotesworth.

SOME MYSTERIES IN CONNECTION WITH GELATINE EMULSION.

I have been engaged for some time past in trying to find explanations for several uncertainties and difficulties I have met with when making and using gelatine emulsion. I thought if I could find out the causes of the difficulties it would be the greatest step towards finding out a way of removing them, and I could then have some hopes of knowing what points to be particular about to obtain an emulsion of a good quality with some degree of certainty.

The first point I took up was one raised by the chairman of the Leeds Photographic Society some time since, asking how it was that a plate exposed in the camera, and then put by in the dark for a time, if again exposed would on development show no trace of the first exposure.

We know that if we wash the plate in a solution of bichromate of potassium it will eliminate the effect of light, and the question at once arises—if, as many suppose, the action of light converts the silver bromide into a sub-bromide—What action can the bichromate have on this sub-bromide to reconvert it either into pure bromide of silver or an equivalent, as far as photography is concerned?

From the first it has appeared to me that the action of the bichromate must be only to act on the gelatine; and, if by putting the plate away in the dark for a time it had the same effect, I argued it must be through an atmospheric action on the gelatine. If it were so, I thought I ought to get the same result by scraping an emulsion which had been acted upon by light from the plate, and by simply remelting it and recoating the plates. It would go far to prove that the bichromate and atmospheric action must be only on the gelatine, and would cause grave doubts as to whether the action of light on a plate by exposure in the camera is really to reduce the bromide of silver to a sub-bromide when the invisible action takes place requiring development.

Perhaps I had better explain at once that I believe the chemical action or reduction to a sub-bromide probably commences in what we know as the "reversed action of light," and is the same as the action which takes place on a daguerrotype plate; but that light acting on the salts of silver, when held in suspension in collodion or gelatine, has a previous mechanical action—namely, the rapid vibration or expansion of the particles which strain or burst the protecting cells of the collodion or gelatine—and that the action of the bichromate of potassium or the atmospheric action, if plates are left in the dark for a length of time, repair, so to speak, the cells of the gelatine which protect the particles of silver bromide from the action of the developer the same as before they had been acted upon by light. I will not take up space by stating all the experiments I have made to test these questions, but will only give some that have an important bearing on practical work.

I made up an emulsion, and to make the experiments as effective as possible the gelatine used in emulsifying was first boiled in ammonia and water to decompose the gelatine, so as to obtain a rapid (or blue) emulsion. The potassium bromide was now added to the gelatine, then the silver nitrate in crystals, and the bottle well shaken up. The bulk of the gelatine was then added, the whole of the operations, so far, being conducted in the bright white light of a paraffine lamp (this I believe, however, has been done before). The emulsion was now put aside to set in the dark. I decided not to wash it in bichromate of potassium solution, because I wanted to clearly test the part the gelatine acts in an emulsion. I washed it, therefore, in plain water, and then remelted it. I coated some plates in the dark room in the usual way. I then coated some others close to the white light of a paraffine lamp, but put them to set in the dark room. When they were set I exposed one of them behind a negative for eleven seconds. On development I got a very dense transparency showing through to the back, so I knew that the whole of the particles of silver bromide would be acted upon by the light in eleven seconds. To be quite sure, however, I exposed three of the plates, which had been coated in white light, eighteen inches from a powerful gas flame for two minutes. I then scraped the emulsion from the plates and warmed it up again for two or three minutes, recoated the plates, and put all away in the drying-box. When they were dry I exposed the plates coated in the dark room, those coated in white light, and the remelted ones for the same length of time behind the same negatives.

On development the plates which had been exposed for two minutes to the gaslight were as perfect as those coated in the dark room; so we see that by simply remelting an emulsion which had previously been exposed to white light, and thereby repairing the gelatine surrounding the particles of the silver salts, we can eliminate the effect of light, the same as is done by bichromate of potassium or by leaving the exposed plates for a length of time and then re-exposing.

There was a slight fog on all the plates, but no more on the remelted ones than on those coated in the dark room. This shows that the emulsion was in fault; but as it was prepared in bright white light, and not washed in bichromate of potassium, there was much less fog than I expected, because, probably through boiling the gelatine in ammonia and water too long, it was so decomposed as to almost reach the grey stage.

As far as my experiments extend, it seems that all the time an emulsion is kept above 90° or 100° white light acts on it only very slightly, if at all; but directly it commences to set even the chill caused by the cold glass (if the plates be coated in white light) is sufficient to cause a slight fog, because the action of light on the particles at once causes them to strain the gelatine.

The same action seems to take place in the case of collodion emulsion. One of our editors told me some time since that he accidentally left a bottle of collodion emulsion in bright sunlight for several hours, and on coating plates with it they only showed a very slight fog. Of course if he had coated some plates, and after they had set exposed them to daylight for a second or two, they would have been hopelessly spoiled, although the same emulsion, when kept in a fluid state, can be exposed for hours without injury. So it will be seen that at least in the preparation of both gelatine and collodion emulsions we shall be able to save our eyes from some of the injury caused by the prolonged work in the dull light of the dark room, and we have here a useful field for further experiment.

I ask how does the theory of a reduction to a sub-bromide explain these facts? or how does it explain the result of friction on a plate? As these questions have been raised lately in connection with the packing of dry plates I will state several points that I have noticed on the subject:—1. It seems to act more on rapid than on slow plates; indeed, with the latter I have never noticed it. 2. Large plates are worse than small ones. 3. The bottom plates in a box show this slight fog often when those taken from the top are all right. I have noticed this several times, and possibly we have been blaming plate-makers for inferior plates when the fog has been due to friction. 4. A batch of plates with streaks of emulsion on the back are worse than those without. So I have come to the conclusion that if the packing-paper between the plates do not entirely cover them, or if the substance of the paper be at all lumpy, or if there are streaks of emulsion at the back of the plates, slight friction is produced by them moving slightly in the boxes, especially in the case of large, heavy plates. In transit this slight movement would produce a continued grinding of the fibre of the paper (and the emulsion on the back of the plate) against the film, fracturing the thin gelatine cells covering the particles of silver bromide, and the developer would act upon those particles the same as if they had been acted upon by light, fog being thus produced. If strips of thick cartridge-paper are put at the edges of the plates fog will often be found where the paper touched, and sometimes a little beyond it, which shows that there was a slight movement of the plates.

Possibly, in some cases, a chemical action may take place between something in the packing-paper and the film which will produce fog; but I have not been able to discover any with any packing-papers I have met with. If there be a chemical action, by laying a piece of the paper on the plate and leaving it for a time fog ought to be produced; if it be not, the fog must be produced by friction when that sample of paper is used.

I have tried several sorts of paper to put between the plates, but I now simply put a piece of velvet or other soft substance at the bottom of the box, clean the emulsion from the back of the plates, lay them one on the other, face downwards, and then wedge them carefully in the box, so that they cannot slip about. The smooth surface of the glass certainly appears to be better than paper to be in contact with the film; besides, they are less likely to suffer from the effects of damp than when a soft, porous paper is between the glass and the film.

DARK-ROOM ILLUMINATION.

I did not intend to again take part in the discussion on this subject; but I would like to take this opportunity of correcting a mistake in your report of a meeting of the London and Provincial Photographic Society a few weeks ago.

It will be remembered that, in April last, I called attention to the fact that if we threw the blue and yellow rays of the spectrum *on one spot* we obtained a pure white light. I also mentioned other combinations of colours which have the same effect, and of these various combinations I stated that if we could get pure colours the white produced by red and yellowish-green (of course when thrown on one spot as with the rays of the spectrum) would be the safest for photographic purposes. In May Mr. W. E. Debenham showed a lamp with two lights—one passing through red glass, the other through yellowish-green, thrown on to one spot as I proposed—and demonstrated that the nearly white light produced by the impure colours of the coloured glasses was safe for practical development.

In the report of the meeting I was made to say that both Mr. Lewis Wright and the Editors objected to my statement. This was wrong as regards the former gentleman, because he kindly showed in his article how my suggestion could be made thoroughly practical. It never struck me how strange the proposal must seem to a photographer used to the Egyptian darkness of his dark room, because for months I had been using a very light yellow reflected light with safety.

As to my suggestion that the reason of Mr. Debenham's combination of yellow and green being whiter (or of a lighter tint) than either colour when used alone is due to the same law (though of course under different conditions) is another matter which I will not go into. I never meant for one moment that if any coloured mediums were put one in front of the other they would produce white light. What I said was that, in the case of the yellow and green, they produce a whiter—that is, a lighter—tint than either colour alone.

I think the use of reflected light is much overlooked in connection with dark-room illumination. By using transmitted light, when the plate is placed within two or three feet of the source of light, we have to put screens to make the *direct light* safe which passes from the source to the plate and the room is in darkness; but by using reflected light in daylight we can have a flood of light first dispersed throughout the room, and have only to be careful that the weak light reflected from any small surface of the room on to the plate is sufficiently non-actinic for ordinary development. HERBERT S. STARNES.

ON PHOTOGRAPHING THE OUTLINES OF COASTS AND HEADLANDS FROM THE SEA, AS CARRIED OUT BY THE GERMAN IMPERIAL NAVY.

THE outlines (profiles) of coasts and headlands are of as much importance to mariners as sea charts. Frequently these outlines are drawn upon the charts, and the necessary views have been generally obtained from sketches the accuracy of which has depended upon the skill of the sketcher and upon the more or less favourable circumstances under which the drawing was made—circumstances which generally left a good deal to be desired. The greatest drawback to these sketches was that they had to be done from the deck of a ship in motion.

The idea then occurred that instead of sketches the more rapidly-made photograph might be used, especially as the modern dry plate, with its instantaneous exposure, might admit of a view secured from a sailing vessel being considered as taken under favourable circumstances. As a matter of fact, in the spring certain attempts in this direction were made by the imperial marine, but no satisfactory results were obtained. An ordinary landscape camera and camera-stand had been furnished for this purpose, along with a lens of relatively short focus (about eight inches), which, though suitable enough for working with on land, was not so for working on shipboard, where the motion of the ship offered the greatest difficulties to the setting up of the apparatus, and still more so to the sharp focussing, especially when the whole business was to be done, not by experienced professional photographers, but by seamen. The pictures obtained were too small for the purpose for which they were intended; they were not sharp, they were often over-exposed, and, in short, they were unsatisfactory.

The task set was evidently that of taking a long horizontal stretch of coast line, the height of which is insignificant compared to its breadth, and which must be at least a sea mile distant from the operator. The ordinary size of landscape plates, which are about as high as they are wide, are not at all suitable for this purpose, as they give much useless sky and foreground. It was further evident that, as it was a case of taking the views from a considerable distance, it would be possible to focus the objective for the far distance while on land, and to fix it at that focus once for all, thus rendering focussing on shipboard unnecessary. Also, the wish to obtain as large pictures as possible of the different features of the coast justified the choice of a lens with a long focus.

These were the considerations which weighed with me when I was asked to recommend an apparatus that should be especially suited to taking views of the outline of the coast from a ship in motion. Accordingly I designed a keel-shaped, flat camera, without extension, for plates ten c.m. high by forty c.m. wide. From amongst the lenses at my disposal I selected that which had the longest focus, viz., an ordinary Steinheil aplanatic of fifty-four c.m. focus. In order that the camera should not follow the motions of the ship it was borne upon a rod four feet long, which terminated above in a spherical projection. This rested upon a perforated, hollow, spherical socket. To the rod that passed through the hole was attached below a hook, to which half-a-hundredweight was suspended. The socket rested upon a broad stand screwed firmly to the deck. By means of the heavy weight, in spite of the rolling of the vessel, the rod was kept in a perpendicular position, and consequently the camera screwed to it was kept level.

The fine focussing was unnecessary; all that was required was to focus the field of vision. A binocular upon the camera served to get the rough focus with, an unfilled-in frame having a couple of threads crossed in the middle of it being placed opposite. On looking through the binocular one could see almost exactly the same piece of the landscape that was delineated by the objective upon the plate. The instantaneous shutter selected was Guerry's. It, however, did not do so well as was expected, as the shutter was often blown close by a strong wind at the wrong time.

By some experiments made on land it was proved that with Sach's plates, even when the next to the smallest stop was used, an instantaneous picture could be obtained in good weather (at the beginning of April). The apparatus had no changing-box, but had six double dark slides, and the whole thing was made by Herr Stegemann, whose old reputation was well sustained by the work turned out on this occasion. Herr Schmid, an engineer of the imperial navy, had some practice on land, in the laboratory of the Technical High School, in using dry plates with this apparatus, which has been found to answer the purpose excellently, the outlines of 150 coastlines having been taken with it by him. In dull weather, or at late hours, a larger stop than the next to the smallest was used. Of course then one part of the plate would be sharp; but that did not matter when the object to be photographed was not very extensive.

Of course many of the plates were over-exposed and many under-exposed, when the state of the light was wrongly estimated, and when, consequently, either too large or two small a stop was used. Still the great majority of the plates were to be considered undoubtedly successful, especially if the difficulties of exposing were taken into account.

It was seen that good instantaneous views of small vessels, such as our gun-boats, which lie very unsteadily in the water, could only be taken when the machinery was stopped for the instant in which the exposure was made. Some of the plates were developed on board, a small dark room having been fitted up there. The washing took place in a closed grooved tin box through which a continuous stream of water was pumped by machinery. This contrivance also answered well.

Thus a new and interesting field of work has been opened up for photography, and it is to be hoped that the examples given will soon have imitators. H. W. VOGEL, *Professor.*

—*Mittheilungen.*

TOURISTS' CAMERAS.

ONE of the last strong expressions of opinion published by the late H. Baden Pritchard was that the tourist's camera of the future has yet to be constructed. There can be no doubt of it, unless some meritorious camera is somewhere lost to sight and to public view. It is one thing to find fault without being able to point out a remedy, and another thing to find fault justly, with a full knowledge of what is wanted and the certainty that manufacturers can meet the want if they have the will. Some two years or more ago I called attention to this subject in these pages, and, having since then had much experience at tourists' work in photography, return once more to the attack.

The glaring, the vital, fault of the present tourists' cameras is that they waste so much of the time of the user in the adjustment of various parts over each view, also in unpacking and repacking. Ten minutes' waste of time over all this may, perhaps, be taken as the minimum; the maximum may be twenty or more. This waste of time, amounting to an hour or more over the exposure of the usual six plates in the three double dark slides, is a permanent grievance in itself, with several minor disadvantages. One is that the time occupied in fixing the apparatus in or near villages and populous places gives more time for a crowd of spectators to assemble, when the operator would prefer their absence. When the Rigi railways were under snow I ascended to Rigi Klösterli with photographic apparatus, and in one place where the path passed through a wood came across a beautiful scene. The delicate twigs of the underwood bending under a weight of snow in the foreground, the white Alps near the entrance of the St. Gothard district in the distance, with the lake in the valley below, and precipices covered with snow-white trees in the middle distance—all was white; everywhere white predominated, with the close foreground of fairy beauty. Yet I knew that taking the view meant standing still for at least fifteen minutes in the bitter cold, with feet in the snow as far as they could sink; and, as it was difficult to keep warm even with incessant walking, the scene was unwillingly left unphotographed—all in consequence of want of intelligence on the part of the maker of the apparatus. Every man who buys tourists' apparatus should try on the premises how long it takes to remove it from its case, to adjust it on the top of the stand, to take it to pieces, and to pack it away again. This should be done in the shop before the would-be vendor, the time taken by a watch, and a calculation made as to how much time would be thus occupied over six views.

Parenthetically, it may be of interest if I quit the subject here for a moment to place on record two phenomena witnessed on that long walk. I had forgotten to bring any snow spectacles with me, to protect the eyes from the glare of white by the neutral tint of the flat glasses; consequently, after one or two hours' climbing, the glare became blinding, the eyes had to be closed altogether for a time, and afterwards slightly opened, just enough to see the way. On finally reaching the inn at Rigi Klösterli and standing in its dark passage, with a door and window at the other end, that window appeared a beautiful scarlet colour, which quickly changed to a bright green. In one sense it was a pleasing sight, but in another an uncomfortable one; because it is not pleasant to have anything the matter with the eyes, even though it be but temporarily. In a few minutes, however, the eyes were in their normal state. Some of your scientific London readers were acquainted with the late Cromwell Varley, the electrician. A few of the last days of his life were spent in this village, when we visited it together, and the object of my return to it last winter was to take a few photographs there to present to Mrs. Varley. In the winter the village contains but eight inhabitants, two of them monks at the Rigi Klösterli pilgrimage church of Our Lady in the Snow. Every morning they called the inhabitants to mass by sounding a wooden rattle.

As to the effect of the glare of fallen snow upon the eye, some habitual Swiss mountaineers admit they ought to use snow spectacles, but that they often forget them. This causes them to walk about in the hills with their eyes nearly closed, and in some instances they cannot drop the habit in the plains, so that when their countenances are also good tempered they have a persistent, waggish look, as if perpetrating a perpetual joke.

The other phenomenon *is* connected with my subject. In rain the atmosphere is clearer under trees, as a rule, than in the open country. This is not so in fine weather, when the trees are covered with dry snow in high altitudes. After missing the photographing of the scene previously mentioned I passed the borders of a pine forest—white above, with dark stems below—and it was possible to see some little distance into the forest between the slender stems. A passing breeze now and then brought down a mist of fine snow-dust from those trees it chanced to agitate most, so that at some places the interior of the forest was seen through a peculiar veil of pure white, whilst at other places its depth could be penetrated by the eye as before. Here was an effect I had never seen in any photograph. I walked on, carefully watching the local snow mists under the trees, but did not attempt to photograph the scene because the camera-maker had, as already stated, turned out apparatus admirably adapted for the freezing of the user thereof.

Perhaps the gentlemen who make cameras may look on complacently at the troubles of tourists who have to use them, until somebody listens to the wail of the distressed, and, by making the first good instrument, turns the tide of popular favour all in his own direction. This matter practically affects others than tourists, namely, the makers of dry plates. With apparatus free from the general defects I should have exposed about a gross of dry plates per month more than I actually used, and mine may not be a solitary instance. The defects preventing the use of more plates were two—firstly, the waste of time over each plate already mentioned; secondly, the absence of thin glass plates for tourists, so that two plates should weigh about the same as one of the present normal type.

Considering that the market of the whole world lies open before him, and that a good tourist's camera might also be used in studios, some intelligent man among optical instrument makers or workers in wood may arise and, after devising a camera as perfect in all its parts as scientific ability and close thought can plan, erect machinery for turning out the several parts, on the same principle that the Americans, above others, often make fortunes, as in their machine-made watches, pencil-cases, and so on. An astute Swiss doctor told me that he believed that the day of making fortunes in any way by hand labour is nearly extinct within the area of civilisation, and that henceforth it can only be done by brains, with personal or other hand labour as the servant. The sooner brains have something to do with the construction of tourists' cameras the better.

To save time in unpacking a tourist's camera from its case, and subsequently repacking it, it might all be inside the case ready for use. By simply pulling out one sliding end of the case the lens might be exposed to the view, and by pulling out the other sliding end the focussing-screen might be exposed to the eye of the operator. If the lens then in position be not the one required, one of the others mounted on the rotating disc, described recently by the Editors in these pages, might be turned into its place as rapidly as the clicking of the spring which then holds it in its proper position. Behind it should be a shutter for long or short exposures, which shutter is available for use with all the lenses, and so made as to render caps for the lenses unnecessary. The camera being ready for use inside its case, the present numerous side adjustments might be abolished.

The lenses should be mounted in something less oxidisable and much less heavy than brass. The camera should either spring into its place upon the top of the stand—say by a bayonet joint—or there should be a conical hollow to guide the ordinary screw into its place, so that the operator has not to fumble about before getting the screw into position. The head of this brass screw should have a hole in it, to run a string through, when it is desirable to suspend a bag with a stone in it to steady the camera in windy weather.

The focussing-glass should not be fixed in its frame so as to give the operator much trouble and loss of time should it get smashed. It ought to slip out easily so that another could be put in its frame at once in case of breakage. All the more necessary screws should be in duplicate, so that outdoor operations shall not be suspended by the loss of one. The focussing-glass should never be of ground glass, which is well known to be too coarse for accurate work; it may be glass coated with a thin film of pure gutta-percha, from a solution of that substance in chloroform, or some other film of equally good character for the purpose. The focussing eyepiece should have an eyecup to it, so that it may not be necessary to put the head under the focussing-cloth when using it.

The dry plates, as already stated, should be of half their present average weight, and there ought to be no springs in the slides near the centres of the thin plates likely to bend them with pressure. The plates should not rattle in the slides, since that is a proof that they are not accurately kept to focus. They might, however variable in thickness, perhaps be always brought to gently press against the front of the frame by placing a sheet—or two, if need be—of corrugated black india-rubber between the backs of the two plates.

The slides should not be of nearly their present size and weight. Paper, aluminium, or something else ought to be substituted for wood in the construction. The shutter should pull right out, with a cut-off, as in American outdoor cameras; then it would not flap about in the wind, and would not let light through in time at a worn pliable hinge. The slide should not be a slide at all, but press into its place after the fashion in American cameras. The latter arrangement is more light-tight, and there is less danger of pushing or pulling the camera out of position on its vertical axis after focussing. If the camera require turning on its side, that being discovered to be the best position after seeing the view on the focussing-glass, there should be nothing to do but to turn it on its side, as in an arrangement devised—or, at any-rate, recommended—by Mr. J. Traill Taylor. Under the circumstances, the apparatus should be such that not an instant is wasted in screwing or unscrewing anything.

The camera should screw out far enough to permit the use of a lens having a focus thrice the length of the longest plate the instrument will take, for wide-angle lenses are the ruin of pictorial beauty and of apparently true perspective. They dwarf mountains to insignificant molehills, and make short streets appear to be a mile long.

A circular spirit level should be let into the top of the camera and fixed there, otherwise it is liable to be lost, not being often required. In hilly districts, with the camera-stand on a sloping bank and no horizontal line in view anywhere, optical illusions sometimes come into play, and it is difficult to know when the camera is level.

The camera should have a falling as well as a rising front, otherwise it will often be useless at high elevations, or to photograph dock gates when the water is out, or anything much below the level of the observer. The up-and-down motions should have a longer range than is usually the case in the present cameras of commerce. The camera—or rather the lens—should have some arrangement for giving more exposure to the foreground than to the sky when desired.

The more essential parts of the camera—that is to say, those for keeping the lens rigidly at its proper distance from all parts of the plate—should be strong enough to bear a reasonable amount of rough usage. The filling-in may be light-tight cloth, leather, or anything lighter than wood. The exterior of the case is not supposed to be strong enough to bear knocking about by railway porters, since that would mean immense increase in weight. It can go in a portmanteau when travelling by rail, and when in use, being in the care of the possessor, is not likely to be kicked about. Still, the essential parts—the parts holding the lenses and plates in their proper relative positions—should be of strong skeleton framework, not liable to be deranged by an accidental blow.

Any reader of these lines who intends to purchase a tourist's camera is advised to cut out the preceding nine paragraphs, and to say to the dealer—"I want a camera like that." I wish he may make the acquisition. Failing to do so, he may go through the paragraphs sentence by sentence, asking, *seriatim*, whether the camera offered for sale has each convenience mentioned, and, if not, why not. These paragraphs will serve as an aid to memory over various little points which otherwise might be forgotten at the moment, and a good camera-maker will be delighted to show that none of these points for the benefit of the purchaser have been overlooked in his instruments. I have not that camera-maker's address.

If special machinery were made to turn out the parts for the model cameras intended to be sold at moderate prices, on the same principle that the Americans have brought so much influence to bear on the Geneva and Clerkenwell watch trades, separate sets of machinery might be necessary to turn out such cameras of different sizes, so one or two good sizes might be selected in the first instance. Mr. Frith, with his very great experience, prefers eight-inch by five-inch plates. A smaller useful size might be the half-plate. Carriers could take plates of various other dimensions, including some for continental plates, for use where plates of English sizes are not obtainable. In designing a model camera the experience of a good philosophical-instrument maker should be obtained. Ordinary cameras are not yet instruments of scientific precision; they have not such accuracy, for instance, as displayed in the fittings of the camera made for Lord Lindsay, by Mr. Browning, for photographing one of the total eclipses of the sun. There were points in that instrument which might be introduced into ordinary cameras with advantage.

The new camera might be made on the principle of the Deacon's "One Hoss Shay," namely, that the reason a thing wears out and breaks down is that one part goes first; consequently the right plan is

> "Jest,
> To make that part as strong as the rest."

Anything of leather in the camera should be made of

> "Tough old hide,
> Found in the pit when the tanner died."

Anything in the camera made of timber should be constructed of

> "Lancewood, which cuts like cheese,
> But lasts like iron for things like these."

Anything in the camera requiring great strength might, perhaps, be of

> "Steel of the finest, bright and blue,
> That was the way he put her through;
> 'Neeow' says the Deacon, 'neeow she'll dew.'
> Do! She would, I rather guess,
> She was a wonder, and nothing less.
> The men who made it all turned to clay,
> Deacon and Deaconess passed away,
> Children and grandchildren—where were they?
> Yet there stood the wonderful One Hoss Shay,
> Fresh as on Lisbon earthquake day."

These lines have been merely quoted from memory, so I hope I have done the poet no injustice; if he did not write them as herein recorded he ought to have done so. The camera, like the One Hoss Shay, being equally strong in all parts, should last one or two centuries, and then suddenly fall to fine powder—

> "All at once, and nothing first,
> Just as bubbles do, when they burst."

W. H. Harrison.

THE CONVENTION OF THE PHOTOGRAPHER'S ASSOCIATION OF AMERICA.

It is too soon for us yet to receive news of what transpired at the Cincinnati convention, which was held last week, but we give the following from the *Eye* as an introduction to what may have taken place, or what, in the estimation of the writer, ought to transpire:—

Last year, at Milwaukee, much valuable time was taken up at the convention with most trivial subjects, such as any tyro in the profession ought to be thoroughly conversant with.

We take it that the convention is not convened as a school of instruction for teaching the rudiments of photography. There are many serious subjects concerning the future and present condition of our business that should be seriously considered in preference to such child-like topics as "How to Make Chloride of Gold," or how to make any other chemical used in photography. Everyone following the profession of photography ought to be in possession of some work that will furnish him such information, and if he is so unfortunate as not to possess such a book, why, then let him go to his nearest drug store and ask permission to look over the United States Pharmacopœia, and he can find out how to mix *aqua regia* to dissolve his gold if he is desirous of making his own chloride. We must confess we do not think that any man has the right to take up the time of such a large body of men on subjects that ought to be known by everyone. The most important subject to bring up is, to first put the Photographers' Association of America on a most thorough and permanent business-like basis. In the first place let us have an initiation fee; do not let it be optional about payment of dues. Let us have a society that every one will be anxious to join, and proud to hang in his rooms his certificate of membership.

We hope that some one will have something new to tell us about blisters on albumen paper; we want the conversation on this hackneyed subject changed. The subject of "How to Conduct the Printing Room" is a good one, and a most important one; we should like to see a good paper read on it. The printer is quite as important a part of a photographer's establishment as his operator, and requires just as much attention. In fact, the proper way to print is really the most important part of the work of a photographic establishment, and any one who can furnish any new and useful information to the fraternity on this most of all important parts of the make-up of your *ateliers* will be conferring a boon that would deserve a medal.

What we want is new information. We do not want subjects discussed that it only wants turning to some everyday book, which is to be found in almost any dry store, to enable one to find out the desired information.

Life is short; our time can be taken up more valuably than with trivial matters such as a good deal of the time generally is.

We do not want any one to take offence at our remarks, as nothing personal is intended for anyone. Our desire is that everyone going to the convention with the intention of getting up to make his little (or big) speech will take care to give us something new.

CARBONATE OF SODA? SAL SODA? WHAT? HOW MUCH?

Some European photographers have complained that photographic formulæ (especially when coming from England or America) are so *indistinctly expressed*, *confused*, and *irrational*, that it is impossible to work with them satisfactorily. (See *Times* for May, p. 244.) Waiving (for the present, at least) the question how far others—even Messrs. Scolik and Zwinkel—are open to the same or even graver criticism, it must be conceded that these complaints are just. Our formulæ do lack precision; they lack a correct use of chemical names, instead of a mixed use of chemical and commercial names, and a correct use of chemical weights and measures, instead of half apothecaries and half avoirdupois. If they confuse and perplex scientific and skilled photographers, what must they be to the less informed or to amateurs?

A *professional* photographer *may* get along with a formula like this:—To develope a 5 × 8 plate: put a teaspoonful of soda and a "mustard-spoonful" of sulphite into a tumbler, pour on water enough, add a "pinch" of pyro., and proceed. (The above quoted words are from actual formulæ.)

As the image comes out his practised eyes sees what is wanted, his trained hand stops at the right moment, and he adds more soda, or pyro., or water, as he sees to be necessary. He soon learns whether to take a one-finger, or two-finger, or three-finger "pinch," as the Sandwich Islander, when eating poi porridge or pudding out of his calabash, finds out whether it is one-finger or two-finger poi. At any-rate, he will know what to do next time; but the bewildered amateur is all in a fog, even with better formulæ. Not knowing what ought to be, he cannot see what *is*, nor can he judge how to make it right.

Let us take the case of the soda-pyro. developers. One of the first formulæ given called for twenty-five grains of carbonate of soda. Comparing this with others given about the same time calling for twenty-five grains of sal soda and twenty-five grains of washing soda, an amateur concluded that the ten hydrated crystals of carbonate of soda, $Na_2CO_3 + 10H_2O = 286$, were meant, and he used them. He afterwards learned that the carbonate of soda prescribed had been effloresced, becoming (nearly) $Na_2CO_3 + H_2O = 124$; so he had been using 162 grains of water instead of that quantity of the soda intended. Perhaps, however, this was just as well or better for him, but it was not just as well in the formula.

One of the latest formulæ given calls for eight grains of sal soda; another for twenty-five grains of sal soda; another for (?) grains of washing soda; another for granulated soda; and another for exsiccated soda.

Now what are all these sodas? *Carbonate of soda* in its strict chemical sense is the pure anhydrous salt, $Na_2CO_3 = 106$; but it is not in the market save in very small quantities for nice chemical processes, and probably never was used for developing a plate. In its general chemical sense it applies to all these sodas, and, therefore, is not precise enough for us to use. In its commercial sense it is now used to denote the *soda-ash* sold in New York by the hundreds of tons. Formerly, soda-ash was very impure, containing half its weight of other salts; now it is comparatively pure, containing only two per cent. of sulphate of soda and chloride of sodium, and no water. It is the most concentrated form of carbonate of soda available, and if the sulphate and chloride do no harm, and it be found desirable, this term "soda-ash"—with proper limitations—might be used in our formulæ. The name "carbonate of sodium," it should be added, has a *pharmaceutical* use. The "U.S. Pharmacopœia" and the "U.S. Dispensatory" denote by it the ten hydrated crystals. These are what our druggists put up in prescriptions calling for it; but in our formulæ it should not be used without proper qualification.

Soda *effloresced* by exposure to the air may be (nearly) a monohydrated carbonate; but its amount of water, and perhaps of carbonic acid, is variable according to the degree and circumstances of its efflorescence, and we should not use it where exactness is desired.

Granulated soda is a *commercial* term. It is commonly applied to the washing soda broken up in small pieces, hundreds of tons of which are sold to the small grocers who do not need to buy so much as a cask. It has also recently been applied to the little grain-like crystals sold in bottles to photographers, probably monohydrated crystals, $Na_2CO_3 + H_2O = 124$, with additional water, &c., from the adherent mother liquor and some small crystals containing more atoms of water. Perhaps it was called "granulated" because the manufacturing chemists would not give a precise chemical name to a variable chemical substance. Another commercial name for it is *crystal carbonate*, hundreds of tons of which are sold in New York. It is quite pure, but contains some three or four per cent. of surplus water. These forms of monohydrate may be convenient enough to call for their use, but they should be understood and precisely named.

Exsiccated carbonate of soda is a *pharmaceutical* preparation of the "U.S. Pharmacopœia" in which the ten hydrated crystals are deprived of half their weight of water, leaving what is about equal to a 2 hydrated carbonate. It is very convenient for medical use and prescriptions, but not suited to our formulæ.

Sal soda is an old *commercial term*, once applied to the less pure 10 hydrated carbonate formerly made from barilla and kelp. It was not even mentioned in the "U.S. Dispensatory" a few years ago, though in the last edition it is mentioned with washing soda, copperas, green vitriol, &c., among the common names. It is now used in commerce for washing-soda crystals.

Washing soda is the common commercial name for this form of soda; but it is applied to it in all its degrees of impurity and efflorescence.

If one selects from the grocer's cask the large, regular, clear crystals of washing soda or sal soda, or from the small grocer's box of granulated washing soda the best clear crystals, he will have a very pure and uniform 10 hydrated carbonate of soda, $Na_2CO_3 + 10\ H_2O = 286$. Will it not be best to use its chemical name?

Can we do better than to use the names, weights, and measures of the "U.S. Dispensatory," found in every drug store, and used by all physicians and druggists, and (for the subjects of which it treats) the most perfect, practical, and reliable chemical work within our reach? —*Photographic Times*. EDWIN LEIGH, M.D.

ENGINEERING PHOTOGRAPHY.*

DEVELOPMENT.

In most processes — and especially in the gelatino-bromide — the latent image is practically invisible, necessitating the use of a developer, whose use depends on the fact that after one atom of silver is precipitated it attracts other atoms as they are thrown down.

The developer first attacks the sub-bromide, shaking off one atom of silver which aids in the precipitation of others, the bromine being absorbed by the developer. The reduction of the silver bromide which has not been effected by light probably takes place according to the formula—

$$Ag + AgBr = Ag_2Br.$$

The so-called iron developer is, all things considered, undoubtedly the best for an engineer, on account of its cleanliness, convenience, and the control it gives in developing plates improperly exposed. The following is the one I use with much satisfaction:—

SOLUTION No. I.

Neutral oxalate of potash	5 ounces.
Bromide of ammonium	30 grains.
Water	20 ounces.

SOLUTION No. II.

Protosulphate of iron	5 ounces.
Tartaric acid	20 grains.
Water	20 ounces.

To four parts of No. I. add one part of No. II; place the plate in the tray and dash the developer over it, wetting the whole plate as nearly simultaneously as possible. For a 5 × 8 plate use two ounces of No. I. and four drachms of No. II. To develope an instantaneously-exposed plate increase the amount of iron to about five drachms, and add a few drops of bromide of ammonium from a solution of ten grains to the ounce; dash the developer over the plate, and as soon as it is wet pour it off. Add three drops of hyposulphite of soda, then pour it back into the tray, after which the picture will come out very rapidly.

The Cramer developer is by many photographers considered the best, and for economy and the excellence of the negatives produced by its use is certainly a very good one. It stains the fingers, and small bubbles form readily in it, like soapsuds, which are liable to stick to the plate and cause spots. It is not so good for developing instantaneous work.

* Concluded from page 491.

The following is the formula for preparing it :—

STOCK SOLUTION.

Sulphite of soda (crystals)	3 ounces troy weight.
*Bromide of ammonium	$\frac{3}{4}$ or 1 ounce ,,
Bromide of potassium	1 ,, ,,
Pyrogallic acid	2 ounces ,,
Dissolve thoroughly in pure rain, distilled, or ice water	32 fluid ounces.
Add sulphuric acid, c. p.	120 minims.
Concentrated liquid ammonia, 26° B. (sp. gr., 0·900)	3 fluid ounces.

Add water to make up bulk to 40 ounces.

Dilute sufficient for one day's use in the proportion of one part of stock solution to eleven parts of water. Use a rubber stopper for the stock solution.

FIXING.

After development the negative is washed and put into the fixing bath, which is prepared by dissolving one pound of hyposulphite of soda in half-a-gallon of water. In warm weather an addition of alum is beneficial. The hyposulphite dissolves the unaffected salts of silver. After fixing wash thoroughly.

Gelatine negatives frequently need intensifying, for which purpose I use England's mercuric intensifier :—

Mercuric chloride	1 part.
Ammonic chloride	1 ,,
Water	20 to 24 parts.

Pour the intensifier over the negative and rock the tray until the picture turns white; then wash thoroughly, after which put it in water containing a small quantity of ammonia, which turns it black.

As a rule, for engineering purposes the negatives do not need either retouching or varnishing.

APPLICATIONS.

The following are some of the uses to which the art can be put by an engineer :—

In visiting engineering works, completed or under construction, much has frequently to be learned in a short time. A few photographs of the general plan, interesting details, and machinery used in construction, showing methods of doing work, would be of incalculable value. The advantage in an engineer being able to take the views himself instead of buying them consists in his being able to get just what he wants without being bothered with that which can be of no value to him. Besides, it will frequently happen that there is no professional photographer near.

If an engineer be in charge of construction, and wishes to report progress either to a chief or board of directors, a photograph is the most accurate and trustworthy method of showing the exact condition of the work. In this case a boy could easily be taught to do the drudgery connected with developing and printing.

In case of accident to railway property, such as a washout or landslide, a wreck caused by collision, fallen bridge, tornado, earthquake, or otherwise, a photograph is the quickest way of reporting the extent of damage and condition of the wreck.

Drawings can be quickly photographed, reduced in this manner to a small scale, and made of uniform size, so that they will occupy but little room and still all the details be sufficiently well preserved to make working drawings from them if necessary. These photographs are also exceedingly convenient for an engineer who is superintending the building of machinery, saving him the bother of carrying a large drawing.

Blue prints can, of course, be made from negatives as readily as from tracings, and for many purposes are preferable to silver prints.

If a blue print be made of a machine or other object, and a pen-and-ink drawing be made on the top of it, the blue may be afterwards washed out or destroyed by immersing the picture in a saturated solution of bicarbonate of soda, which in about a minute causes the blue to disappear, leaving only the black ink lines on a white ground. Wash it carefully in water, and dry; after which it may be photo-engraved and set up with ordinary type in printing a catalogue, or elsewhere. The best ink I have ever found for the purpose is "Higgins' American Drawing Ink" ("waterproof"). The Moss Engraving Company, of New York, use silver prints and wash out with cyanide of potassium; but this is obviously inferior to the above method, which I have never seen described, and it may be new.

If autolithographic ink be used instead of Higgins', the drawing can be transferred immediately to the stone without washing out the blue. The accompanying view of my surveying camera was made in this way. For this work paper prepared for autolithography should be used.

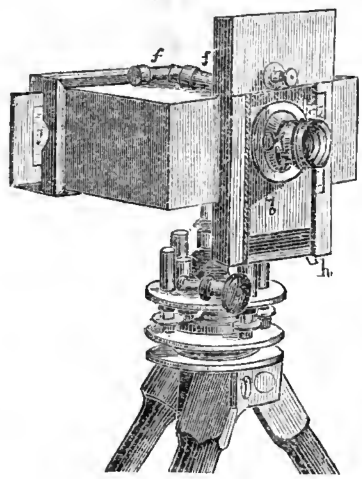
A negative can be taken from a tracing or drawing on thin paper directly by contact instead of by using the camera, prints taken from it giving black lines on a white ground in silver printing, or blue lines on a white ground in blue printing. For a large drawing the negative and chemicals for developing would be expensive.

* If you prefer intense negatives use one ounce of bromide of ammonium; but if you prefer soft negatives three-quarters of an ounce will be best, and will allow shorter exposures.

SURVEYING WITH THE CAMERA.

This being a strictly engineering use of photography, and having been but little used, if at all, in this country, and not much anywhere, is perhaps the most interesting to those present or who will read this paper. I will, therefore, now give a description of the surveying camera which I have had made for experimental work next summer, in connection with the United States' survey of the Missouri River; also the general principles and method of application, reserving the details for another paper, which, if you desire it, I will read at some future time, when I hope to know more about the subject.

In this work the dry plate must, of course, exactly take the place of the ground glass used in focussing, both of which are in the plane of the picture. It is obvious this plane must be made accurately vertical, so that all vertical lines may appear so in the photograph, and that all objects may be projected on the horizon by parallel lines. That the horizon may be accurately determined, some line, as the one through the centre of the ground glass, must be capable of being made truly horizontal. To accomplish both these ends the small levels, shown at f and f^1, are placed on the top of the camera box, the one being horizontal and parallel to the ground glass, the other perpendicular to it. The back of the box must be rigid and the focussing done by moving the lens, which is easily accomplished, since for distant objects but little change is necessary. The dry plates should, on the score of economy and convenience, be long and narrow, these I use being $2\frac{1}{2} \times 8$.



The lens should be so fixed that it can be moved up or down, for taking bluffs or mountains above the point of sight or valleys below it.

To accomplish this the lens a is attached to a slide b, moving vertically. A clamp screw is shown at c. The slide carries a vernier e which, in connection with the fixed scale d, shows how far the lens has been moved. The zero of the scale is determined by bringing the lens to the point where objects in the horizon are projected on the horizontal line through the centre of the ground glass. The slide b is held against the front of the camera box by brass springs, one of which is under the clamp c and the end of another is shown at h. The ground glass for focussing is shown at g, partly withdrawn.

The distance from the optical centre of the lens to the ground glass is accurately determined by measuring a base line in front of the camera, measuring the distance to the base line, and the length of the image or distance between the extremities as shown on the ground glass. Any change in the focal distance is measured by a scale on the side of the lens, not shown in the drawing. One of the smaller stops should be used to sharpen up the picture.

If photographs be taken with the surveying camera from two known stations, and the direction of the point of sight be measured with a transit or by means of a compass attached to the camera, the position of each object which can be seen in two pictures can be determined on the map both horizontally and vertically. The method of placing the photographs in position and locating objects is, I think, so well shown in the accompanying map that it need not be described here. [A map was here shown representing a portion of an experimental survey made at Bushberg, twenty-five miles from St. Louis.]

The draughtsman should work directly from negatives on account of the greater accuracy and distinctness of detail. The accuracy of the gelatine film on glass is so great that Dr. Eder was not able to discover any change, from developing and fixing, although by the method used he could have detected a variation of $\frac{1}{5000}$th in the distance.

By this method of surveying the plane table is virtually brought into the office, and the topographer is at both stations simultaneously, without being bothered by sun or wind.

The chief difficulty arises from aërial perspective, or the fact that distant objects appear as masses, it being hard to distinguish details. The photograph should therefore be taken when the air has little smoke or haze in it, and, if possible, when the sun shines on the back of the instrument. For nearly inaccessible mountain regions, where the air is so clear that distant objects appear very close, I think the surveying camera will be invaluable. Its peculiar adaptation to military purposes, where it is important to reduce the time of the field work, need not be pointed out.

Besides the above use of photography there are many critical moments arising in engineering practice, as where Captain Abney, R.E., tested the value of torpedoes by instantaneously photographing the column of water thrown up by the explosion.

D. C. HUMPHREYS, C.E.

FOREIGN NOTES AND NEWS.

Photography by Electricity in California.—Herr Wilde's Matt Albumenised Paper.—Herr Kindermann on Intensification with Mercury and Ammonia.—Photography at Heidelberg University.—Statistics of Photography in Switzerland.—Annual Book Fair at Leipzig.—Simple Arrangement for Packing Dry Plates.

In an amusing letter to Dr. Vogel, Herr Schoene, of San Francisco, relates how a full house was lately secured at Baldwin's theatre there. An advertisement was inserted in the morning papers to the effect that it was intended to photograph the auditorium of the theatre that evening, and every lady present would, by leaving her name and address when giving up her ticket, receive in a few days a gratis copy of the photograph taken. The thing "took," the theatre was crammed, and the photographer had a splendid puff. The operator and an amateur took their places on the stage. The electric light was turned on at three different places with such dazzling power that ladies had to spread out their fans and gentlemen had to put up their hats to save their eyes. Six plates were exposed—two in each of three cameras. Camera 1 received an exposure of fifty seconds with a portrait lens; camera 2, also with a portrait lens, an exposure of sixty seconds; and camera 3, which was handled by the amateur and was furnished with a landscape lens, gave the best result of the three with an exposure of forty seconds.

The great advantage of albumenised paper is its finely-grained surface, which brings out all the delicacy of the drawing and gradations of tone. For small work a taste for highly-glazed albumenised paper has been developed of late; but some people still consider the glossiness objectionable in large pictures. In order to retain all the advantages of fineness of surface, without the gloss objected to for large prints, Herr Wilde sensitises upon the following silver bath:—To a 1 : 8 or 1 : 10 solution of nitrate of silver add ammonia until the solution becomes almost colourless again; then add a 1 : 10 solution of citric acid in water until a slight precipitate is formed, which no longer disappears when the bath is shaken up, but leaves the latter slightly milky. To a litre of this silver solution is then added 100 c. c. of sulphuric ether. The bath is then filtered and is ready for use.

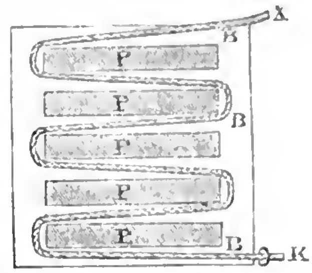
In the *Deutsche Photographer Zeitung* Herr Kindermann writes that he hears frequent complaints of plates intensified with mercury and ammonia turning brown in spite of having been *most thoroughly and carefully washed*. The cause of this he takes to be that they have not been properly fixed, and he is convinced that if the plates it is intended to intensify be left a-quarter of an hour in the soda the negatives will never turn brown, even though the subsequent washing should not be so very thorough.

Professor Eisenlohr is to give a course of lectures on photography, with practical demonstrations, as a part of the summer course at the University of Heidelberg.

Herr Boissonas reports at length in the *Correspondez* respecting the group (25) "Photography" at the National Exhibition, held last year at Zurich, and from his report the following statistics are culled:—There are now upwards of 200 photographic establishments in Switzerland employing five or six hundred men and women, and doing business to the amount of about three million francs. M. Boissonas divides these establishments into three classes, according to the turn over and the number of *employés*, thus:—1st class, twenty studios, with six to ten assistants and a turn over of 30,000 to 60,000 francs; 2nd class, fifty to sixty studios, with three to six assistants, with a turn over of 15,000 to 30,000 francs; 3rd class, 120 to 130 studios, with one to three assistants, and a turn over of 5,000 to 10,000 francs. With regard to the spread of photography during the last twenty-four years he tells us that in 1860 there were in Switzerland forty-six photographic establishments, but few or no amateurs. In 1870 the numbers had rather more than doubled, to 101 establishments, but still few or no amateurs; while in 1883 the number of professional establishments had again doubled and risen to 204, and there are now many amateurs. A natural tendency was observed for the largest establishments and best work to be found at the places most visited by the travelling public.

At the annual book fair at Leipzig an exhibition was held in which representatives of the leading firms of London, Boston, New York, Paris, Turin, Milan, the Hague, and St. Petersburg took part, and a splendid illustrated catalogue has been issued descriptive of the progress of printing and illustration, from a *facsimile* page of Guttenberg's Bible (1450—1455) to the photographic Schnell pressdruck of the present day. Amongst the lichtdrucks to which the *Mittheilungen* calls attention are some by Hoffmann, Dresden; Römler Jonas, Dresden; Rommler, Frankfort; Nauman Schroeder, Leipzig; Kochs, Pforzheim;—and autotypes of Gaillard, Berlin; Meisenbach, Munich; Angerer and Goeschl, Vienna, &c.

The accompanying illustration shows a section of a very simple arrangement for packing dry plates, as recommended to the Berlin Association for the Cultivation of Photography by Mr. Kilburn, of Littleton, New Hampshire. An ordinary box about the length and width of the plates to be packed is taken, and two long, soft, white cords laid parallel to each other across the bottom of the box, one end of each being made fast as shown by K, while the longest part of the cord hangs outside the box. The two cords are laid smooth and parallel along the bottom of the box; the first plate is then laid down upon them, and the cords are turned across over the plate, so that they hang out at the opposite side to that from which they did before. The second plate is then laid on the first one, and the cords doubled back again; another plate is put in, and so on until the box is full. To take out a plate: pull the strings, which will at once raise the uppermost plate. Mr. Kilburn says there is no fear of the string marking the plates. He has transported thousands of plates in this way, has already used about 1,800 of them in Europe, and has as yet only had one broken plate. In order to keep out light perfectly the box is placed in a second somewhat larger box, and that again in a third.



RECENT PATENTS.

APPLICATION FOR PATENT.

10,950.—"Photographic Cameras." (Complete.) J. H. Reed; communicated by C. R. Smith.—*Dated August* 5, 1884.

Our Editorial Table.

How to Foretell the Weather with the Pocket Spectroscope.
By F. W. Cory.
London: Chatto and Windus.

This little work of ninety pages will give to the reader who possesses a smattering of science a fair idea of what can be done with the spectroscope in the way of weather-forecasting. The author, after fully describing the nature of the so-called "rainband" and its position in the solar spectrum, proceeds to point out how the spectroscopic examination of the sky must not be taken by itself as a weather-guide, but that other circumstances must be noted concurrently. A considerable amount of correspondence which appeared in *The Times* in 1882 on the subject is here reprinted, and this will give to the non-technical reader a fair idea of the arguments for and against the spectroscope as a meteorological instrument. Descriptions and cuts are given of Browning's and other spectroscopes suitable for rainband observations, and the book will, no doubt, prove useful to a large section of the community who do not wish to dive too deeply into the waves of science.

Contemporary Press.

AMATEUR PHOTOGRAPHY.

[Time.]

A very fallacious notion seems to be prevalent on the part of the general public that photography is an art very nearly approaching the occult, but nothing can well be further from the real state of the case, as it is, on the contrary, a very simple and easily acquired art—I had almost said amusement—and can be learned from a handbook.

It is very fascinating, especially in the earlier days of the beginner, and the ease with which photographs can be taken by the modern dry plate process leads the tyro to roam about always on the look-out for whomsoever he may focus.

When I first took up the *rôle* of an amateur photographer I made myself a veritable terror to the neighbourhood, and those who knew of the new bent of my mind went by my domicile in fear and trembling and with an anxious aspect, just, for all the world, as if they were actually in a studio—for a portion of my paraphernalia was an instantaneous shutter, by the aid of which I was able to secure rapid views. Sunday was my great day, and just as the people began to file past on their way from church, out came my camera, and, concealed amongst the lilac bushes in my front garden, I was wont to lie in wait with a two-foot smile, like a tiger ready for its spring—and almost as much dreaded by my friends—and, so soon as a notable group came within range, click went my trigger, and lo! the picture only needed to be developed and otherwise prepared. Thus I was in the habit of producing pictures in which highly respectable and decorous old gentlemen would be shown standing on one leg, with the other lifted in the air, as if hopping; another would be pourtrayed in the form of an animated letter X, as he happened to be taken just as he was making a stride; another would be shown in the act of taking off his hat with a sweep, but appearing in the photograph as though committing a violent assault, with the said head-gear, upon the lady who was in reality being gracefully saluted; others would be blowing their noses and looking ridiculous; others, who happened to be walking past at a more brisk pace than usual, might be presented *sans* legs at all—each looking like a head and trunk with some diaphanous, cloudy-looking support that gave a very phantasmal general aspect to the object. One gentleman—who wore a white hat and who stooped in his gait—always gave the impression, in the resulting photo., that he was carrying his nose by the shortest cut to the ground; and this gentleman in particular, who was of a meek, retiring disposition, became a livid object of terrified apprehension as he neared the spot, and hastened onward in the greatest trepidation in order to avoid being, as it were, lampooned—for I took care that any striking picture was duly circulated among the group of friends.

This was of course all very wrong and unchristian, but, fortunately for my victims, many of these attempts were failures—either from one cause or another; but sufficient survived the various vicissitudes of the perfunctory treatment of the novice to "get my name up." People got at last to carefully put up their umbrellas as they passed, and all I could focus was an apprehensive nose; and those who had been in the habit for years past of grouping themselves at the corner where the cross roads divide—just opposite my house—became afraid to do so, but went a little way onward so as to be covered from the baleful glance of my searching lens—much to my chagrin.

It was curious to see those who were in the secret, and did not mind being photographed so long as they could be made to appear dignified, pass by my hiding-place. They drew themselves up to their full height, and scrupulously turned towards the possible camera their best side face, and generally placed themselves in the most romantic and interesting attitudes. But all in vain; for so fell was the spirit that then actuated the amateur photographer that, so soon as he saw them all ready, he turned the angle aside and sought for other and more noticeable subjects.

Passing traps and bicyclists were aimed at by the score, and sometimes only the hind wheel was secured on the plate; or sometimes a cart appeared to be but a square mass of fog, or the horse's legs did not show, or it had two heads, or else the plate only showed the wheels in full presence, and nothing else.

In the earlier stages of the craze, for such it was, my family fell into the groove I thus prepared for them with the greatest enthusiasm, and were ready to be photographed whenever and in whatever combination I, the *pater*, chose to fix upon; but even they—long suffering as families are to the fads of their progenitors—became at last so thoroughly sick of the constant posing and focussing, that at last it was only by dint of unlimited bribes—in the shape of sweets and toffied presents—that even the youngest of the clan could be induced to submit his rubicund countenance and podgy form to the influence of the camera. The bulldog, too, became so familiar with the whole business, that she actually sniffed when her master assumed a wheedling air, with the well-known camera and black velvet in his grasp. The times that that bulldog has been focussed would use up the computations of a multiplication table, and unhappily, as a rule, the result has been dire failure, as that very estimable quadruped generally winks, or becomes conscious of the possibility of cats and starts away, thus spoiling an otherwise unblemished photo.

As with most things that are started vehemently—and I venture to say that most beginners with the fascinating art of photography are vehement—the first hot fervour soon subsides and more moderate counsels prevails and less plates are wasted. In many cases, however, after a close perusal of the accounts of the various exhibitions—detailed at length in the photographic press—the tyro begins to be ambitious to excel, and to become an exhibitor; and he, moreover, soon acquires such countless negatives of his own famdy, and his own and his friend's dogs, that he is led to seek for other subjects wilder afield. He has, we will suppose, secured a tourist's set, very light and neatly packed in a hand case, together with a folding stand. With this he sallies forth; and varied and ambitious are his first ideas of landscape taking, especially when, as is often the case, he proceeds to do a landscape at the very first outset of his career.

The advice books generally suggest a first commencement being made upon some stationary object—such as a plaster bust, or a house, or something of a similarly motionless character. For my part, the very first photograph I attempted the early morning after I had brought my set home was a group consisting of five persons, a tricycle, and two dogs. I had passed the previous evening in reading up most carefully all that had to be done; and the night hours were largely filled with dreams of most striking pictures of phenomenal appearance and beauty. As soon as the group could be mustered in the morning they were marshalled on the lawn; but it was noticeable that upon the faces of all present—except that, perhaps, of the operator, who was a shade nervous—there were displayed looks, expressive of amused doubt, which further tended to the discomfiture of the embryo photographic artist. He, however, with due gravity, continued the operations as laid down in the manual, and finally exposed the plate. All the family accompanied him into the cellar, where the ruby lamp was lighted in readiness, and watched the process of flooding the plate with the ready-made developer with unflagging interest. Not that anything of a special nature was expected, but all seemed to be possessed of a vague curiosity to see what particular shape disaster would assume, and what sort of a fantastic affair would be evolved. When somebody's collar made its appearance as a black strip on the negative there was a chorus of "ah's!" but as detail after detail showed itself, and a fairly-satisfactory negative was produced, astonishment, mingled with some small respect for the operator, became manifest. In the presence of the leading fact that, after all, a picture had been produced, minor defects were passed lightly over, and there was a general agreement that we had succeeded in getting a good photograph—considering. While arranging the group it was decided that it would look nice to have the larger dog, a deerhound, gazing up affectionately into its mistress's face; and to this end the dog was spoken to, and coaxed, and pushed, until it did eventually pose itself in the required attitude. During the exposure, however, while all were casting the stony glare into space that people seem to think essential while being photographed, the dog had moved, and all the time had been carefully waving its bushy tail to and fro—the result being that in the resulting print, the whole dog presented the general appearance of a bundle of tow, no feature or limb of any kind being distinguishable; while the misguided animal had apparently discovered something upon the ground that required close examination. The other dog, a white one, was presented with three legs and a sort of pillowcase, and two distinct faces; but, nevertheless, it was tacitly understood that the effort was a great success, and foreboded great things to come.

In the same way the tyro, on his first expedition, instead of being content with one church, or a house, or one or two trees, for his first photograph away from home, sets himself to work to think which of all the views he remembers is the grandest, and probably hies himself and his camera to some high hill, or other point of vantage, and straightway proceeds to try to produce a landscape—upon his small plate—extending as far as the eye can reach, and the great probability is that he will be disgusted to find, instead of a similitude of one of the "Views by Frith," he has only about the first hundred yards, with, perhaps, a tree or two in focus, while their leaves and branches are misty, owing to the motion caused by the wind, while the cow in the field a-quarter of a mile off is rendered like a speck of dust.

In nothing so much as photography does wisdom come from experience, and the tyro soon learns to moderate his aspirations, and to confine his efforts to more practicable subjects until he gains more skill in the manipulation of his lens and his chemicals.

To the tourist the camera is a most interesting adjunct, as by its aid he can secure an ever-living view of each place of interest; and when he returns home, instead of seeking to laboriously describe in words the sights he has seen, all he need do is to proceed into the darkness of his cellar, or dark room, and develope his negatives, and then scatter his prints broadcast among inquiring friends.

During a tricycle tour in England and in Normandy and Brittany last year, the present writer took something like fifty or sixty views of different places and scenes of interest. Most of these turned out fairly well—although he was then but in the first months of his novitiate—and, therefore, it can readily be understood, that the art is not difficult of acquirement. One of these views was an *impromptu* picture of his *compagnon du voyage* fast asleep in bed at nine o'clock in the morning, when the breakfast bell was ringing and the amateur photographer had been out for a couple of hours in the early sunshine, and had been luxuriously bathing in the sea in St. Aubyn's Bay, Jersey. This picture is an everlasting memento of a lazy man, and is duly labelled as such.

The whole of the apparatus, stand and six plates included, only weighs five pounds eight ounces, so that there is no difficulty in transport.

The chemicals needed are usually simple to manage and do not soil the hands or clothes, and there is really little to stand as a set-off against the pleasures and advantages of the practice of amateur photography in its modern form.

SIGMA SMITH.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
August 12	Bolton Club	The Studio, Chancery-lane.
" 13	Bury	Temperance Hall.
" 13	Photographic Club	Anderton's Hotel, Fleet-street.
" 14	London and Provincial	Masons' Hall, Basinghall-street.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AT the meeting of this Society, held on the 31st ult., the chair was occupied by Mr. W. E. Debenham.

Mr. A. COWAN showed an appliance intended to be placed between the lenses of a combination, to act as exposure shutter and as diaphragm. It consisted of two thin plates of ebonite, working close to each other and in opposite directions. In one position they left no opening, but upon being simultaneously moved in opposite directions they showed a square opening, the size of which depended upon the amount of motion given to these ebonite plates. A brass stop furnished with a tightening screw served to fix the limit of motion of the plates, and, consequently, the size of the aperture. A scale on one of the plates was marked to indicate, for each particular lens to be used, the place at which the stop-screw should be fixed to give a particular length of exposure, reckoned on the universal system.

The CHAIRMAN thought that the idea was very ingenious, but it was to be regretted that the form thus necessarily given to the diaphragm was square instead of circular.

A MEMBER suggested that an apparatus on a somewhat similar principle would make a good dissolver for the lantern, the slide being changed at the moment of complete closure.

Mr. COWAN had had that in view when constructing the slide.

Mr. W. COLES showed a print on one of the opal plates distributed by Mr. Ashman at the previous meeting. The print was of a deep rich colour. He (Mr. Coles) remarked that it had fixed out a great deal, and thought that it printed slower than paper.

Mr. W. H. PRESTWICH was of opinion that opal plates printed quicker than paper.

Mr. W. COBB showed a roll of paper especially made for packing purposes. It was rolled into flutes or grooves which, it was remarked, would serve as grooving for negative boxes. The paper itself resembled brown paper, but thicker, and was manufactured, as stated, from clay and straw. Mr. Cobb also showed 12 × 10 prints from an instantaneous negative of the procession on its way to the Hyde Park demonstration.

Mr. Coles inquired whether anyone present had had any experience with tissue paper as a covering for the glass roof and sides of the studio. He had been informed that when used on the sides the lights in the eyes of the sitters were made much too large.

Mr. Cobb said that the desirability of such a covering must depend on local circumstances.

A Member considered that tissue paper was scarcely as good as ground glass.

Mr. Cowan knew of two studios entirely glazed with ground glass, and no ill effect was complained of.

The Chairman was aware of a studio at an establishment of the highest class which was entirely covered with ground glass. For himself he had the roof glazed with a glass resembling that known as Hartley's rolled, but much whiter. It was not made in England, but came from St. Gobain, in France.

Mr. S. C. Salmon was elected a member.

MANCHESTER PHOTOGRAPHIC SOCIETY.

We are requested to state, in reference to the meeting of this Society already announced to take place on Wednesday next, the 13th inst., at Kirkstall Abbey, that if not less than ten persons give in their names steps will be taken to obtain a reduced rate of travelling charges, which will be about one single fare and a fourth for the double journey; but unless a sufficient number of names be given in to the leader (Mr. J. S. Pollitt) not later than Monday next, the 11th inst., no arrangements can be made for a reduced railway fare, and gentlemen going to the station on the morning of the 13th without having given previous notice will be expected to obtain their own tickets and pay the full ordinary fare. The train leaves the new Exchange station at 9 a.m.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

The ordinary meeting of this Society was held on Thursday, 31st ult., at Llangollen, under the presidency of Dr. Kenyon.

Mr. H. Pedder was elected a member of the Association.

The day was a favourable one for photography, and, although the meeting was very scantily attended, good negatives were secured at Ruabon, Vale Crucis Abbey, and at Berwyn. A most enjoyable outing was experienced by those who were present.

AMATEUR PHOTOGRAPHIC ASSOCIATION OF VICTORIA.

The above Association celebrated its first anniversary by holding an exhibition on Monday, the 23rd June last.

The Association was formed on the 18th June, 1883, on which occasion nineteen members were enrolled. There are now forty-three names on the Society's register, and fresh nominations are received almost every month. The meetings have in general been well attended, and practical demonstrations of the leading photographic processes have been given from time to time and experiments conducted. This was the first amateur association formed in any of the Australian colonies or New Zealand, having been in existence since June of last year, although the Auckland Photographic Association received the credit of having beaten Australia, so far as priority was concerned; this, however, it will be seen, is not the case.

The exhibition was held in the Hall of the Royal Society of Victoria, in Melbourne, and included every description of photographic work. There was a very large attendance of visitors, the exhibition having proved a greater success than its promoters had ventured to anticipate. The greater part of the work shown was excellent; and, in addition to the stock apparatus, there were several novel inventions of the members, in the way of cameras, changing-boxes, and other apparatus. Some of the members have taken up the manufacture of gelatine plates, and have met with great success, which was shown by the abundant good work which they exhibited. Among the specialities shown were two or three professional exhibits.

Mr. Ludovico Hart, well known in English and French photographic circles, showed an exceedingly-interesting and well-executed set of photo-mechanical prints of all kinds. (Mr. Hart was formerly Superintendent of the Photo-mechanical Printing Department of the New South Wales Government in Sydney, as well as Lecturer on Photography at the Sydney Technical College.) The same gentleman also delivered an address at the exhibition on the *Rise and Progress of Photography*, tracing the art from the earliest period down to the present time, and detailing the difficulties which stood in the way of the early discoverers and pioneers.

The President of the Association delivered the opening address, and the exhibition closed with the display of a set of transparencies in the lantern, these being wholly the work of members.

Messrs. J. W. Lindt and Co., Nettleton, R. L. J. Ellery (Government Astronomer), and John Noone (Government Photographer), were well represented. Mr. Ellery sent several photographs of the moon and fixed stars, taken by the great Melbourne equatorial telescope, which was manufactured to the order of the Victorian Government, some years ago, by Mr. Howard Grubb, of Dublin. These would have formed objects of interest at any exhibition—direct photographs of the moon about eight inches in diameter, as well as several enlargements, being amongst them.

The work shown by Mr. John Noone was confined to copies of line drawings and engravings. Many improvements in the process of obtaining these specimens, as well as in photolithography generally, were the discoveries of Mr. Osborne, Mr. Noone's predecessor in the Department of Crown Lands, Melbourne. Papers of Mr. Osborne's were read at the meetings of the English societies twenty years since.

The Association meets on the first Monday in each month, at the Royal Society's Hall, Melbourne, and the members will always be pleased to see any photographers (amateur or professional) from the United Kingdom who may happen to visit Melbourne, and the President (Dr. Browning), the Secretary (Mr. J. H. Harvey), or any other member will be glad to take such visitors by the hand, and pilot them to the many pretty spots worth photographing which are to be found in and near Melbourne and the suburbs.

Correspondence.

August Meeting of the Photographic Society of France.—Eliminating Grease from Gelatine.—To Preserve Sensitive Albumenised Paper.—Presentation of Anatomic Proofs.—An Instantaneous Shutter, by M. Braun.—Another Rapid Shutter, by M. Davids.—M. Audra on the Keeping of Concentrated Solutions of Pyrogallic Acid.—Presentation by Professor Stebbing of Mr. McKellen's Portable Camera.—Vacation of the Society.

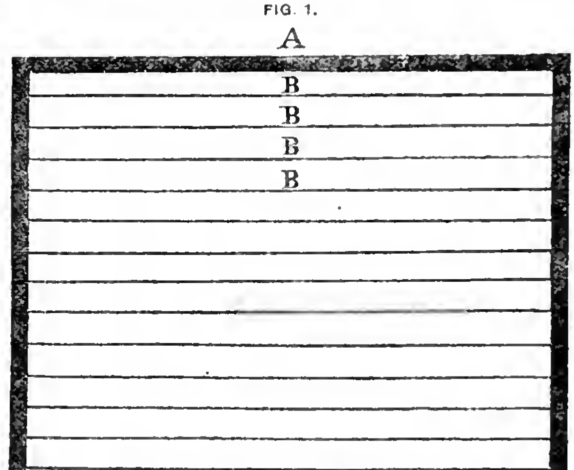
The usual monthly meeting of the Photographic Society of France was held on Friday evening last, the 1st instant,—M. Davanne in the chair.

In reading extracts from the photographic journals the Secretary drew attention to a plan for eliminating grease from gelatine, proposed by Herr Vogel, which, if it were true, is simplicity itself. It consists in merely washing the strips of gelatine in one or two changes of distilled water. An important discussion took place, and the power of distilled water to eliminate grease from gelatine was denied.

I informed my colleagues that I had always washed my gelatine before using it, but the washing was ineffectual when grease was present. I stated my opinion to be that grease was hardly ever equally distributed throughout the whole body of the gelatine, but only upon the surface of the sheets—the cause of which we must seek in its manufacture.

The gelatine, when hot, is received into a square wooden box or mould, the bottom of which is a little smaller than the top. When the gelatine has set the box is turned "topsy-turvy," the lump or loaf of gelatine falls out, and is then taken to a machine which carries the block of gelatine and forces it, as it were, through a frame of knives, which cuts it up into slices. Girls then take these slices and lay them upon network frames to dry. The frame of knives is composed of an

FIG. 1.



A, iron frame; B, &c., thin steel bands, like watch springs.

iron frame in which are fixed from ten to twenty watch springs according to the thickness of gelatine required (*fig.* 1). When very thin slices are desired the difficulty of cutting is at its maximum. It is here that the workman, in order to facilitate his task, greases the thin steel blades of his cutting-frame. This was of very little consequence before the gelatino-bromide process came into favour. A manufacturer informed me that this greasing was only prohibited for photographic gelatine, but he could not guarantee that it was not done "on the sly" by the workmen.

To sum up: I preferred thick gelatine when the quality was the same, and have found the idea given by M. Scola to be the best cure for greasy gelatine. He proposes to wash the gelatine in pure benzoline before using it. I have tried this system and found it good. Only pure benzoline must be used. After having been employed several times for the same purpose it is easily distilled, and so used over and over again.

A Member proposed a mixture of benzoline and alcohol—

Benzoline	....	1,000 parts.
Alcohol	....	250 ,,

A question arose as to how sensitive positive albumenised paper could be kept white for a long period, and the following was proposed :—Float the albumenised paper upon the following solution :—

Distilled water	....	1,000 parts.
Nitrate of silver	....	150 ,,

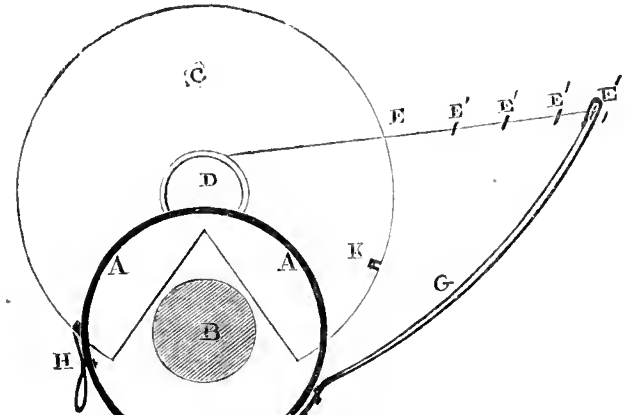
Allow it to remain from four to five minutes, then hang it up to drain. When the last drop has fallen off float the back of it upon a bath composed of citric and oxalic acids. The paper will remain white for a long time.

Another formula highly spoken of by many in the profession is simply to add to the positive bath as much nitrate of magnesia as of nitrate of silver. This addition, it is said, keeps the paper white for several months. If the back of the paper be floated upon water slightly acidulated with hydrochloric acid the whites will remain much purer.

M. Pinard presented some proofs of anatomical work and an oil painting of a surgical operation. A carbon transfer was made and laid upon a prepared canvas; the canvas was thoroughly cleaned by ox-gall, and then a solution of gelatine poured over it. This was found sufficient to make the carbon transfer adhere to the canvas. A painter then put on the required colours.

M. Andra, in the name of M. Braun, of Angoulême, presented a new instantaneous shutter. The shutter is formed by a revolving metallic disc out of which a segment has been taken. This disc is placed in the centre of the diaphragms, in order to obtain the greatest rapidity combined with the least possible distance to travel. On the axis to which this circular disc is fixed is a small wheel, to which is attached a piece of string, and when the disc is turned round for the exposure the string is wound round the wheel. If the string be

FIG. 2.



A A A, lens; B, aperture of lens; C, metallic disc; D, wheel on the axis; E, cord or string; E' E' E' E', knots in string; G, steel spring; H, catch; K, socket for catch.

pulled, naturally the disc will revolve back to its former position so much the more quickly the more violently the string is pulled. M. Braun has replaced the hand by a steel spring attached to the drum of the lens (*fig. 2*). By shortening or lengthening the string more or less rapid exposures may be obtained.

I think it was said that this shutter was constructed for M. Braun by Mr. Dallmeyer, of London. If so, the model can be seen there. I think with a little change this shutter will become the simplest and the best in the market. I should propose to change the string and spring with which the motion is given for a true watch spring on the axis, which could be wound up more or less according to requirements. M. Braun has thus brought out a very simple and workable instrument—an instrument which will remain when all others which have not for their basis the central position of the diaphragms will be, if not lost to memory, at least discarded from daily use.

M. David's shutter was presented, but it was found that it had been brought to our notice years ago under another name. It consists of a circular tube placed in the centre of, and at right angles with, the lens. This lens, or drum, has two holes in its side. When it revolves, and the two holes are in conjunction, the light passes through the lens, and from thence upon the sensitive plate. The drum continuing its course then presents a dark side to the opening of the lens, and the light is cut off.

M. Berge presented a series of calculations upon the true size of the aperture of photographic lenses. These tables, if found to be of value, will be published.

M. Andra informed the members that he had succeeded in keeping concentrated solutions of pyrogallic acid by the following means :—A solution of twelve per cent. of sulphite of soda is made; then another solution containing one-tenth of sulphuric acid is added. Eight parts of pyrogallic acid is now put in, which brings the strength to one gramme of pyrogallic acid for fifteen c.c. of water.

I had the honour to present Mr. McKellen's camera and dark slide. The lightness of the camera was specially remarked. The turn-table "dodge" was admired; but the dark slide obtained the most attention. The idea is very good, but a doubt was expressed as to its practical results, seeing the great difficulty of keeping rapid gelatino-bromide of silver plates from light during their changing in a simple bag.

The President said that if the maker had made a turntable for the bellows, so as to have had the camera of the form of a parallelogram instead of a square a much lighter apparatus still could have been obtained.

The back and front being on the swinging principle, gained the approval of the members.

The Secretary then announced the summer vacation, and the meeting was dissolved. E. STEBBING, *Prof.*

25, *Rue des Apennins, Paris, August* 4, 1884.

LIGHTING THE STUDIO.

To the EDITORS.

GENTLEMEN,—Your valuable and practical suggestion of reflectors, arranged after the fashion of a Venetian blind, will doubtless attract much attention. I presume the reflectors are to be used inside the studio, and not, as in the case of Chappuis' daylight reflector, on the outside.

I consider it such a matter of importance that I would venture to suggest a little set of drawings illustrating the system.—I am, yours, &c.,

79, *Princes-street, Edinburgh, August* 1, 1884. E. DEBENHAM.

[We think that drawings are scarcely necessary to make this matter thoroughly understood. The Venetian blinds may be fixed either inside or outside the studio.—EDS.]

GAS BOTTLES.

To the EDITORS.

GENTLEMEN,—Some time ago, when using a gas bottle, exhibiting for the then Mayor of this town on a public occasion, I was much annoyed at not being able to get a proper light in the lantern and had to give up the entertainment. On examination I discovered that the bottle, which should have contained oxygen, was full of air instead.

On writing to the party who had "filled" the bottle he was honest enough to own that he had found his pump was out of order, and that, therefore, it had been compressing air. No doubt several others beside myself had suffered like inconvenience and annoyance. I have not used a bottle since, as I see no reason why similar misfortunes may not very easily occur.

Query: suppose a bottle is being filled with hydrogen, and, through a leakage in the valves or other part of the machine, air is also pumped in, what would be the consequence?—I am, yours, &c., B. BOOTHROYD.

Southport, July 30, 1884.

PHOTOGRAPHY AND ART.

To the EDITORS.

GENTLEMEN,—If you will not take it amiss, I should like to make a remark or two in reply to your notice of my "mid-air" photographs—the *Flying Cupid*, the *Mercury*, and the *Curfew*—which you were kind enough to publish in No. 1,261 of the Journal.

After some very laudatory remarks, which I feel are not deserved, you state that the "cleverness" (as you were pleased to call it) displayed in the production of these pictures "belongs rather to the stage-carpenter than to the artist." Now, as far as this concerns my individual efforts I have nothing to say; but, if by that remark you imply that such work is at least not legitimate work for the art-loving photographer, it seems to me to merit some reply.

Photography has always been hampered by rigid laws and hostile agencies beyond the control of its devotees, to an extent unknown and altogether unappreciated by the complaisant artist at the easel. The camera artist must of necessity work between set limits—limits prescribed by the laws of optics, of chemistry, of human unsteadiness, &c. Whenever he goes outside of the strict lines so marked out, he attempts the impossible and fails to produce good results. Conceding this, why, *why* should not the art photographer explore the *entire* field of possibilities in his profession? And why would he not be more than justified in calling to his aid the best appliances, not only chemically and optically, but also mechanically, in the furtherance of unusually difficult work? What, after all, is the simple rigging necessary for a suspended position of the subject in the studio but an elaboration of the clumsy head-rest in daily use? And why should not the introduction of the instantaneous plate pave the way for photographic art—effects *formerly beyond the power of the photographer*, owing to the too great slowness of the wet plate?

No; it certainly is not a case of art-atrophy, but of progress, when the camera-worker calls to his aid, in the production of hitherto unattainable results, not only more sensitive chemicals than heretofore in vogue, but also the devices of the stage carpenter or machinist.

I consider photography an art worth living for, and to achieve legitimate and novel results under its banner, especially in life-work, I would subordinate to it the teachings, the applications, the clevernesses of all other known arts; and will not the entire brotherhood agree with me when I say that, if adventitious aid must be used, it is very much preferable to exercise the "cleverness of the stage-carpenter" rather than the methods employed by our best baby-photographers, which suggest the cleverness of the mountebank, the acrobat, and even of the circus clown?—I am, yours, &c., 949, *Broadway, New York.* B. J. FALK.

Notes and Queries.

ARGOSY wishes to be informed whether it is not incorrect and in bad taste for a photographer to print a portrait of a fair lady with auburn hair in such a manner as to represent her hair as being very dark.——To this we reply that it is both incorrect and in bad taste to do so.

"Is a portrait not better when taken by means of a lens very closely stopped down than when a large aperture is employed with the same lens?—A. T. G."——Answer: Not necessarily so; for, on the contrary, it may be said that the larger the aperture the greater the degree of pluck and vigour in the portrait caused, *inter alia*, by some parts being better defined than others.

"IRON" says:—"Could you kindly inform me what would turn ferricprussiate paper black after it has been fixed and washed (when it is blue)? I have tried a weak solution of ammonia, which only turned it a deeper blue, and oxalate of potash, the same as used in iron development, but the picture simply disappeared."——We reply that no reliable toning formula for the conversion of blue into black pictures has yet been published.

G. B. T. inquires:—"If I render a photograph transparent and colour it from behind do I infringe any patent?"——In reply: Innumerable patents have been taken out for doing what is here proposed; but as it was published and given freely to the world long before the first patent was taken out the method may, of course, be practised by anyone who chooses without any hindrance. It has been estimated that more patents have been taken out, in succession, for this method of colouring photographs than for any other invention, or so-called invention, ever brought before the public.

"I HAVE been troubled of late with blistering of my prints. After I have toned and fixed them blisters appear more or less all over the print. They are about the size of a pinhead or larger. When dry they still show, or where they are the spots are a little darker. Any remedy will be thankfully received by S. J. B."——In reply: Let our correspondent try the following:—After fixing the prints transfer them directly to a moderately-strong solution of chloride of soda, and allow them to remain in it previous to placing them in the washing tank. If this do not prove a remedy let our correspondent write again, enclosing a sample of his paper.

MONA says:—"Kindly inform me in next Journal how to use Weston's burnisher. I have one, and every time I try to use it, although I clean it well, the cards always stick and the back is spoilt."——In reply: "Mona" must first of all see that the feed roller is made rough by being rubbed longitudinally with coarse emery cloth. He should next give the prints a slight application of a suitable lubricant, such as an alcoholic solution of Castile soap, and, having made the burnisher warm, he must then pass the prints through, not applying too great pressure. Under these circumstances they will not stick, nor will the back be damaged in any way.

THOS. DUGDALE, Jun.—This correspondent has a studio situated just as described in an article in our last number; that is to say, it is surrounded by high buildings in such a manner and to such an extent as to render it exceedingly difficult to take a portrait in which the top light is not greatly in excess. He is favourably impressed by the idea of Venetian blinds of silvered glass, and believes it will effect a perfect cure of his trouble. He wishes a further hint or two with regard to the dimensions and method of fixing them.——In reply: The wooden laths should be about five inches wide, the glass being of the same width, and let the distance of one lath from another be such as may be determined by a trial. The frame containing the laths may be erected either outside of the side windows or inside.

J. G. G. writes:—"1. How is it that central flare is caused by *some* lenses and not by others?—2. I am not yet aware that I possess strength in any special department of photography, but the subjects I prefer to go for are actual operations and old implements of manufactures. As I find that the largest percentage of the prizes, &c., are given for the largest pictures, I wish to know the *most generally useful* size of camera and lens for one who wishes to compete with some chance of success."——In reply: 1. Central flare mainly results from the position of the lenses as regards distance from each other.—2. If our correspondent will employ 12×10 plates, or even those one or two sizes larger, he will have a good chance of producing imposing-looking pictures, which will undoubtedly attract more attention than if they were of small dimensions.

W. says:—"I observed in your Journal of the 25th ult. a plan of intensifying gelatine plates by mercury and sulphite of soda approved of in one of your leading paragraphs. I have just tried it. I washed the plate very carefully, bleached it with bichloride of mercury, then washed carefully, and put it into a bath of sulphite of soda (saturated solution one ounce, water one ounce), and, after keeping it there for twenty minutes, no change appeared; so I again well washed it and placed it in the usual ammonia bath, when it became black. I may mention that I develope with the oxalate of iron developer. Can you give me any reason for my failure?"——In reply: This is so contrary to the experience of ourselves and friends as to lead to the surmise that the substance tried cannot have been sul*phite* of soda at all, but probably sul*phate*; or, if it has been sulphite originally, it has oxidised into sulphate.

"IN last week's Journal I notice your reply to a querist asking particulars respecting North Wales. I should also be glad to know what focus of lenses for covering whole plates would be the best to take to that district. In the articles *Where to Go with the Camera* places are described as being good for camera work, and this place and that place are mentioned as making charming views; but I have looked in vain to see the size of plate and focus of lens best adapted for taking the view. Unfortunately some amateurs possess only one lens, and when they get on the spot find they are unable to take the view. I think you will agree with me when I say that if, in the descriptions of places they will take a certain size of plate—say whole plate—and give the focus of the lenses used in the production of the best views, the writers would confer a benefit on amateurs working the district described.—JOHN T. LEES."——To this we reply that such addition to the description of places as is here suggested is really unnecessary; for if a photographer will provide himself with a very small equipment of lenses—one of which has a focus nearly equal to the length of the plate employed, and another somewhat longer in focus—he will be prepared for almost every emergency as regards included subject. This is not a matter of size of plate, but one of relation of foci of lenses to the plate, no matter what its dimensions may be.

PRIMULA writes:—"I am about to deliver a popular lecture on photography to the children and teachers of a Sunday school with which I am connected, and would feel greatly indebted if you inform me what light I should use in order to take a photograph from the life in the course of my lecture. Not having any experience of the lime light I would greatly prefer the employment of any other means of illuminating my sitter."——In reply: The best light for such a purpose as the one described is that emitted from magnesium. No preparation or gas bags are required. The metal is ignited and burns brilliantly. It may, however, be necessary, and it certainly will be desirable, to make ample provision for getting rid of the fumes emitted from the incandescent metal. "Primula" should make a careful and thorough rehearsal of the intended experiment previous to the evening on which he intends to lecture, and he will thus ascertain by personal experience the precise quantity of magnesium required to give light sufficient to impress an image on a gelatine plate. If from any cause our correspondent, from necessity or choice, cannot employ the magnesium light, he may obtain a light of great actinic power by the admixture of one part of sulphide of antimony and two parts of sulphur with six parts of nitrate of potash. These ingredients must be powdered separately when dry, and then thoroughly mixed. When ignited this gives a light of surpassing brilliancy.

Exchange Column.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPHS REGISTERED.—

William Pankhurst Marsh, Norfolk Cottage, Bognor.—*Three Instantaneous Photographs of Esplanade and Sands at Bognor. Two Photographs of the Goodwood Racecourse.*

J. AND A. J. HOPKINS.—Received too late for this week.

F. WRIGHT.—The apparatus in question is not an article of commerce—at least in this country.

R. L. M.—No relative, so far as we know—certainly not what may be termed a very near relative, at anyrate.

J. G. G.—The gentleman you name uses plates nearer to twenty inches than of quarter-plate dimensions. For other replies see *Notes and Queries.*

E. H. D.—Your letter has been forwarded. We shall be most happy to meet you when you are in our neighbourhood.

T. H. S.—See in *Our Editorial Table* for notices of handbooks or manuals for beginners. We have no preference for, and never recommend any, special one.

A. Z. and NEMO.—These correspondents have not complied with our rule by enclosing their names and addresses; hence their queries remain unanswered.

K. F.—Any of the formulæ given in our ALMANAC for the last three or four years may be employed. You will, perhaps, get on better by employing a slow emulsion in your first experiments.

INQUIRENDO.—Several plans have been suggested for reducing over-printed pictures; but the best remedy in practice is to tear up the prints and make fresh ones. It is best and most satisfactory in the long run.

A. H. I.—There is no question that if the plate were not thoroughly washed the developing action would proceed, to some extent, while it was soaking in a small quantity of water, which might increase the intensity slightly.

G. HOLLINGSLY.—The advantage of trimming the prints prior to toning is that you economise gold. Bear in mind that if the dark edges remain they will, of course, be toned the same as the picture, and, possibly, consume more gold than the image.

P. S.—Unless you possess one of the graduated screens actually prepared by Mr. Warnerke for use with his sensitometer it is hopeless to attempt to draw any line of comparison between your own results and those of others. The mere possession of a phosphorescent tablet means nothing—if you made it yourself, perhaps less.

QUARTER-PLATE.—Any firm who makes a speciality of enlargements will do the work for you, but we doubt if they can supply the diagram in one piece; it would probably have to be joined. Would it not answer your purpose to project the image of the transparency, by means of a magic lantern, on to a screen and then trace it with crayons?

W. S.—The best plan of preventing the collodion plate drying during hot weather is to place a wet cloth at the bottom of the camera during the exposure. A somewhat thick collodion, made with a porous pyroxyline, will also help matters considerably, as such a collodion has less tendency to dry—or, at least, to produce stains—than one made with a horny sample.

FREUND.—The result is quite as it should be. The effect of adding barium nitrate to the ferrous sulphate is to bring about an interchange of elements, ferrous nitrate remaining in solution while insoluble barium sulphate is precipitated, and should be removed by filtration. Acidify with acetic acid, and employ in the usual manner. This developer was highly recommended at one time.

PUZZLED.—You are using a lens of far too short focus. Instead of replacing your seven-inch focus objective by one of five inches, you would have done better to have changed it for one of ten or twelve inches focus. Your argument that because the five-inch lens is a more powerful magnifier than the seven-inch it should render the object on a larger scale in the camera is based upon a complete misapprehension of the laws of optics.

A NOVICE IN PRINTING.—The "marbled stains" on the piece of paper enclosed arise from you having floated it upon the sensitising bath while it had a scum upon its surface. If, after floating a few pieces of paper, you allow the solution to stand in the dish, in a short time a scum forms upon the surface. This must always be removed by drawing a strip of blotting-paper over it; otherwise you will always be troubled with the markings.

CANARY.—1. The yellow precipitate you complain of is sulphur—the result of the decomposition of the sodium hyposulphite by the acid. Acid should never be added to the hypo.; it is, indeed, better to purposely render it *very slightly* alkaline.—2. The "new fixing agent," as you describe it—sodium thiosulphate—is only our old friend hypo. in a new garb. The correct modern name for the salt you know as sodium *hyposulphite* is sodium *thiosulphate*.

JAMES HENDERSON.—Your room will certainly be improved for portraiture if you increase the size of the side window as you propose; also, by the addition of a top light—say extending half way across the roof and the same length, or a little longer than that at the side. The cause of the heavy shadows in the portraits sent is that you have not managed what light you at present possess to the best advantage. Read the series of articles on *Portraiture for Amateurs*, which appeared in our volumes for 1882 83. These will afford you much useful information.

W. S.—The spots are by no means easy to be accounted for. If the mounts had been printed with bronze powder we should at once have attributed the spottiness to particles of the bronze on the front of the cards. However, this may still be the cause. Have you any mounts printed with bronze about your mounting room? or have any been passed through the rolling-press at the time these were rolled, through which particles of the powder might have adhered to the rollers, and so caused contamination? If not, the most likely suggestion is that there is something deleterious in the mountant you have employed.

FORRESTER.—1. There is no satisfactory method of reducing a negative which has been intensified with mercury.—2. The small spots are, in all probability, due to the negative being insufficiently washed after intensification; hence contact with the silver paper has caused the spots. The plan you have pursued in mercurial intensification will not, *per se*, produce spottiness; that is caused by the silver in the paper.—3. All things being equal, no difference should exist between the exposure of the two lenses. It may happen, however, that from a difference in the tint of the glass one instrument will be somewhat more rapid than the other.

J. G. LEWIS.—The "cut-out" appearance of the portraits is due to the background being placed too close to the figure. Arrange it so that it shall be three or four feet from the sitter and the effect will be far better. Never mind its being out of focus—all the better.

THE LATE MR. J. L. LANE.—We regret to have to announce the decease of this gentleman, so long identified with the manufacture of cameras and other photographic requisites. Although long a sufferer from illness, the deceased retained to the last the clearness of judgment and intellect which he always possessed in a remarkable degree. On the 19th ult. he was taken suddenly ill, and died on the 29th, "full of years and honours." The funeral took place at Norwood Cemetery on Tuesday last. We understand that the business will be carried on by his sons, under the style of "J. L. Lane and Sons." On the latter has for some time devolved the conduct of the business during the long illness of the senior Mr. Lane,

MOUNTING PRINTS ON MUSLIN. — At a recent meeting of the Rochester (New York) Photographic Society, Mr. J. M. Fox gave the following account of his method of mounting prints on cloth. He said:—"After trying many experiments in double mounting on muslin I have adopted the following method:—I prepare several yards of cloth at a time by sizing with starch, and always keep a roll of it on hand ready for use. While damp the cloth is stretched not too tightly on a frame and sized plentifully with warm starch paste made rather thin, and spread on evenly. Where large quantities of muslin are used perhaps tenter bars might be employed to advantage for stretching. When dry cloth is cut to the size required before mounting, allowance being made for the expansion of the prints, if the starch for mounting be used while warm (which I think is preferable), it should be as stiff as can be conveniently spread on the print, for the reason that it will expand the cloth less and dry quicker. From the moment the first print touches the cloth dispatch is important; therefore both prints are first pasted, one being laid aside ready to be picked up quickly. The first print is rubbed down with a hand-roller, which can be done more expeditiously than with the hands. When the second print is properly laid on the side there is less occasion for haste, and rubbing down by hand is preferable; because, although the roller does the work perfectly on the first print mounted, it is liable to leave air-bubbles in rolling down the second one. To avoid bubbles in the hand-rubbing the strokes should be towards the middle of the print, and not in every direction from the centre. When the mounting is completed the prints are placed between papers and covered immediately with several folds of cloth of sufficient weight to keep them in place. To facilitate drying they may be aired after an hour or two and placed between dry papers and again covered with the cloth."

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. STEWARD, Optician,
For three Weeks ending August 6, 1884.
THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

July.	Barometer.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max. Shade Temp.	Min. Tem.	Remarks.
17	29·76	W	64	59	114	74	55	Cloudy.
18	30·03	W	62	57	114	70	53	Bright & Clear.
19	30·10	W	60	55	115	69	51	Cloudy.
21	29·95	SW	63	60	93	71	57	Cloudy.
22	30·00	W	64	61	101	74	57	Overcast.
23	29·93	W	63	61	107	72	61	Overcast.
24	29·76	W	62	56	113	70	51	Cloudy.
25	29·91	NW	58	54	106	68	50	Cloudy.
26	30·13	W	56	51	85	64	46	Hazy.
28	30·12	N	58	55	106	71	54	Cloudy.
29	30 05	W	64	62	89	69	56	Overcast.
30	30·19	E	65	62	86	68	61	Overcast.
31	30·20	W	66	61	111	80	59	Hazy.
Aug. 1	30·10	NE	66	64	116	83	61	Hazy.
2	29·93	SW	73	66	122	85	61	Bright & Clear.
4	30·23	W	63	57	113	76	53	Cloudy.
5	30·25	SW	63	58	116	79	54	Hazy.
6	30·14	SE	67	61	118	80	55	Dull.

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1267. Vol. XXXI.—AUGUST 15, 1884.

ALBUMEN IN GELATINE EMULSIONS.

With regard to the persistent clotting which occurs when silver nitrate is added to even a thick solution of gelatine containing albumen, the result may be pretty safely laid down to the coagulation of the albumen, and not to the formation of albumenate of silver; that is to say, if albumen could be introduced into the emulsion in such a form that, while still capable of combining chemically with silver salts, it remained uncoagulable either by their action or by heat or alcohol, then the difficulty of obtaining an emulsion of silver albumenate would be removed.

There is no obvious reason why albumenate of silver should precipitate in a coarser state than bromide, chloride, or iodide; indeed, from the nature of the compound it would seem to offer the prospect of being more easily diffused in a condition of extreme fineness in a viscous solution than any of the inorganic silver compounds. We know, moreover, that albumen can be mixed with gelatine to form a clear solution so long as the temperature remains below a certain point; but immediately it is raised sufficiently high to cause coagulation, the objectionable want of homogeneity is produced. Hence we have been led to the conclusion that it is coagulation, *per se*, that has to be guarded against.

One of the first suggestions that presented itself was the formation of the albumenate separately, and its subsequent addition to the emulsion in alkaline solution; but this plan was at once rejected on trial. In fact, it soon became clear that, in order to preserve the conditions which are necessary to the preparation of a successful emulsion, there must be no complications arising from the presence of foreign matters. It was needful, therefore, to seek for some means of modifying the character of the albumen itself.

Few of our readers require to be told that albumen exists in the soluble and insoluble conditions. It exists in the former state naturally, but is changed to the latter by the application of heat, by the action of alcohol, and by a very large number of metallic salts and the mineral acids. This change is known as "coagulation," and upon it depends the chief value of albumen in its industrial application. For our purposes, however, we have to endeavour to avoid coagulation by altering the character of the albumen.

It is not needful to go into the whole chemistry of this interesting substance, nor to detail the remarkable series of reactions it exhibits under various conditions. We shall confine ourselves merely to one or two methods of treatment which seem to offer the chance of bending it to our purpose.

We have said that soluble albumen is converted to the insoluble form by heat and by the action of the mineral acids. These conditions may, however, be nearly exactly reversed. Thus, acetic, citric, tartaric, phosphoric, and most of the organic acids fail to produce any precipitate in dilute solutions of albumen; but if added to concentrated solutions the whole solidifies to a jelly, which may be freed from excess of acid by washing. This jelly possesses properties the reverse of ordinary albumen. It is solid in the cold, but becomes liquid when heated, and again sets into a jelly as it cools just as gelatine does. It is not coagulated by alcohol—indeed is partly soluble in that liquid—and it may be boiled without coagulation.

Unlike ordinary soluble albumen, however, this solution is precipitated by weak alkalies and by solutions of the neutral salts of the alkali metals. On the other hand, many of the metallic salts which coagulate soluble albumen fail to produce any precipitate with the warm solution of this jelly.

The non-coagulability of this substance by heat would seem to render it specially applicable for use in emulsions that have to be boiled, while the fact of its setting upon cooling forms another recommendation in its favour; still another is the circumstance that when once dried it becomes insoluble, so that films containing this altered albumen would be particularly hard and suitable for use in hot climates. But its easy decomposition by neutral and comparatively-inert salts renders it probable that its utility would be very limited in the ordinary methods of emulsification, as both the alkaline bromides and the nitrates produced by double decomposition would precipitate it in a more or less flocculent form, and most probably in such a state as to render the emulsion worthless. For these reasons we have not yet experimented with this curious substance, but mention it as being a possible means of employing albumen.

We have, however, obtained some tolerably satisfactory results with a similar preparation, though it would be premature to say much at this stage of our experiment. We may, however, venture to assert that it is extremely easy to make a gelatino-albumeno-emulsion in which the albumen may be present in almost any desired proportion in *chemical* combination with the silver salts—an advance on our previous experiments that we could scarcely have hoped to attain a short time back. We have as yet not had time to adjust the proportions of the various materials so as to make a good working formula, but we may hope to do so soon. Meanwhile, we give a general sketch of the *modus operandi* in order that those of our readers who choose to do so may take up this line of experiment.

If the white of an egg, just as it comes from the shell, be beaten and allowed to settle and then treated with a strong solution of caustic potash it is transformed into a tough, gelatinous mass, which may be broken up and washed in cold water until free from alkali. The proportion of alkali we have employed has been sixty grains of potassium hydrate (dissolved in two drachms of water) to each ounce of albumen. Add this gradually to the albumen, stirring very thoroughly, as, if added too rapidly, the gelatinous mass becomes so stiff and unmanageable as to cause considerable loss. Allow the action to continue for a-quarter of an hour, and then pour off the solution and wash rapidly in several changes of water; finally, break up the mass into small pieces, and wash in running water in a canvas bag for some hours.

The result at ordinary temperature is a firm, gelatinous substance closely resembling clear, swelled gelatine. If it be exposed to the temperature of boiling water, over a water bath, it slowly liquefies, and remains permanently liquid on cooling. The jelly may be dissolved in boiling alcohol, and from this solution it is again precipitated by ether, still retaining its original properties. Organic acids precipitate it in a form insoluble in water, either hot or cold, but soluble in excess of acid. With nitrate of silver it forms a fine, white precipitate—presumably silver albumenate—which darkens rapidly to a full black in sunshine.

If a certain proportion of this jelly be heated with gelatine until completely dissolved, the soluble haloids and, subsequently, the silver nitrate added, an emulsion is formed possessing all the smoothness of the finest gelatine emulsion, and possessing the additional property of darkening rapidly to a full, strong tint on direct exposure to light.

For the reasons we have given we make no attempt at stating a formula, but place the matter in our readers' hands ready for experiment.

In our article last week, page 497, twelfth line from the bottom, for "bromine absolver" *read* "bromine absorber."

VIGNETTING FRAMES.

A vignetting attachment to a printing-frame exhibited at the last meeting of the London and Provincial Photographic Association is believed to possess certain features which may render the details of its construction of value to some of our readers.

Its principle—that of universal adjustment—has been recognised for many years; not only so, but certain applications of the principle have formed subjects of patents, and have already elicited our encomiums on account of their ingenuity. In this special example of carrying out the principle the materials are of such a nature, and the workmanship so very easily effected, as to render its construction a matter which will fall within the powers of any one whose mechanical skill does not even extend beyond the rudimentary stage. This vignetter is, in its precise form, of American origin, and is stated to emanate from a photographer bearing the Chinese cognomen of "Singhi."

A light wooden frame is fashioned so as to fit over the printing-frame, much in the same way as a cap fits upon the hood of a lens, and with a similar degree of tightness. A little glue, aided by a few brads, suffices to keep the frame together. Attached to one side of this frame is a cover formed of a very thin, hard, brown millboard of about the thickness and consistency of a cardboard mount of good quality for cabinet portraits. It is highly calendered, and is known in the paper trade as "glazed board." A sheet of this forms the cover of the frame, to which it is attached by glue or, as in that which we examined, a half dozen small brass tacks. In this cover is an aperture of dimensions corresponding to that in the printing-frame, whether whole-plate, half-plate, or any other size. When, therefore, this framed cover is placed upon the printing-frame there is nothing to prevent the negative from being printed full out to the margin. But glued to each end, and on the face of the cover, is a strip of the same millboard one inch in width, having a slip underneath throughout half its breadth so as to provide accommodation for another sheet of board intended to slide underneath these guides, like the rising-front of a camera. This sliding sheet—the motion of which is across the frame—also has in it an aperture of the same dimensions as that in the fixed or foundation piece; and it, too, is fitted with strips like the other for the reception of still another sliding piece. In this case, however, they are placed in the longitudinal direction of the aperture—not across it, as in the previous one. Now, it will be obvious that if another sheet of millboard, containing an aperture, be made to slide in this latter piece, it will be possible by the two motions, longitudinal and transverse, to bring such aperture directly opposite any part of the negative. But the principle of universal application is carried still further. One of the longitudinal sliding pieces is fitted with guiding strips so as to permit of still smaller slides being employed, and these may contain oval, square, circular, or pear-shaped apertures, placed in any desirable position and of even the smallest dimensions.

When covered with tissue paper, or when printing in the shade without such covering, the vignetting of a figure is effected with the greatest accuracy. The adjustments are quickly made, and if the operator have not a mask of the precise form suited to the requirements of a particular portrait, one may be made by either cutting an aperture in a slip of paper and fixing it with gum to one of the cardboard slides, or by aid of a crayon stump and black chalk a Waymouth vignetting paper may be extemporised.

This is a convenient form of vignetting mask, introduced in the summer of 1872 by the late Mr. John D. Waymouth, of Nailsea, near Bristol, consisting of a sheet of thin and transparent paper printed black all over, except in the centre, in which is a clear aperture of one or other of the numerous forms employed in vignetting—this aperture having graduated edges to form the vignette. As the whole stock was, on the death of Mr. Waymouth, purchased by a gentleman in the south of London, there are no genuine Waymouth vignetting papers now to be had; but their preparation is not attended with any difficulty. It is only necessary to obtain a sheet of opaque paper of any kind, cut in it an aperture a little longer than the vignette desired, paste over it a small sheet of tissue paper, and with the crayon stump or a bit of black chalk to carry in the opacity gradually from the margin of the tissue-paper towards the centre, leaving a portion there quite clear. There being now no restriction, moral or legal, upon its manufacture or employment (although when first brought out twelve years ago Mr. Waymouth had his invention protected by a three years' registration), there is no reason why some enterprising lithographer should not manufacture these papers in this country as well as in the United States of America, where, we learn from contemporary transatlantic journals, one person at least manufactures and supplies them to the public. But all this is by the way, so we return to our vignetting-frame.

If the vignetting-frame be pushed closely down upon the printing-frame this action will ensure the vignetting-mask being situated at a definite distance from the negative. But it may happen that a still greater distance might be desirable, in order to obtain an enhanced degree of softness in the vignetting. This is secured by a method the simplicity of which will approve itself to everyone. A band of elastic tape, attached to the vignetting-frame at each end in such a manner as to pass round the printing-frame, secures both of these together, and by means of a square perforation near the ends of the former it is possible to insert between the two frames a square stick, the point of which is wedge-shaped for facility of entrance. This effects an increase of the distance between the vignette-mask and the negative to an extent equal to the thickness of the stick. By these means the vignetting may be either made gentle or abrupt.

GREASE IN GELATINE.

It is needless to say that workers in every branch of photography in which gelatine is concerned know quite well it is rarely that any two samples of this material can be procured commercially which are identical in their characteristics, although they may have been made by the same manufacturer—unless, indeed, which is seldom the case, they happen to be actually out of the same batch or making. These remarks, be it understood, do not apply with equal force to the better class of gelatines by English makers, for, as a rule, they are far more uniform in their character than are those of foreign makers.

Unfortunately, however, English gelatines are not so well adapted for many photographic purposes as are the better qualities of continental gelatines. The latter, generally speaking, are harder and less soluble than the former, which renders them far more suitable where toughness and insolubility is an absolute necessity, particularly at this season of the year. Apart from the want of uniformity in composition, foreign gelatines are liable to produce certain spots and pits in the film, which are far too familiar to dry-plate workers. It frequently happens that those samples which, in other respects, may be most suitable are those which give the greatest amount of trouble with regard to pits and spots. It may not be so generally known that pits, like those on dry plates, are always formed in the film, if a similar sample of gelatine be used in the collotype process; and here they cause spots on the impressions when taken from the plates. If a pitting sample of gelatine be employed in the carbon process—either for transfer paper or tissue—it gives equal trouble; for what in a film formed in a horizontal position (as on a dry plate or a collotype plate) would be a pit becomes what is technically called a "bleb," formed thus:—As the paper leaves the solution the pit forms, and, as the paper is for a short time in a vertical position, the pit elongates and causes a tear-shaped mark of thinner coating.

Various theories, as all our readers are aware, have been promulgated to account for these peculiarities—one of which is, that they have their origin in grease. But the grease theory will not account for all the spots met with. Evidently there are spots and spots, and, until gelatine makers will take photographers more into their confidence, and let them into a few of their "trade secrets," we fear we shall still be troubled with uncertainty, as the manufacturers do not thoroughly understand the photographer's requisites, even if they *could* meet them. Incidentally we may here mention that some of the worst samples of spotty gelatine we have had to deal with were labelled as being specially prepared for photographic purposes.

There is no question whatever that for every purpose, photographic or otherwise, for which gelatine is employed grease must always be more or less an evil. The questions very naturally suggest themselves as to how the grease is introduced into the gelatine, and if it be not possible to eliminate it. Grease may, and probably does, exist in two forms: one in which it is incorporated with the gelatine in its manufacture—possibly from small particles of fat on the hides, bones, or sinews from which it is made; the other in which it exists on the surface only, acquired after the gelatine has been made—in all probability from the nets or wires upon which it is dried being slightly greased, to prevent its adhering, or maybe from the machinery used in cutting it into flakes or shreds.

The elimination of grease from gelatine is by no means the easy matter that it may appear, particularly when it is incorporated with the gelatine itself. One of the plans suggested—and it is one that might be supposed would answer—is to add to the gelatine ammonia or other alkali in small quantity, with a view of converting the grease into soap, and so render it innocuous. On putting this suggestion to the trial of practice it has proved to be ineffectual, as it fails entirely to eliminate the greasy matter when it is incorporated with the gelatine, though it may answer to an extent when it is on the surface only. Another plan which has been suggested is to precipitate the gelatine from its solution, wash the precipitate, and then redissolve. Theoretically this plan should answer, but in practice it does not produce satisfactory results. In one or two experiments with this method we have been successful, but in others we have failed completely. In fact, one sample thus treated proved to be, with regard to pits, about the worst we have ever met with.

At the last meeting of the Photographic Society of France the subject of the elimination of grease from gelatine formed a topic for discussion. This arose out of a suggestion of Herr Vogel's to wash the gelatine in two or three changes of distilled water. Why this treatment should remove grease we fail to see, and, at the meeting referred to, the fact that it did so was denied. If the grease exist only on the surface it can, however, generally be completely removed by washing the gelatine with either ether or benzole. Several samples that we have experimented upon, which pitted badly before, after this treatment gave a film as free from spots or pits as could be desired. But this plan fails entirely when the grease is diffused through the substance of the gelatine.

The only plan which has proved effectual in our hands under all circumstances is that of clarifying the gelatine with albumen, as described in our columns quite recently. With it we have made a great number of experiments, and we have never met with a single failure. But whether it will answer under every condition, in the presence of the vagaries of gelatine, it is too much to hazard an opinion. Now, having to clarify or otherwise treat a gelatine before it can be successfully employed is undoubtedly troublesome and inconvenient. In practice it is far more convenient and economical in the long run to discard an unsuitable gelatine than to attempt to doctor it before it can be used. There are samples to be met with which do not require any such treatment; but, as we have said before, they cannot be relied upon at the time of purchasing.

Unfortunately, at present we are as much at the mercy of the gelatine manufacturers as we are of the photographic paper-makers, and must, perforce, be content with what they supply and make the best of it. As a practical hint, we may say the best plan of obtaining a reliable article is to procure a small quantity of different samples, try them, and, when one is found which works satisfactorily, to secure a sufficient quantity to last a considerable time, as gelatine does not deteriorate by keeping, provided it be kept in a dry place. This plan, if it be adopted, will save much trouble and anxiety, and, it may be mentioned, is one frequently pursued by large consumers. One firm we are aware of, who manufacture dry plates, found, a short time back, an exceptionally good sample for their purpose in the market, and secured the whole making, amounting to many hundredweights, congratulating themselves by so doing that for a considerable time to come they would be free from all anxiety—at least with regard to the character of their gelatine.

PHOTOGRAPHY AND PHYSIOLOGICAL OPTICS.

Photographers do not differ from others in wishing to possess the *mens sana, in corpore sano;* but, though doubtless all of them thoroughly believe in their enjoyment of the former, the possession of the latter, so far as regards that organ alone which now interests us, the eye, is by no means common. We pointed out last week how desirable it was for every photographer, working as he does under trying conditions of light, to make use of spectacles or adopt other optical assistance rather than strain his eyes in the slightest degree in endeavouring to discern details of his work which are rather beyond his ocular powers.

With regard to the actual capabilities of the eye: it may be interesting to note that the results of a large number of examinations show that a minority of persons possess healthy, normal eyes. Thus, twenty-eight per cent. possess the peculiarity described by us last week as existing in one of our contributors, though not to the same extent—we refer to the unequal power of the eyes; and seven per cent. find the reading of the small type termed "diamond" beyond their capacity altogether, thus clearly showing that one man out of every fourteen could not focus accurately without some kind of lens to assist him.

It has been roundly asserted of late years that the strain put upon the eyes of school children and students is causing a gradual deterioration in the present generation; but the statistics we have referred to show that such is not really the case, and that, on the contrary, from the age of ten upwards to forty a slight improvement takes place. The Rev. T. K. Preston, of Marlborough College, has made a large number of examinations of the boys and found that the eyes of more than one-half of them were astigmatic to a greater or less extent, and that this particular quality increased with age. It is evident that anyone whose eyes were so defective could easily arrive at a false judgment as to the qualities of a lens under examination unless certain precautions were taken.

This part of the subject is too large to enter upon fully in our pages, though we may be induced at some future time to give a few examples or diagrams which would enable anyone to test for himself the exact power of his own eyes. Meanwhile we advise those of our readers who should visit the "Healtheries" to find out the Anthropometric Laboratory, where will be found every convenience for testing eyes accurately and scientifically, and with skilled assistance to aid. Several hundreds of examinations have already been made, constituting a valuable addition to the accumulated store of facts, in addition to satisfying a laudable curiosity—or, perhaps, we should say a legitimate desire for information.

Among other data the kind of colour-blindness and the degree to which the visitor's defect extends may be ascertained without difficulty, this peculiarity especially being one not readily discriminated without special means at hand. It exists in many persons, some of whom are known to have been quite ignorant of it almost through life. We could instance the case of a colour-blind gentleman who was educated as an artist, passed through school and college in ignorance of his defect, and did not discover it till he had arrived at manhood. We could point out another gentleman who is so entirely colour-blind that, on a recent occasion, he could not discover any difference between the colour of blood and a piece of blue wrapping-paper. There are individuals who have a generally imperfect power, of greater or less extent, of discriminating colours, and others whose defect of power lies in certain directions only. Thus, there is green blindness, red blindness, and violet blindness—each of which naturally is to be perceived, not alone in the examination of objects so coloured, but in all hues and tints of which it forms one of the constituent elements.

The actual percentage of colour-blind male subjects out of over fourteen thousand examined, all classes mixed, is 4·16—that is, about one person in every twenty-five is colour-blind; but of a smaller number of females the percentage was ·4—that is, one in two hundred and fifty. Members of the Society of Friends had the largest proportion of colour-blind, 5·9 being the proportion.

With all these facts before us it becomes matter beyond doubt when the question of dark-room illumination and the visibility under different lights of certain tests—printed matter, and soforth—is being discussed, that there is every probability that some of those who take part in it are deficient in the colour sense to a certain extent, and so are incompetent to give an opinion of any value to photographers whose eyesight is normal. Probably, if the most vigorous tests possible were carried out, it might be found that very few people indeed had eyes perfectly perceptive of all colours. We ourselves, at the moment of writing, while feeling that we possess the power of colour perception to an acute degree, are conscious of a distinct difference in the quality of light as perceived by the right or left eye; but to be able to note such minute differences requires both the power to receive and the training to observe such *nuances*.

As we have said, we recommend everyone who possibly can to pay a visit to the Anthropometrical Laboratory at the Health Exhibition to learn for himself. For those who cannot we strongly recommend the purchase and perusal of a little work lately published by Churchill, embodying the recommendations of the Anthropometrical Commission of the British Association, altered and improved in this, the second edition, by the editor, Mr. Chas. Roberts, F.R.C.S. The work is entitled *The Detection of Colour-Blindness and Imperfect Vision*, and it contains a variety of carefully printed diagrams and letters for enabling the qualities of long and short sight, acuteness of vision, astigmatism, &c., to be ascertained. At the end of the book also, worked on to the last page, will be found a set of coloured Berlin wools, arranged in series upon a given plan, so that the degree of colour-blindness and its kind can be readily tested. When, finally, we say that the publishing price is only five shillings, our readers will not think we are recommending a large expenditure to satisfy the gratification of a desire for knowledge, whether it be termed laudable curiosity or thirst for information.

The ample programme issued thus far in advance of the opening of the International Inventions Exhibition, which is to form the third of the series inaugurated last year with the "Fisheries," and continued this year by the "Healtheries," gives promise that it will be at least as interesting and popular as its predecessors. In photography especially, which is honoured by having a group to itself, we have particular reason to be satisfied with the arrangements, and we have little doubt that there will be a full response. One noticeable feature is the total absence of the almost antediluvian notions which generally mark the official arrangements in connection with photography at such exhibitions. Here all is fresh and modern, and, as a matter of course, useful.

The editor of the *American Monthly Microscopical Journal* gives a very fully-detailed method for treating alcoholic solution of shellac to get rid of the well-known thick opaque magma which, by the ordinary method of treatment, is so difficult to filter out. We have often pointed out that shellac contains certain matters not entirely soluble in spirit, and that the part which is soluble is not simply one homogeneous substance, but is a mixture. The important question arises—"Does the process of freeing the solution from its insoluble accompaniment in any way interfere with soluble constituents?" Experience alone can determine, and it would be advisable to put the matter to the test. The instructions are as follow:—To prepare the cement obtain from the paint shop a quantity of shellac and good varnish, or prepare it by dissolving common shellac in alcohol. It is well to use five or six ounces of the varnish, as there will be considerable shrinkage of volume during the process. Place the varnish in a bottle, which should not be more than two-thirds full, and add to it about a quarter of its volume of naphtha or petroleum spirit. In our recent operations we used gasoline, which happened to be at hand, with satisfactory results. Put in the cork and shake well in order to thoroughly mix the two liquids. Let the mixture stand a few minutes, and shake it again, repeating the operation two or three times. Then let the bottle stand undisturbed for twelve hours, or as much longer as convenient. The naphtha will be found in a layer above the shellac containing the flocculent matter, which, being insoluble in cold water, renders the ordinary solutions of shellac turbid, while the alcoholic solution beneath will be perfectly clear. With the aid of a syphon, extemporised by means of a piece of rubber or glass tube, the clear shellac may be drawn off from beneath the naphtha.

There seems to be a probability that the metal iridium, which, from its peculiar properties of extreme hardness and power of resistance to all chemical agents, would be of great value for many technical purposes, may be rendered capable of being worked with no very great difficulty. Mr. Holland discovered, some time since, when engaged in working the stylographic pen, that when the metal was heated to a white heat and exposed to the action of phosphorous it could be brought to a state of complete fusion, so that it might be cast into any desired shape. There are many difficulties in the way of its extended use, not the least of these being that of obtaining it in quantity. It is said, however, to be stored in the vaults of the Imperial Mint of Russia, the dealing in iridium being prohibited in that country owing to the damage which particles of iridium gave rise to the dies used for gold coins, as the metal is so hard as to cause the minute grains to indent and deface the hard steel dies. Attempts have been made to obtain coatings of iridium by electroplating, but with no very considerable success, from the difficulty of finding any solution capable of dissolving the metal. At present iridium is used for the knife edges of chemical balances, for which purpose it is steadily supplanting agate. It is utilised for the hypodermic syringe of the surgeon, contact points of electric apparatus, and a variety of other purposes where durability is an object of importance. It may easily be seen how useful it could be made for photographic purposes. A burnisher faced with iridium would get rid of one of the great difficulties of that popular machine—the liability of the burnishing edge to become scratched from the action of small particles of grit acting during the burnishing operations, the steel having become softer through repeated heatings.

The British Association for the Advancement of Science has closed its offices in this country, its organising officers being *en route* for Canada. Most of the members and associates will also now be on their way, as the inauguration meeting takes place on the 27th inst. Our readers will join us in wishing all, particularly our photographic friends, a safe and pleasant voyage.

With the thermometer registering 92° in the shade, as had lately been recorded, the fortunate voyagers across the water will be envied by their scorched and baked compatriots who are doing their "level best" to take a good negative with the mercury at the top of the thermometer tube. Such tropical heat has not been experienced for sixteen or seventeen years, and it behoves all employers to look to every possible arrangement for the comfort of their printers and other assistants being carried out. Perhaps we should say arrangements for minimising the discomfort; for no one has had "comfort" for some time past.

Everyone may, at anyrate, congratulate himself upon the almost total disuse of collodion for portraiture. Temperature 92° Fahr. and ether vapour would have been too utterly insupportable.

The question of what to drink to assuage the tormenting thirst which is experienced by dark-room and printing-room hands is very important. The danger, quite apart from other grounds, to the photographer of using alcoholic liquids has been pointed out many times by us, and we strongly advise that they be not used. A well-known photographer of our acquaintance—one who works—tells us that nothing is more suitable than a mixture of soda water and milk.

On the 1st instant several new regulations in connection with the Patent Act of 1883 came into force. In the case of patents granted before the Act a patentee who had paid the prescribed fee of £50 before the end of four years from the date of his patent may, in lieu of the prescribed fee of £100 payable before the end of seven years from such date, pay the following annual fees:—Before the end of the seventh year from the date of the patent, £10; eighth year, £10; ninth year, £10; tenth year, £15; eleventh year, £15; twelfth year, £20; and thirteenth year, £20.

We lately alluded to M. Montigny's weather prophecies, and further details of his views are to be found in a little pamphlet just published at Brussels. Mr. W. Spring had determined that the colour of pure water in great bulk is blue, and on this fact M. Montigny grounds his system. The luminous rays, he argues, traversing the air, charged with large quantities of pure water, are necessarily tinged with the blue colour of this medium. The excess of blue in the scintillation of the stars thus becomes an almost certain means of predicting rain. This theoretic conclusion corresponds with the results of his observations, continued for several years past, in the appearance of the stellar rays in connection with the state of the weather. During the few months of fine weather in the present year blue has been much less conspicuous than in the corresponding months of the previous period since 1876, when wet weather prevailed. It also appears that green, which had always coincided with clear skies during the five years before 1876, has recently again become predominant. Hence, as we have said, he draws the inference that a cycle of wet weather has terminated, and that one characterised by a more normal condition of weather may be anticipated.

THE LATE JABEZ HUGHES.

Our readers will be concerned to hear that death has once more been at work in our ranks, the victim on this occasion being Mr. Jabez Hughes, who may be considered as one of the veritable fathers of photography. A protracted and painful illness, the crisis having apparently passed, caused the deceased to visit Harrogate for change and recuperation; but after a very brief stay he was ordered home by the doctors. Complications set in, and, after fighting the disease to the last, Mr. Hughes succumbed on Monday morning, the immediate cause of death being dropsy.

The last occasion on which Mr. Hughes appeared in public was at the funeral of his friend the late H. Baden Pritchard, that being the first time he had ventured from home for a period of three months. His condition and appearance were then the subject of general remark.

As we write we learn that the funeral is fixed for Thursday, 14th inst., at Abney Park Cemetery, so that when these lines are published the ceremony will have already taken place.

In our next number we shall give a portrait of the deceased gentleman, together with a full notice of his long connection with photography.

RETOUCHING FOR AMATEURS.

The production of portraits is a favourite pastime of amateur photographers at the present time, and is likely to remain so, in spite of the fact that the department of portraiture is the only photographic one in which amateurs have little or no chance of competing with professionals.

The work certainly has a charm of its own; and, even if the amateur can admit to himself—which he rarely will—that his portraits are not by any means happy reproductions of his friends, and attempt to put portraiture on one side altogether, his friends are not likely to permit him to do so. They will pester him to "take their likenesses," and he is persuaded to do so, although he knows well that little thanks are likely to be given him for the lugubrious productions which cost him so much trouble. He is handicapped in two ways: he has at least in ninety-nine cases out of a hundred no studio, and he has no knowledge of the art of retouching.

With regard to the first part of the difficulty: it may be said that there are certain styles of portraiture which can be produced quite as well, as regards roundness of lighting, in an ordinary room as in a studio, if due consideration be given to the use of reflectors, and so forth. With regard to the second it may be said that a *certain* skill in retouching is acquired without very much labour if only the amateur know how to set about it.

Of the elaborate modelling now so universally practised by professional portraitists I intend to say nothing, nor to enter into the question as to whether it is a commendable procedure or not. It is in the present day very much spoken and written against by those who do not practise it. Possibly there is something of the "sour grapes" in these mutterings, the decriers of the practice being, I believe, always unable to perform it themselves.

There is great difficulty for an amateur in getting any information on the method of going about such rudimentary retouching as he is likely ever to become an adept at. I believe that this difficulty arises from the fact that all those who have given instructions in retouching are themselves great adepts at the work, and that those who are very skilled in any manipulative art have great difficulty in communicating their methods to beginners, because they cannot bring their minds and hands back to the helpless state (with regard to the particular art) in which they were when they first commenced.

I remember once reading an article on the subject of retouching, doubtless by an able retoucher, in which he remarked that "a stipple could be produced in many ways; for example, by making little crosses or dots with tints." These may not be the exact words, but they convey his meaning, and, heavens! how senseless the *meaning* must have been to most amateurs—myself among the number.

For the reason indicated I have thought that it might be of use—at least to some—if there were given some account of the rudimentary retouching, which any amateur may easily acquire with a little practice, by one who certainly has not attained to any such excellence as to justify him in being unintelligible to beginners.

We will take a very common case. A portrait has been produced, and the artist, gazing upon it, comes to the conclusion that it would be a gem of art were it not for those few spots—possibly due to a defect in the plate, but more probably to some incipient freckles in the face of the original which are almost invisible to the eye, but which, on account of their yellowish colour, come out on the print with startling distinctness—were it not that one or two slight and almost imperceptible lines on the forehead have come out like the lines of care on the face of an old man, were it not that the diagonal lines passing from the corners of the eyes to the cheek appear much more marked than they do in nature, and were it not that there is a slight patchiness here and there. The probability is that the picture would not be a "gem" were all these defects removed, but it is quite possible that it would be a favourable portrait; and there is no reason why the amateur should not remove them.

All that is necessary in the way of apparatus is something to act as a retouching desk, a suitable lead pencil, and some "medium" to give the pencil a bite on the film. If the amateur have any skill in carpentry—even a very little—he may make a dish for himself; if not, he may buy one very cheaply. The object of the dish is as all know, to hold the negative in a good position, whilst it shades the light from the operator's head, the operator looking through the negative on to a sheet of white paper or a mirror according to the density of the first mentioned.

As for a pencil for the simple retouching to be performed, any good H or H H drawing-pencil will do well enough. The point must be kept *very* sharp. I have tried many "retouching mediums," but have found none of them to give a better tooth than is given by a drop of turpentine applied to the varnished film and worked till dry either with the finger or a piece of chamois leather over the part to be operated upon.

When all is ready it is best to begin upon the spots, as these are by far the easiest to eradicate. It is well to have a proof at hand to refer to. The pencil is applied gently to the spot and is lightly worked in a circular direction. The transparent portions will gradually disappear. Great care is necessary to press but lightly or the varnish is likely to be scratched and the whole labour of retouching will be lost—the only thing to be done when a scratch has been made being to dissolve off the varnish and to proceed anew. If the spot be a very dark one—dark on the print, transparent on the negative—a softer pencil may be used.

Perhaps the marks next to spots the most easy to eradicate or reduce in prominence are lines. The pencil is simply carefully worked along these. Even greater care is required in this case than in the case of dots to avoid scratching the varnish.

The lines which fall obliquely from the inner corners of the eyes, and also at times from the corners of the mouth, now require attention. They should be softened and shortened, but should not be eradicated altogether, or an unnatural result will be produced. To do this we begin at the outer extremity of each line where it blends itself imperceptibly with the rest of the face. Here we work very gently in a circular or spiral direction or in short strokes parallel with the direction of the line. We thus cause the lower end of it to entirely disappear, and working gradually upwards reduce the transparency of the whole of it, being careful to have an even gradation of density in such of the line as is allowed to remain. Somewhat the same process may be applied to the lines under the eyes, if these have come out darker than they ought to do. In this case the pencil is worked in short curves, the same as those of the lines.

Rather more difficult than the operations which I have described is that of a more or less general mottled appearance of the face. We are very liable to overdo our work in this case, and merely to substitute for portions too transparent others too opaque, giving a worse appearance than before we commenced. To avoid this we must work very lightly. It is well to begin at one "corner" of the face (if I may be allowed to use such a term) and gradually to work over the whole. Thus we may begin at the upper left-hand corner. We again work with the pencil in small circles or in short lines; and, whilst doing so, we must be particularly careful, as we proceed, now and then to look at the general effect which we are producing from a greater distance than that at which we are working. If we do not do this we will probably substitute patchiness on a large scale for the same on a small scale.

The amateur who has acquired by practice the power to eradicate the defects which I have mentioned will find that he is capable of improving his portraits to a very great extent. He may possibly aspire somewhat higher, and may wish to modify the too abrupt transition from high light to shadow which is so liable to appear in photographic portraits, especially those taken in an ordinary room. To do this is much more difficult than to perform all that has been already described.

It is necessary before commencing it to remove all patchiness. After this the pencil is worked very lightly in sweeping lines, following the direction of the boundary of light and shadow. The first few attempts at retouching are likely to be failures. This need not, however, in any way dishearten the beginner. The negative is not spoiled because it has been badly retouched. It is only necessary to apply a drop or two of turpentine to the part and to wipe it with a piece of chamois leather, when all trace of retouching will be removed and the process may be recommenced. W. K. Burton.

ON CHOOSING A SIZE FOR *CARTE* AND CABINET NEGATIVES.

In continuation of this subject, which I discussed a fortnight ago, I have now to describe the method I adopted for *carte* negatives and their storage. It may be remembered that I alluded to the change I made in my system of sizes selected and storage of negatives on account of the increased convenience in working *cartes* and cabinets on one size of plate, coupled with lessened cost of the new size and capabilities of diminishing the weight of the gradually-increasing stock of store negatives, which, as I kept them in an upper room, became a great responsibility in view of the stability of the architectural arrangements.

Taking, as I do, two *carte* pictures on one plate, it is evident that the only way of lessening weight was by making two negatives out of one plate, and only saving one of the two, which nowadays, when all negatives are retouched, is not a difficult matter, as it does not often happen that both sides of a double negative are equally good and equally worthy of being retouched. As a matter of fact my printing-stage was usually covered with much useless lumber in accommodating the non-selected halves of double negatives.

I had some difficulty in deciding how to cut the plate, as one single cut divided it into two pieces half-an-inch longer than the ordinary "quarter-plate," and the use of such a size would involve the making of special printing-frames. Yet, on the other hand, my old experience had taught me the inconvenience of the quarter-plate as a *carte* size; for, if the figure or head were not very well "centered" on to the plate, it was difficult to cut a *carte* out of the print without bringing in the edge of the negative. Again, too, if I decided to cut the glass down to the regulation quarter size two cuts with the diamond were involved; and, as this would be necessarily done by the printers, I had a very natural hesitation at taking such a risk—the more so when I felt that occasional need might arise, where the figures were ill-placed, to cut a small piece at both top and bottom to accommodate the figure. This, as it might require the removal of very fine pieces, involved the necessity for greater skill with the diamond than I felt I was justified in expecting. The question then simply became—"One diamond cut and negatives requiring special frames, or two to three diamond cuts and their risks, and power to buy extra frames at any time without having to wait for their making."

I chose the former and, I think, the better of the two. I had, of course, to wait after my order for frames was sent in to allow for its being executed, as it was utterly improbable that the size would be stocked anywhere; but there was very little inconvenience, and the delay, thanks to the energy of the maker, was only slight. I ordered such quantities as were likely to suffice for all possible requirements, even in a push of business. The size is more convenient in every way than quarter; and, whenever I come across the pile of disused printing-frames of the old seven and a-half size, I by no means regret the expense incurred by relegating them to the lumber department and filling their place with lighter and more convenient frames.

In storing them there was a very considerable gain. I had up to that time kept my negatives on grooved shelves, open back and front to the air, one seven and a-half negative reaching from back to front. Such shelving is expensive to put up, and, in addition, a considerable space is occupied by comparatively few negatives; but by using the long quarter-plate it became possible, by planting a narrow lath upon the grooving, to place two negatives in one pair of grooves, one series from one side and the other from the other side of the shelving. Those of my readers who adopt a similar plan will be well aware of its advantages, the same shelf space containing at least double the number that the old ones could hold of the seven and a-quarter size. This gain I still further increased by placing the negatives in lengthwise instead of upright, thus giving me a gain of an inch and a-half in every row—an amount that would allow room for two or three extra shelves in the lower negative-storing chambers.

For dividing my half-plates into two I simply employ a small board with a lath nailed on to the left end, a couple of pins being let into the board at top and bottom to serve as guide for the straight-edge. The negative is pressed against the lath, the rule is slipped against the pins, and the diamond cut is given with certainty.

Finally: I may say that I do not make any claim for novelty in the system I describe. I have merely given it with a hope that it may contain hints for anyone who is about to establish a studio, or may be contemplating a change in the size of his *carte* and cabinet negatives. G. Watmough Webster.

ON PHOTOGRAPHIC BACKGROUNDS.

It does not appear that photographers pay so much attention to the production of backgrounds as formerly, but trust more to the stock subjects of the dealers to supply their needs. Compared with the monstrosities of former times there is much improvement; yet many of the higher class backgrounds of the present are not in keeping with the majority of sitters, and are not always remarkable for pictorial qualities.

The idea has often struck me that photographers do not make use of the scenes which surround them as they might, the principal reason being, I suppose, that the cost of a specially-painted background is at present so much more than that of one from a stock pattern; yet this scarcely need be so. New subjects could be outlined in, and even painted fully, for the purpose of photographic scenery from a picture projected upon the canvas by means of the lantern, and thus introduce a great deal of the mechanical and, therefore, less costly element into their production, by economising the time of the artist, who should still be a first-rate one at finishing.

It is probable that there is a good opening for the manufacture of backgrounds from photographers' own subjects if a good article could be supplied at only a slight advance on that of the stock one. The interest would be much greater if a portrait were taken with a local scene instead of being backed-up by something foreign in itself as well as to the sitter. The plea could scarcely be urged for any neighbourhood that there was nothing suitable for the purpose. It would, indeed, be a poor one which had no "beauty spot." In this place (Littlehampton) there are several; but one, in particular, which exhibits all the characteristics of the place in so highly-interesting and pictorial a fashion that one can almost imagine Nature to have specially designed it for the purpose of portraiture. Lest there should be any difficulty respecting the point at which to place the sitter, there is a stump for mooring ships to mark it. As the top of this is usually covered by someone its suitability is apparent. I have noted similar views in other places in which there has been nothing "loud" to detract from them as accessories if painted in detail. Picturesque street views, forest scenery, portions of old ruins of abbeys and castles, might be represented.

The chief consideration in making the photograph, and to avoid incongruities of perspective, will be to make up one's mind at about what point in it the sitter's bust will appear to most advantage, making that the point of sight for the camera, and that the object in that direction may be formed on the focussing-screen in the axis of the lens. Let it be borne in mind that a slip off the side of a picture will not answer. The bust of the sitter being the point of sight, the vanishing point of the background picture must be in the same direction, immediately behind. Sufficient attention is not paid to this requirement; hence the frequency of pictures in which the sitter in respect of the background has an impossible look.

Those photographers who have slack periods, and possess a certain amount of freedom of hand (when the paint brush is in it), may with the help of a sciopticon paint their own. The introduction of this piece of apparatus reduces the operation almost to a mechanical one, and may on that account disgust some of our artistic readers. Be that as it may, no doubt the majority are like myself, who prefer to take the shortest and easiest path, not being over-anxious to see how much trouble he can put himself to, provided the result is not inferior.

The materials required for oil-work are a size of suitable canvas, a wooden strainer, a pound and one or two other paint tools, and three or four pots containing as many different grades of the background tint of spirit "flatting."

After straining the canvas upon the frame, or nailing it up to a wall, the laying-on of the ground colour, consisting of that grade which will prevail as middle tint, is proceeded with, and allowed to dry. The operation may be then repeated to get body or to correct colour, making it lighter or darker, if necessary. As this ground constitutes the greater part of the finished article some trouble should be taken to get it quite right. When thoroughly dry it is ready for the picture. Of this have a thin positive and negative, similar in size, to be inserted and registered in the same position in the lantern. The former being clear in the lights will enable the painter to put them in more easily, and the latter having the same quality of transparency for the shadows will give the same advantages in respect of those. Place the negative in the lantern first, and project its image of the desired size upon the prepared canvas; then proceed to sketch in the picture, and fill in the half-shadows with the next lower grade of colour, taking care, of course, not to obstruct the light from the lantern by your presence more than you can possibly help. Do not overdo this first painting in depth; it is an easy matter to strengthen any parts that require such treatment when the lights have been added. Now remove the negative from the lantern and insert the positive in its place, so that its enlarged image may be exactly superimposed upon that of the negative's, and paint in the half-lights, after which let daylight in upon the work, and "take stock" of it.

If the operation have been fairly well performed the canvas will present a flat-looking scene, rather too dull for the office it is required to fill. The heightening of the lights and deepening of shadows may now be done with the remaining lighter and deeper grades of tint, and any rottenness or unevenness in any part of the picture made firm and smooth. For cloud and atmospheric effects a softener will be a useful addition to the tools employed. The painting of a photographic background will not be found a very difficult operation if the most trying part—correctness of drawing—be ensured by using the enlarging lantern.

Very much the same procedure may be followed if the work be done in distemper. The colours employed should be rubbed up in thin boiled starch and applied in the liquid state, or made up into crayons and used wet. The former will, however, be found most convenient. Lay on the ground colour with a whitewash brush, rub it well into the canvas, and apply a coating to the back, if necessary, to secure a good, solid base. When dry, work over it with a stiff hair brush or a roll of coarse rough paper to reduce inequalities of surface and produce uniform deadness. It is then in a condition to receive the picture.

It will be found more tedious to sketch in with water-colour or distemper, because it does not flow so nicely on account of the rapid absorption of water by the ground. There must, therefore, be greater freedom with the brush or messiness will soon be apparent. Distemper, however, is the thing for plain backgrounds, effects of cloudiness and gradation of tint being readily attained by its means. As it has been repeatedly described in these pages I shall only briefly allude to it.

The square of canvas is strained upon a frame and wetted. Various grades of grey are then rubbed into it, according to their strength—usually the lightest of the series at the top and the darkest at the bottom. While the canvas is still wet a moderately stiff and open-haired brush is worked in a circular direction over it, likewise commencing at the top and working downwards; or, if the top be too light, it is worked upwards, always taking care to work gradually out of the one into the other to avoid cloudiness of the wrong kind. When dry it may again be worked over with a roll of rough paper, which still further equalises, but has a tendency to lighten, it in tone. After these operations, if it be still not to one's liking, it should be wetted up from the back and powdered crayon of suitable tint sifted over those parts requiring modification, and worked again with the brush to prevent spottiness. Its depth of tone can be altered, or it may be freshened up at any time by repeating the wetting. JOHN HARMER.

LENSES WORKING AT CROSS PURPOSES.

It was a singular comment upon the boasted fine definition given by a photographic objective which is not now constructed—the orthoscopic lens—that a mechanically-fine example of one of these, of presumably the largest dimensions yet constructed (the front lens being four inches in diameter and the maker being an optician who was, if anything, rather unusually fastidious), and which was submitted for examination last week at a meeting of one of the societies, should have been certified by at least two experts by whom it was carefully tested to be seriously defective as regards that very quality for which it has long been famed, namely, sharpness of image.

The maker, who was a scientific as well as a manufacturing optician, had made a perfect study of the conditions under which sharpness was obtainable by means of this combination, and in consequence of such study had written the only treatise extant in the English language on the advantages of this combination. Petzval, too, the inventor of the lens, had obtained by its agency such a high degree of definition as to have led him to employ it as the object-glass of a telescope, the image formed by its means being capable of examination through a powerful eyepiece. Notwithstanding all this, this large specimen of the lens in question was unmistakably defective in the very quality for which it had been previously renowned. How could this be?

The first surmise in a case of this nature is that expressed in the question—"Were not the lenses changed?" To this we reply that such skilled, sharp-sighted observation as could at the present time (the creative factors in the question have all "gone on!") be brought to bear upon a critical examination, point to this verdict—that the particular lens in each cell is the work of the professed maker, and that the burnishing-in of the lenses in their cells was effected under such circumstances as to leave no room to doubt their genuineness.

On second thoughts we see no good that can result from making any mystery of the paternity of the lens to which we here draw attention. It is an orthographic combination of the largest dimensions and highest pretentions, made by Andrew Ross at the time when he was specially assisted in this department of his business by his son, Thomas Ross, and his son-in-law, J. H. Dallmeyer—all since deceased. To think that these *haute noblesse* of optical science in their day would permit one of their productions, in which so much pride was felt, to go to the public in an imperfect form is preposterous. How, then, is this lapse to be explained? We believe it is capable of being explained upon very simple principles, and to do so is the object of this article, because it recognises a principle susceptible of application to more lenses either than this one or any emanating from a particular factory.

We have said the lenses in this individual case were stated to be genuine. Having seen the objective in question our own opinion coincides with this verdict. But we do not forget that on one occasion a large portrait lens, by an eminent maker, was submitted for examination, the character given of it being one that was essentially bad, notwithstanding the fact of its being procured direct from the maker. Crucial investigation disclosed the fact that the front lens of the objective complained of did not belong to *that series* at all but to another; but, as both were of the same diameter and set in cells, the screws of which were similar, the individual to whom had been entrusted the final wiping of the surfaces with wash-leather and the packing of the lenses in soft tissue paper had inadvertently screwed the front lens of one into the mount of the other, resulting in both objectives being found to turn out badly.

To apply this to the case before us: this, too, was the opinion we entertained, and when, by making an offhand experimental trial of other fronts of shorter focus applied to the same back, and finding that by means of one of a focus several inches shorter we obtained magnificent definition, even with full aperture, we then knew that a change of some such nature as that hinted at had been effected. A four-inch portrait lens had probably been allowed to go forth to the world with a front far more powerful than there was any occasion for; while, on the other hand, as in the present case, a front possessed of too long a focus to harmonise with the back left in the mount was the result of the *mésalliance*.

When an orthoscope or orthographic objective gives imperfect definition, the probability is that this can be remedied by increasing the power of the front element. In general terms the more powerful the anterior lens the more intense will be the definition and illumination; but we do not allege this to be always the case. There is a suitable balance that must exist between the anterior and posterior combinations in a lens whether it be an orthoscopic or a portrait objective. The back lens corrects the aberrations (spherically speaking) of the front for axial rays, and also lengthens oblique pencils so as to bring them to a focus on a plane which is as near as possible to that upon which the axial focus falls.

In conclusion: if a lens bearing the name of a maker of eminence is found to be bad, it is a safe inference to conclude that some change has been made in its constituents since the moment the maker had it upon the "horse" for the purpose of being tested. Into the precise nature of such change we do not here enter.

ON ORGANIC DYES AND SOME PHOTOGRAPHIC USES OF CARMINE.

The relative merits and demerits of different classes of colouring materials, and of the solid substances by which they are held in suspension in films, will have to be experimentally ascertained before the best light for the development of photographic plates is obtained; for, although much has been done of late in improving the light of the developing-room, there is a certain amount of empiricism in the methods, with considerable room for better results than any yet seen. On the present occasion I intend to say nothing about translucent window or lantern screens, in which, after myriads of reflections and refractions in the interior of the substances, the light finally gets through, greatly weakened by the passage, before it reaches the eye. A certain amount of safety in the developing-room can be obtained by colourless translucent screens alone, a certain amount of safety can also be obtained from coloured transparent screens, and a certain amount of safety likewise from translucency and colour combined. In experimentally ascertaining the numerical values of these influences, it is best to keep them separate; that is to say, to obtain translucency by means of colourless translucent films, and to obtain colour by means of transparent films, so that the two methods shall not be used in a single film, thereby placing difficulties in the way of ascertaining their relative values in the production of a safe yet strong light for developing.

The long prevalent idea that the best light for developing is exclusively one as close to the extreme red of the spectrum as possible has of late been proved to be practically erroneous; one of the chief of the three or four reasons for this is—the comparatively weak impression made by those rays upon the nerves of sight, so that if the yellow from the same source of light be taken instead of the red, but reduced to half its normal intensity by translucent screens or otherwise, the half-power yellow may yet have more physiological influence on the retina than the full-power red, and be as safe or safer to work by because of its comparative reduction in intensity. This does not prove that previous hypotheses about developing-room illumination were wrong, so far as they went; but that they were erroneous for practical purposes because other conditions were not taken into account. Yellow, as proved by photometric experiments, has far more luminous intensity than any other portion of the spectrum, but this may be due solely to the construction of the eye, and bear no relation to its comparative influence upon photographic films.

In the production of transparent screens we have the choice of mineral, vegetable, and animal colours. As a general rule, the mineral colours are the least brilliant but the most permanent; the vegetable and coal tar colours are more brilliant but more fugitive, especially under the action of light; the animal dyes are usually more permanent than those of vegetable origin, and equally brilliant. Coal tar dyes are more permanent upon an animal than a vegetable fabric; that is to say, more permanent on wool and silk than upon cotton and linen. For the same reason it is best in all cases, where possible, to apply these dyes dissolved in albumen or gelatine rather than in varnish when coating glass or fabrics with them for photographic purposes. In the dyeing trade there is a great demand for albumen, despite its high price, because it conduces to the permanency of certain aniline colours.

Mr. Leon Warnerke found that his window screen, dyed with aurine, was bleached by light to a large extent during his prolonged absence in Russia. He does not say whether he selected wool rather than cotton to carry the dye, and whether he cleaned, bleached, and mordanted it as dyers do before applying the colouring matter, that the latter might be fixed in the very fibre of the material. Had he done so the life of the screen would have been prolonged; but exposing a screen of this kind constantly to "the garish, glaring eye of day" is straining it beyond its powers. This, from my point of view, is no argument against the value of the screen; for I feel convinced, from experiment and theory, that no man can possibly have the best obtainable light in his developing-room when the original source is constantly varying daylight, exceedingly rich in actinic rays. In the best light of the future unsteady daylight as the primary source will have to be abolished altogether. A screen which is safe with light of one intensity is not necessarily safe with a light of higher intensity; but, if it be, the operator, in the first of the two cases, obviously works with a worse light than the necessities of the case demand.

Films of organic colours, for lanterns, may be expected to have a long life, and can certainly be easily and cheaply renewed. They should not be liable to injury from the heat of the flame; for the lantern should be a large one, with its flame some little distance away from the coloured screen, so that it does not strain the optical powers of the latter to the utmost. Taking all the points into consideration it seems probable that the extra brilliancy and transparency of organic dyes may be utilised with advantage as compared with the less bright but more permanent colours of stained glass.

Of the animal organic dyes there are but two of leading importance in commerce, namely, carmine and lac, both obtained from insects. The exquisite colour, carmine, has been sinking in price of late years, because of the advent of the aniline dyes. My sample, of the very best quality, was obtained at two shillings an ounce from Messrs. Becker and Co., Maiden-lane, Covent Garden, London; a few years ago the price would have been seven or eight shillings an ounce. There are several qualities of carmine, many legitimate as well as illegitimate ways of preparing it, and two varieties of the cochineal insect from which it may be derived. Pure carmine is totally soluble in water of ammonia, which usually leaves foreign matters and adulterations behind.

A suitable solution for coating glass plates is made by dissolving carmine in albumen to which one fourth its volume of strong liquid ammonia has been added. The albumen should first be whisked into a froth, and allowed to stand all night to subside. When the solution is weak in carmine the films on glass have a pinkish-red colour, and absorb chiefly portions of the green rays of the spectrum. With stronger solutions all the green and nearly all the blue rays are absorbed, and with stronger still all the more refrangible rays than the yellow are cut off, the yellow being next attacked. At this stage it much resembles ruby glass in its action on the spectrum, there being a tendency in a strong light to let a feeble trace of blue through; but the carmine film has the advantage over ruby glass that it has a brighter colour, and transmits more useful light, area for area. Altogether it makes a better screen when the original source of light is not of great intensity; and artificial lights of low intensity should, in my opinion, always be the primary source of developing-room illumination.

Just as two sheets of ruby glass give safety from all trace of blue by general absorption, and lowering the useful light in the room, so is the same effect produced by superimposing two intense carmine films. The preferable plan is to use one of intense carmine to get rid of the green and almost all the blue, then to cut off the trace of blue and violet by a second sheet of glass coated with one of those yellow dyes which absorb the more refrangible rays powerfully, but permit the red and yellow to pass freely. The optical properties of some of these yellow dyes I will deal with on another occasion, for I have made a long series of experiments on their characteristics likewise.

One of my objects has been to prepare glass lantern screens, each consisting of one or more dry films, to give the chief true colours of the spectrum. Already I have obtained a pure green when the light is moderate; when the light is very strong a scarcely visible trace of the extreme red of the spectrum comes in. The red glass in the market flashed with copper oxide on one side and silver on the other gives a nearly pure red; with a strong light it passes a trace of orange.

There is, however, difficulty in obtaining a pure yellow. Lord Rayleigh, the coming President of the British Association at Montreal, has tried to obtain a pure yellow by means of troughs of coloured liquids, but says that he has not been altogether successful. He adds:—"The best was a mixture of bichromate and permanganate of potash with a salt of copper (sulphate or chloride). The first removes the blue and violet, the second the green, the third the red, and thus the yellow is isolated in considerable purity. This liquid is very unstable. The comparison of the simple and compound yellow (which nearly matched) was interesting. One was transparent to the sodium flame, the other completely opaque to it. When the two are brought together so that the light has to traverse both, almost complete darkness results, even when the brightest clouds are used. I should mention that it is only when the light is strong that any of these liquids give yellow in full perfection; otherwise the colour is more nearly described as brown, which is, in fact, identical with a dark yellow or orange. The best natural yellows, such as chrome, are partly simple and partly compound, returning all the light which falls upon them except blue and violet. It is clear that neither a purely simple nor a purely compound yellow can rival them in brilliancy." The difficulty in obtaining a pure yellow the carmine films are likely to help to overcome, by making them of such intensity as to cut off the green without interfering with the yellow, whilst chloride of copper of suitable strength may be used to cut off the red rays. When it is too strong it cuts off the yellow also.

By means of a pair of carmine films, with a little suitable yellow added, a purer red has been obtained by me than is given with the "stained red" glass, as it is called; for the latter passes a trace of orange when the light is strong. Carmine, without yellow intermixed, is very unsafe for developing-room illumination, unless the film or films be of sufficient depth of colour. Then it is safe.

The attention of Dr. Vogel and others who are trying to increase the sensitiveness of dry plates to the less refrangible rays of the spectrum might be given to carmine, with its strong power of absorption of some of the true green rays. It does not readily absorb one portion of the green.

Carmine dissolves freely in albumen and ammonia until a fairly intense film is given on glass by the solution, but on increasing its strength beyond a certain point floating red specks form in the liquid; such, at least, is the case with my sample of the dye. Hence it might be well to first levigate the carmine with the alkaline albumen, and afterward dilute down the mixture with more albumen and ammonia. The solution of several of the aniline dyes in the same liquid can similarly be greatly hastened by trituration and levigation, whilst others dissolve freely without any necessity for such mechanical operations. The porphyry slab and muller of the druggist is a useful instrument for such levigation; but an Italian artist—a friend of mine—makes a thick and even magma of any desired colour, simply by means of two flat slabs of glass, one larger than the other—the smaller one being used as the muller, the larger one as the slab. In a common pestle and mortar the points of contact are not large enough for purposes of levigation; the Germans, however, have a useful flat-bottomed mortar and flattened pestle to do this kind of work. The albumen acquires a slightly more gelatinous consistency after the addition of the carmine; in fact, a solution of carmine in plain water and ammonia is itself slightly gelatinous. The red specks previously mentioned sink when the liquid is allowed a day or two to rest, so it is advantageous to keep the solution in a long, narrow bottle; in fact, in all experiments with dyes in albumen or other menstrua it is well to use tall, narrow bottles, on broad, flat stems.

Carmine is made from the cochineal insect, a Mexican shield-louse, of which there are two kinds—the one covered with a cottony down, the other bare. The latter is the more valuable insect of the two. The unfortunate creatures are killed by drying upon hot plates, by immersion in boiling water, or by baking in ovens, which processes deserve the attention of the Society for the Prevention of Cruelty to Animals. The dried insects keep for very many years if not exposed to damp. The most simple way of making carmine is to pour a solution of alum into a decoction of cochineal; but there are many processes, some of them peculiar to particular continental towns, and in all of them boiling forms an important part of the operations, the duration of the application of heat being of moment. Like the aniline dyes, carmine is sometimes adulterated with starchy matters. Occasionally vermilion is added, which increases the weight and reduces the brilliancy of the colour.

W. H. Harrison.

ROYAL CORNWALL POLYTECHNIC SOCIETY.

The following is the list of awards in the Photographic Department of the Annual Exhibition of the Royal Cornwall Polytechnic Society, which opened on Tuesday last. A more detailed account of the Exhibition will appear in our next:—

Professional Photography.

First Silver Medal	W. W. Winter.
First Silver Medal	W. Gillard.
First Silver Medal	H. P. Robinson.
Second Silver Medal	Geo. Hadley.
Second Silver Medal	L. Berry.
Second Silver Medal	T. J. Dixon.
First Bronze Medal	W. P. Marsh.
Highly Commended	J. Milman Brown.
Highly Commended	R. Faulkner.

Amateur Section.

First Silver Medal	A. Pringle.
Second Silver Medal	A. G. Tagliaferro.
First Bronze Medal	W. J. A. Grant.
Second Bronze Medal	P. H. Emmerson.
Highly Commended	P. H. Emmerson.

Photographic Appliances, &c.

Second Bronze Medal	F. B. Dagley.
Second Bronze Medal	R. R. Beard.

WHERE TO GO WITH THE CAMERA.

[It is hoped that this series of articles will be continued at regular and frequent intervals during the vacation months, and we shall be glad to receive contributions to the series from any friends able to treat of new and interesting ground.]

BEESTON CASTLE, BUNBURY, AND PECKFORTON.

On a bright, clear, and promising morning in the early part of May, 1884, at 8.20, ten (more or less) enthusiastic members of the Liverpool Amateur Photographic Association left the Birkenhead Station for Beeston Castle, &c. We quickly reached Chester without any noticeable incident, except that we had the pleasant and consoling assurance from our own special "weather prophet" that on account of a vague clearness over the Welsh hills we should not get off "Scott"-free from rain, although to present appearances the only "wet" we were likely to see would be required to supply the vacuum which the heat of the day would cause. Here we gazed anxiously around for signs of a missing member of the party. At last we were startled by discovering a gorstly and shapely sarcophagus of solid leather, something under a ton in weight, with a pair of legs reposing placidly behind. This, we at last concluded, must know something about our missing friend; but, as the solid bulk could not give any connected account of itself, we, after sorrowfully contemplating it for about fifteen minutes, wondering if the owner were inside, sadly and dejectedly went our way to the train. But to our joy the absent one turned up from a morning walk round Chester, just in time to get the object of our solicitude stowed away in the van for safety. A little further on we were joined by our worthy President (and his new $7\frac{1}{2} \times 5$).

On reaching Beeston we found that, it being Beeston Fair, no conveyance of any kind was obtainable, except a wheelbarrow, which we respectfully declined. Then came the question—How was the case to be conveyed? It might have been carried *à la* sample of grapes from Canaan slung from a tripod between two strong men's shoulders, but no "two strong men" volunteered. At last a porter was obtained—no other than one who was understood in his time to have been the smallest man in the world, but having commenced to grow, found, like Othello, his "occupation gone." A move is made at last, after sundry quenchers of milk, soda, &c, &c., through the fields, bathed in a flood of glorious May sunshine, with scarcely a ripple among the leaves—a perfection of photographic weather!

Beeston Castle, built about A.D. 1250, by Blundeville, sixth Earl of Chester, must have been an almost impregnable fortress, and was never reduced by open assault. The surrounding walls are nearly a mile in extent, and the apex of the hill is crowned with a citadel, defended by a deep and wide ditch, and entered by a very picturesque, steep, and narrow pointed doorway. In the interior is the great well, nearly 400 feet deep, round which many county traditions linger.

Curving round the base of the massive rock or hill surmounted by the castle, we reach the great gates. Here is found a picture comprising the old doorway and cottages beyond, with the Peckforton Castle in the distance. Cameras are all unloosed, but on the ground glass the view is not so satisfactory as to the naked eye; consequently we pass through the gate, and wind up the sinuous "covered way" to the top of the hill. Here a glorious panorama unfolds itself to our delighted vision. Far and wide the eye roams over the level plain of Cheshire (well named the "Vale Royal of England") shimmering in the summer sunshine:—Eastward, the horizon line is filled with the hills of Stafford and Derbyshire; northward the vision wanders from Northwich and Stockport round to Alderley Edge and down to Sandbach and Crewe; westward, the tower of Chester Cathedral leads the eye to the Welsh hills in the calm, far distance. All the intervening landscape at our feet is filled with pleasant farmsteads and shining waters, strung together like pearls by the thin white lines marking the highways.

But we must withdraw from the contemplation of the distant scenery to the work more closely at hand, and what a battery of cameras, old and new, are pointed at the old castle! Here a scenograph lowly stoops its modest head; there a more ambitious 10×8, or whole-plate, or 7×5, are dotted about; but whole-plate votaries are in the majority, and, indeed, we are glad to find that that seems to have become again the favourite size, being capable of making pleasing pictures without being too cumbersome for a comfortable day's tour. Soon each "Cyclopian" machine was at work on the castle gateway and marvellous ditch cut out of solid rock, terminating in a picturesque and impassable gorge. Tempting long-focus "shots" were essayed at the Peckforton Castle on the opposite ridge of hills, bearing some resemblance to the Cat and Mouse castles on the Rhine. After about an hour and a-half's work in blazing sunshine it was thought we had earned lunch, and sandwich boxes were rapidly emptied under the grateful shade of the trees, while efforts were made to secure the prize picture—*Repose*.

Leaving the castle hill, we take a pleasant footpath winding through a shrubbery and across two or three fields bringing us into a picturesque lane, well shaded with overhanging trees and closely skirting Peckforton hills. Hard by stands a pretty black and white grange. To the left we pass through a rustic gate into the Peckforton woods in search of Pennsylvania, temptingly described by Murray as "an artistic gem."

The cart-track leads us up, up, and the evident beauties of the present scene are neglected for the prospect of what is to come, showing the folly of not taking heed to the Æsopian fable of the dog and the shadow. A turn of the road, and Pennsylvania is before us; but where, oh! where! is the artistic cottage? In its place we found a restored slated building that was perfectly contemptible from a photographic point of view. Blessings and grateful thanks were *not* showered down on the head of the conductor, and "Pennsylvania" became the standing joke for the remainder of the day. Nathless, the sylvan glades and silver birches were worth, and obtained, a plate or two.

Passing down through the woods, artistic corners, gnarled tree trunks clothed with dainty foliage, and quaint road-turns, reveal pictorial compositions requiring only an appreciative eye to see them. Back to the old lane again and to work on the quaint black and white thatched cottages, and to long shots at Beeston Castle. Here we press into our service an antique dame who looks almost coeval with the surroundings. But now the light, which had been so favourable, had for the last hour or two been going from bad to worse, and as we finished work in this romantic lane we saw the last of old Sol for the day, and the gathering haze prohibited our intended distant view of Peckforton Castle. By devious courses we strolled back to the hotel for a satisfactory wind-up and substantial tea. Deferring our intended visit to Bunbury Church, with its graceful columns, recumbent marble figures, altar tombs of the middle ages, and old family chapels, for another excursion, which shall also embrace the old and characteristic Cheshire mansions of Ridley and Spurstow, the antique parochial chapel of Woodhey, and perhaps Cholmondeley Hall.

Mine host at the Beeston Castle Hotel had fortunately done justice to himself and to this illustrious Society, and the final arrangements were voted "last but not least." In conclusion: in deference to the wishes of a correspondent who thinks that it would be useful to state the *focus* of the most useful lenses for particular landscape excursions—I may say that, "on this occasion," lenses were used varying from three inches to eighteen inches focus, and almost every length between!!

A. W. Beer.

FOREIGN NOTES AND NEWS.

Professor Vogel on the Development of Landscape Dry Plates.

In the *Photographischen Notizen* Dr. Vogel says that, having remarked that in America the pyro. developer, which had been rather neglected for a time in favour of the newer oxalate developer, was again resuming its place as first favourite, he has frequently been asked whether that meant that he himself also now preferred the pyro. developer. Pyro. having the undoubted advantage of working quicker than the ferrous oxalate, he does certainly use it oftener than he formerly did, and he admits that with sufficient experience the same gradations of tones may be obtained with the pyro. as with the ferrous oxalate developer; but then the former is apt to carry green fog in its train, though, on the other hand, it is easy to remove the fog again by laying the fogged plate in a solution of iodine one gramme, iodide of potassium four grammes, and water 1,000 c.c., until the green fog becomes yellow, then placing it in hypo. until the iodide of silver formed be removed, and, finally, washing carefully. The green fog is also said to occur with the ferrous developer, but Dr. Vogel has never observed it. On returning from his American journey he brought a number of plates with him, which he developed in the following way, keeping in view the circumstance that he never knew whether the plates to be developed were under- or over-exposed:—A plate was first laid in 150 c.c. of a neutral 1 : 3 solution of potassic oxalate and 5 c.c. of a 1 : 3 iron solution, and a watch kept for the first appearance of the image. If in the first minute and a-half only the highest lights appeared, the plate was considered to be properly exposed. It was then removed into a second bath containing 150 parts of potassic oxalate to ten of iron. Meantime a second plate was laid in bath No. 1. If plate No. 1 did not seem to progress in bath No. 2 it was removed to bath No. 3, containing twenty parts of iron to 150 parts of potassic oxalate, in which the development was generally completed. The under-exposed plate, however, gave nothing in from two to three minutes in bath No. 1. It was then dipped into bath No. 2, and, subsequently, into No. 3, and, lastly, into No. 4, which contained fifty parts of iron to 150 parts of potassic oxalate, and here it was developed to the end. If the plates appeared very quickly (within half-a-minute) in bath No. 1 they were placed in a special bath of the same strength, to which five to ten drops of a 1 : 10 solution of bromide of potassium was added in order to prevent the development from going on so fast, and to allow them to become sufficiently intense. Afterwards they were, in order to finish the development, passed into baths richer in iron and corresponding to baths No. 2 and No. 3, but always with the addition of bromide of potassium. When three or four plates had been developed in the baths they were strengthened by having five, or in the case of the stronger ones, ten, c.c. of iron added to them, and a new bath made up instead of No. 4. In this way all the plates developed very slowly, it being quite half-an-hour before they had passed through all the necessary baths; but, in consequence, they all became sufficiently dense to do without intensification, save in exceptional cases. The time required for each separate plate also allowed of four plates all being developed at once, each at a different stage. Of course one had to pay attention that a plate did not go too far. That did occasionally happen, but not often. On one occasion he had some plates that had been taken on the table lands of Arizona and New Mexico, to which he had given an average exposure of seven seconds with the smallest stop—an exposure which had proved quite right for the North Pacific Railway; but all the pictures taken at this great altitude proved over-exposed. Bunsen has already shown that in high-lying districts the chemical power of light is greater than in low-lying ones, but Professor Vogel had not expected to find the difference so great as it was. Over-developed plates he reduced with iodine. He has never been pleased with cyanide of potassium since some films slipped off under its action, which has never happened with iodine, the latter being more under control. The solution employed was that mentioned above as being used for the removal of green fog, or if more rapid work were required the water might be reduced by one-half. The plate is left in the solution a few minutes. Part of the silver of the image will be converted into yellow iodide of silver, which makes the plate lighter. It is then dipped into hyposulphite of silver to remove the iodide of silver. Should the plate not yet be sufficiently reduced repeat the treatment with iodine. If the reduced plates have become too thin intensify with chloride of mercury and ammonia. Professor Vogel goes on to say that anyone who has only taken portraits in a studio with dry plates will be inclined to laugh at all these details, but not the landscape photographer, who, after returning from his journey, has no means of replacing an unsuccessful plate. A distinguished amateur was quite astonished to learn that Professor Vogel frequently spent more than an hour trying to "doctor" up a single plate.

PHOTOGRAPHERS' ASSOCIATION OF AMERICA.

FIFTH ANNUAL CONVENTION.

The fifth meeting of this representative body was this year held in Cincinnati, Ohio. It will be remembered that the meeting of 1883 was held in Milwaukee, Wis., those for the years preceding being respectively, dating backwards, in Indianapolis, Ind.; New York City, N.Y.; and Chicago, Ill.

The reports of the Convention yet before us are extremely meagre, the Cincinnati newspapers being either unable or unwilling to devote much space to the proceedings. It certainly cannot be that they do not consider the proceedings at the annual Convention of the Photographers' Association worthy of being reported, and yet, from such newspapers as we have seen, such a deduction would be justifiable.

The first day's proceedings are described as follows (and we distinctly wish it to be understood that our authority is that specimen of the Cincinnati daily press which, so far as we can learn, has devoted most space to recording the transactions):—

The Convention was called to order about ten o'clock [on the forenoon of Tuesday, the 29th ult.] in the spacious dining apartments of the Music Hall, with W. H. Kent, of Rochester, N.Y., President, in the chair, and Leo Weingartner, of Cincinnati, Secretary, having charge of the minute books. To the eye of the reporter it seemed that over one thousand delegates were in seats at this morning's session, who listened and took part in its proceedings.

The regular routine business, such as organising, report of the Committee on Credentials, &c., was proceeded with. The President's annual address was next in order.

During the course of reading hammering was heard, and the chair was interrupted. After a little reflection he announced the important fact that he did not prepare an address to be hammered out. (Laughter.) [We are unable as yet to publish this paper, which, we have no doubt, will be found worthy of Mr. Kent. Our local authority merely says:]—The paper dwelt on the success of the organisation and the interest derived from a brotherhood.

The Secretary announced the programme of entertainment. He said that the guests would have the privilege of witnessing that evening a fine display of fireworks at the Highland House, prepared for them by Colonel Harff, and that tickets could be obtained for thirty-five cents. Tomorrow afternoon the delegates were invited to start from the Music Hall in a body to the Cincinnati Northern depôt and then make for the Zoo. Those wishing to go along will have their thirty-five cents ready. The evening will be spent in dancing.

It is well to view a subject from more than one side; hence we find in another Cincinnati daily newspaper (the *Enquirer*) that on the opening day the technical proceedings, which commenced at ten o'clock, terminated at noon, during which time two short reports were followed by a pithy speech by the President, after which an adjournment took place. Speaking of the exhibition this paper says that there were hundreds upon hundreds of specimens of photographic portraits exhibited, from life-size down to vignettes.

The second day's proceedings are summed up (we still quote the same authority) in the curt statement that, after a paper on photography had been read, "a resolution was adopted to raise the prices of photographs." But the authority, to which our first reference is made, condescends to give us somewhat more, albeit still very slight, information relative to this second day's work. It says:—

A business session was held at ten o'clock in the morning, President Kent, of course, presiding, and Mr. Weingartner acting as Secretary. After the reading of the minutes and other routine had been gone through with, Mr. J. F. Ryder, of Cleveland, was introduced as the orator of the day. Mr. Ryder then read a most interesting and valuable paper upon the subject of the *Management of the Photographic Business.* The gentleman concluded his remarks by recommending a raise of prices among photographers, claiming that the artist who will turn out cabinet pictures for \$2 or \$2 50 must necessarily "make a bad job of it," while good workmen are made to suffer by his cutting of prices. In the future \$3, \$5, and \$8 will probably be charged for cabinet photographs.

Mr. James Inglis, of Rochester, moved that Mr. Ryder's address be published in pamphlet for gratuitous distribution to the profession; but it was finally determined to wait and print the entire proceedings of the convention.

This authority becomes quite enthusiastic when describing the post-business transactions. We append an account of the proceedings connected with the photographing of the group of the members according to time-honoured custom:—

"The real idealised was given a splendid illustration at the Music Hall yesterday. Just before the convention of photographers started for their little excursion to the Zoo, the delegates were all assembled upon the steps of the great Springer edifice in order to have a picture taken of them in a group. A huge camera was got ready upon the opposite side of the street, at the Washington Park gate, which was to be operated by Mr. Ingalls, of Rochester, N.Y., while Mr. Seavey, the famous background painter, arranged the "sitters." Then the fun began. All the street Arabs, pan-fish, hoodlums, and stragglers from the park began to push to the fore. All, of course, had something to say, while amid the babble of voices the shrill whistle of the small boy could be heard, and cat-calls and peals of laughter so augmented the frightful din that chaos seemed to have come again. Then other photographers broke from the crowd, and seizing cameras, lenses, and plates, sought out convenient places, and, in less time than is required in the relation, upward of twenty boxes were in operation, varying from the diminutive detective camera to the size of an ordinary dry goods box. Street cars and wagons rushed to and fro between the operators and the group, thus increasing the confusion, and many fleeting moments galloped by before Mr. Seavey called "All ready! Go!" and in another half-second the caps were off the lenses, the shutters clicked, the plates flashed from the boxes, and the howling mob, quieted only for a second, were shown up in miniature as the most orderly assemblage imaginable. Pan-fish and all were so idealised that there, in the sombre shadows of the stately temple of art and song, one saw a gathering representative of the refinement, intelligence, and civilisation of the nineteenth century. Ingles, Weingartner, Rombach, Munroe, Allen, Wardlaw, Kent, and many other famous photographers secured negatives, and while the band on the balcony still tooted its inspiring strains there was a general scampering for the "dark rooms" where the developments were made. The march to the Zoo then began, dozens carrying with them cameras, intending to secure pictures of the animals and birds of that famous garden."

The publication of the remainder of the proceedings must be delayed until we are in a position to have them recorded. It is to be regretted that the local papers were either incompetent or unwilling to give a fuller report than they have done.

It is stated that two reports were submitted, but there is no indication as to the nature of these reports. It is, however, customary that the reports on *Photographic Progress* during the past year be handed in sometime in the course of the first two days.

According to announcement made last year a committee was appointed to draw up such a report, Mr. J. Traill Taylor being the chairman. We learn that on the grounds of inability to confer with his fellow-members of committee—some of whom lived hundreds of miles apart—Mr. Taylor had some correspondence with the President relative to his being relieved of the duty. The President sympathised with him in his position; but, instead of allowing him to retire, discharged the other members, leaving Mr. Taylor forming a committee of one. But in the absence of this gentleman from New York, afraid that no report whatever might be forthcoming, Mr. Charles Gentile, of Chicago, was requested to fill the anticipated gap. As we are fortunate in having received advance slips of the reports of both the gentlemen named we append them, although, from the slip-shod manner in which the two daily newspapers referred to have reported the proceedings, we are in the meantime somewhat at a loss to indicate any particulars connected with the reading of these reports. But whether they were read on the first, the second, or the third day, or were not read at all, they will afford an example of the way in which two different men look at the photographic transactions of the world during the past twelve months:—

REPORTS ON PHOTOGRAPHIC PROGRESS.

By C. Gentile.

I much regret that we have not a report from the able pen of Mr. J. Traill Taylor, as I know it would have interested us and been appreciated.

As regards the progress of photography during the past year it will appear that there has not been any marked improvement to record. But let us reflect and see what has been done; for, most assuredly, there has been great progress in the spread of our art-science. Never has there been a year so prolific in the creation of photographers in America as during the past year. If we go on increasing as in the past it will not be long before the number of amateurs will outnumber the professionals. In my opinion this influx of educated men of an inquiring turn of mind will be anything but hurtful to our profession; it will assuredly tend to elevate it in the estimation of the public—a thing of which we stand in need.

One rapid stride that photography has recently taken is the use that is made of it in courts of law as a means of aiding juries to form just and correct opinions on matters that otherwise would be in doubt.

In cases of forgery, duplications of precious documents, comparisons of specimens, of textile fabrics, blood, and crystals, it is constantly used with ever-increasing advantage, and the veracity of the testimony of the expert is put beyond the question of a doubt. The detective camera has also been brought into practical use, and adds its assistance to the detection of the criminal. In jails and penitentiaries likewise the camera and photographer has penetrated, and an instantaneous likeness of each new inmate puts the prison authorities in possession of a description of a prisoner far more accurate than any verbal explanation. Many experts have been brought from the ranks of the amateur photographer because the professional photographer has not the time or means to make a study and speciality that an amateur is capable of doing.

In Europe one of the most marked improvements or discoveries has been made by Dr. Herman Vogel, of Berlin, he having discovered a process by which colours can be photographed in a manner that will render their just values more correctly than hitherto has been the case. Dr. Vogel has given his process to the world, which has been appreciated by his countrymen, who voted a handsome testimonial prize for his services in this and other improvements in our art. However, from recent European advices, it seems likely that Dr. Vogel's claims to this discovery are to be disputed, as M. Attaut Tailfer, a Frenchman, claims that he is the inventor and patentee of the isochromatic gelatino-bromide of silver plates; and, in a long discussion that occurred on the 4th of July before the Photographic Society of France, it was proved that Major Waterhouse, of Calcutta, had a prior claim, he being the first to propose colouring the film to obtain different results.

In many branches of what would be called "commercial photography" great progress has been made during the past year. I have reference to the mechanical means of rapidly multiplying photographs by means of processes known as typographical or lithographic. A process known as the ink process gives very beautiful results, being extensively used in England. We frequently receive illustrations in their journals that prove the perfection they have arrived at in this mode of producing a plate that can be employed in the steam press, as the Sprague ink photograph, which has been used for book illustrations.

We have every reason to believe that the time is not far distant when our daily papers will be illustrated by the aid of photography, for there have been many and great improvements in block work by Ives, Meisenbach, and several others well known to us.

The bromo-gelatine dry plate, as we see from the exhibition before us in these halls, has made immense strides in popularity during the past year. It is needless for me to try to say much on this subject when we have such a show before us that are facts indisputably proving the superiority of the dry plate over collodion and the negative bath, which are being very rapidly put aside by all progressive photographers today. An operator now who cannot work dry plates satisfactorily stands a poor chance of obtaining a first-class situation.

The dry plate has caused a revolution in our business in many ways. The smallest country photographers can now claim to use exactly the same chemicals as the best operator in our profession; but I would remind them of a recent remark made by Colonel Stuart Wortley, at the last meeting of the Photographic Society of Great Britain, when he said he could teach a person how to make a plate, but that to develope a plate was a *science*—a most true remark as regards the developing. The making of a really first-class plate is no easy matter, as any thoroughly conversant with their manufacture will admit.

I regret to say that during the past year we have lost several leading lights in photographic literature. I allude chiefly to the recent loss to photographic journalism of Mr. H. Baden Pritchard, who has done much for us, and I am sure his death will be a great loss. There have been several other losses of men prominent in the profession in England and other countries in Europe; but it gives me great pleasure to state that I have not to record the death of many in America.

As regards the progress of our literature it seems to be rapidly increasing; for instance, in Chicago we have a weekly and also a fortnightly published in the interest of our art.

In Europe the governments take an interest in photography that is not done in this country. The King of the Belgians has invited a congress of photographers to assemble at Brussels to take into consideration the advisability of greater accuracy in the use of terms and uniformity with regard to photographic dimensions.

In England the Photographic Society of Great Britain has accomplished something on this subject by establishing standards for screws and flanges.

It seems to me it would not be inappropriate for this Association to take steps to be represented at this congress to be held in Belgium.

Whether or not the government of the United States has been invited to take any notice of the coming congress I am unable at present to furnish any information. I know that other governments have. We are certainly interested as much as our European brethren in the proper accuracy in the use of all terms connected with our profession.

Dry-plate photography, together with the rapid increase in the number of amateur photographers, has caused the manufacturers of all kinds of apparatus to bestir themselves to endeavour to produce the most portable, elegant, and useful apparatus. During the past year many improvements have been made which are of value to us all.

Every year the artists (the painter, I mean) are becoming more closely allied. The portrait painter finds it difficult to get along without the assistance of the photographer; and I find that the more a painter knows of photography the more willing he is to leave his sitter in the hands of the photographer to light and pose his subject. He is more willing to look on and content himself with a few suggestions only, knowing that the good photographer understands the effects that can be obtained under his own skylight better than one who knows nothing about it.

I am satisfied that the demand for photography in all its branches is on the increase, and will be so.

Lastly, but not least: of the improvements that can be recorded during the past year is the great progress in illuminating the dark room of the dry-plate worker. I most thoroughly endorse Mr. Debenham's system of orange and green glass as a means of satisfactorily lighting the dark room.

By J. Traill Taylor.

Photography advances with such imperceptible strides as to render it somewhat difficult to indicate definitely the progress it has made within a circumscribed period, more especially when such period embraces the comparatively brief span of one year. While the past twelve months have not been so fruitful in invention or discovery as to cause that period to stand out in contrast with others, neither have they, on the other hand, been characterised by stagnation.

During the past year innumerable printing processes of a mechanical description, or involving the use of printers' ink, have been invented, patented, or published. Of these, some have reference to the production of intaglio surfaces for employment as in copperplate printing; others—and these the most numerous—come under the category of relief or surface blocks for printing in conjunction with type.

There is another process to which none of these distinctions apply, inasmuch as it is neither an intaglio nor relief process. It has not been patented or published, but is worked as a secret process. And yet it is in place to refer to it here, because during the past year it has been selected as *the* process apparently best adapted for preparing the illustrations of the leading European photographic journals. From the brief description which I shall give, its character and, possibly, its *modus operandi* will be perceived. To commence at the end: the printing is executed at the lithographic press from a transfer laid down upon a lithographic stone, which is smooth or polished—not grained. And yet the print possesses a fine stippled grain similar to a chalk drawing or a print from a grained stone. From this any one conversant with the process of lithographic printing will necessarily infer that the granularity has been imparted at a stage prior to that of placing the transfer upon the stone. A film of bichromatised gelatine supported upon paper, glass, metal, or any other substance more convenient is exposed to light under a negative. It is now submitted to the action of chemicals, by which granularity is imparted to the surface, although the gelatine film may be so prepared as to possess within itself the requisites for imparting the stipple. In an outline sketch like the present, however, it is unnecessary to describe the means employed for producing this indispensable effect—the more particularly as they are, doubtless, known to most of those for whom this subject possesses interest. The requisite granularity of surface having been obtained, it is rolled up with transfer ink, and an impression being taken on transfer paper is conveyed to the stone, from which impressions are obtained in the usual mode. From such experiments as I have made I am enabled to say that the fineness or coarseness of the grain is under the complete control, and ranges between the most delicate touch of a blacklead pencil to the coarse, granular texture characteristic of the large portraits of actors and others utilised as public show-bills.

Desirous of ascertaining the possibility of applying this process to the production of surface blocks, I laid a transfer upon a polished zinc plate, etched it in such a manner as not to undercut the delicate stippled grain, and in this way produced a block which was capable of being printed when surrounded by type. This, however, is a deviation from what I commenced with, which is that the process as printed from lithographic stones is an accomplished fact, whatever may be the nature of its details, and is one which, from now being extensively made use of by European, and especially by English, journals is worthy of notice.

No topic has of late engrossed more attention than that of the illumination of the operating-room. The yellow light by which wet collodion operations could be safely conducted was found totally inadequate for gelatine plate manipulations, and was superseded by light of an intense, deep, ruby colour. In a physiological point of view this was found to be productive of effects positively deleterious to the eyesight in some cases, and inconvenient in others. Hence a reaction set in and the question was propounded—"Which is the light that produces the least amount of action on the sensitive plate combined with comfort to those in the dark room?" Mr. W. E. Debenham, a professional portrait photographer, of London, constituted himself the champion of reform. He found that perfect safety to the plates, together with comfort to the eyes and a resulting light of a character which, by contrast with others, may be termed a "very subdued white light," was obtained by interposing between the lamp and the manipulating bench a compound layer composed of green glass and yellow paper. Two thicknesses of paper of a deep canary colour, along with a plate of green glass or of gelatine or paper stained of a peculiar green colour, have in my own case been made to supersede a deep ruby glass with much comfort and satifaction. The particular tints are of importance.

But the special advantages of green light as a useful source of illumination in the dark room are not now pointed out for the first time. In January, 1870, an American gentleman, whose name is as much honoured in Europe as in the United States (for science is of no nationality), strongly recommended the substitution of green glass, pure and simple, for the orange glass hitherto employed in dark-room illumination; and this recommendation of Mr. Matthew Carey Lea was enforced by arguments deduced from his own experience of its use. The light he employed was gas, and the green glass was neither the darkest nor the lightest kind, but that of an intermediate shade, care being taken that it was not of a bluish-green. Such a light, while possessing all that comfort and safety for the eyes claimed on its behalf at the time by Mr. Lea, was safe for collodion plates only, and this when the light was not too powerful. The addition of the yellow paper referred to appears to fulfil all the requirements of the present time. Even when it may prove inconvenient at once to remove the red glass from a window or lantern, a marked improvement in the quality of the light will be immediately perceived by the addition of one thickness of yellow paper.

The subject of increasing and reducing the intensity of gelatine negatives is one that has received and is still receiving much attention. As regards intensification: chloride of mercury followed by other agents still enjoys popular favour, notwithstanding many recorded cases of deterioration. The first action of chloride of mercury upon a negative, as we all know, is to turn it black. If the action be arrested at this stage by copious washing the image appears to be permanent. Certainly I have found no change in some that were treated in this manner about nine years ago, while in connection with other negatives treated with this salt, combined with iodides and other preparations, I have not experienced the same immunity from change.

A method of adding iodide of mercury to the developer, as suggested by Mr. Henry J. Newton, by which an increase of intensity is obtained by the developing operation, is a fitting subject for—and will doubtless receive—consideration by the members at this Convention. A solution which is at once a decolouriser and, with the addition of a few drops of silver, an intensifier was introduced by Mr. B. J. Edwards just in time to permit of its being alluded to in my *Report on Photographic Progress* last year. It consists in adding to the usual clearing solution of citric acid and alum a quantity of protosulphate of iron in the proportion of about one-third more than the combined weight of the other two ingredients. When employed without any nitrate of silver it decolourises a yellow negative; with silver it intensifies the image. Since the last Convention it has been much tried, and enjoys popular favour. Pyrogallic acid, as a reducer of the nitrate, is also now being employed. These, it will be observed, are analogues of the methods long since suggested for collodion intensification. I fail to discover among my negatives any which have faded after having been treated first with chloride of mercury and then with diluted ammonia, or old cyanide fixing solution nearly saturated with silver. Exceptional care was taken in the washing of these.

Reducing intensity may be effected by a variety of processes. Those only which are of recent introduction will be here noticed. Mr. A. L. Henderson has found that the fumes of cyanide of potassium, acting upon a gelatine negative to which air has free access, will effect a gradual reduction of its density. This reducing action is not a rapid one. It may be safely predicted that a method of reducing intensity proposed by Mr. E. Howard Farmer will prove to be *the* process of the future. If a solution of ferridcyanide of potassium (red prussiate) be applied to a gelatine negative the silver forming the image becomes immediately converted into ferrocyanide of sliver, to remove which all that is necessary is to apply hyposulphite of soda. Mr. Farmer mixes these together in the following proportions:—An ounce of the ferridcyanide is dissolved in a pint of water, and when about to use it a few drops are added to a solution of hyposulphite of soda of the same strength as the other. When the negative is immersed in this a gradual reduction of intensity takes place; for as the silver forming the image becomes converted into the ferrocyanide of silver it is immediately dissolved by the hypo. I have tried numerous experiments with this system of reducing negatives, both wholly and locally, and beg strongly to bear testimony to its merits. Its description will suggest the somewhat analogous solution of iodine in cyanide of potassium; but the latter is unmanageable and dangerous by comparison.

Much ingenuity has been displayed in the devising of instantaneous shutters, into which have been imported numerous mechanical appliances. Portrait photographers require, however, not so much a shutter giving instantaniety of action as a prolongation of the exposure at will. Without intending any slight to the many ingenious inventions designed to effect this end, I may adduce as an example of one of the latest that recently introduced by Mr. Cadett—the gentleman who, it will be remembered, was the first to apply the pneumatic principle to exposures in the camera. This most ingenious effort of Mr. Cadett's may be described as a square cap, which is fixed upon either the inner or outer end of the lens. A very fine piece of rubber tubing is attached to the side, the other end of which terminates in the well-known pneumatic ball. Upon pressing this a tiny rubber bellows concealed in the body of the cap actuates a lever, by which a sliding shutter working between guides immediately darts upwards, leaving the lens uncovered for either a fraction of a second or a period that may be prolonged into minutes according to the nature and duration of the pressure upon the rubber ball.

Shutters suggest lenses. Since the Convention of last year no new form of lens has been introduced; but immediately before that meeting an amateur optician, Mr. Thomas Furnell, devised a form of combination, which from its character appears to hold out a promise of good so soon as it is introduced by the manufacturing opticians. Although it cannot be said to possess either novelty or principle, or, indeed, anything startling—inasmuch as it is only a slight departure from what has been previously effected—yet curves other than those hitherto adopted have been imported into it, and, while there is no difficulty in its construction, it defines sharply over a moderately-large field. It is a triple lens—a class, by the way, which has been out of favour for several years. Its front lens is achromatised. The centre element is a single lens of flint glass, double concave, and its back a plano-convex of crown glass.

Nothing has of late transpired in connection with negative gelatine emulsion calling for special mention, unless it be the fact that the value of an addition of iodide to the bromide is more and more fully recognised. The preparation of paper, opal plates, and plain glass plates with gelatino-chloride emulsion is now an established branch of commerce—at least in certain parts of the world. For producing enlargements by the lantern the application of emulsion to paper offers exceptional advantages, for the operations may be conducted quite independently of daylight. Opal pictures, either enlarged or printed in the frame, possess a peculiar charm; while, for lantern transparencies, a point of value is found in chloride emulsion, as with any given class or brand of plate any desired tone—from the warmest red to the coldest black, including sepia, brown, and purple—can be obtained at will by the action of the developer alone.

It is several years since eosine was suggested as a substance which, when added to collodion, tended to give a more truthful representation in light and shade of the colours of nature. It is pleasing to be able to report that Professor Vogel has of late made some further advances in this department of photography.

Among the deaths of those more or less known in the ranks of photographers may be noticed that of Mr. Codman, of Boston, and in the Old World those of Mr. H. B. Pritchard (of the *Photographic News*), and the Rev. F. F. Statham, who was the President of the South London Photographic Society since the period of its organisation.

There are many other subjects of a less important description which have transpired in the photographic world; but to even refer to them all would unduly lengthen this communication.

RECENT PATENTS.

APPLICATION FOR PATENT.

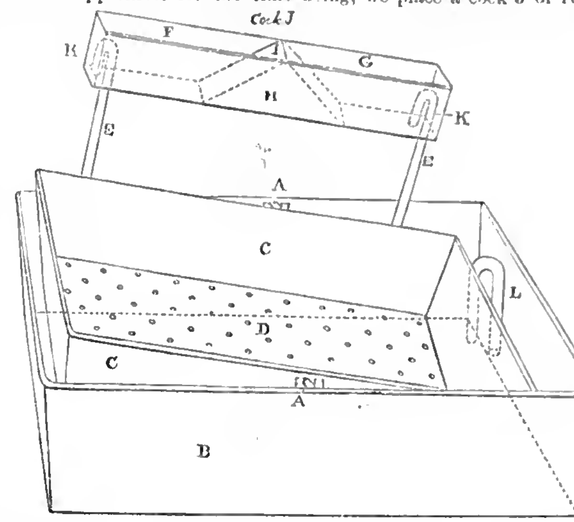
No. 10,970.—"Enamelling (as termed in photography) Surface-Coloured Photographs, whether the same are Coloured or Painted in Water or Oil Colours." Frederick Safe, photographer, 28, Grove-road, Holloway, N.—*Dated August* 6, 1884.

Apparatus for Washing Photographs.

Complete specification. By Abel McDonald, Penrith, and Thomas Williamson Kendall, Cockermouth.

In washing photographic prints it is very desirable to give them a good shake up, but without crushing or tearing them, both to prevent the prints sticking together and to cause the water to thoroughly circulate over their entire surface, and thus wash out all the hyposulphite contained in them.

We accomplish this periodic shaking in the following manner and with the following apparatus, namely:—Pivoted on a trunnion or bearing A on two opposite sides of the main trough B, and so that it is free to oscillate through a considerable arc, we place a second tank C with a perforated bottom D. In this tank the photographs to be washed are placed, together with a quantity of water. Fixed to or supported in sockets or standards E on this oscillating trough and a trifle above it, and divided over the axis of the trunnions aforesaid into two divisions, F and G, we fix a trough H having a double slope I in the centre as the division. Into this, over the point of double slope, so as to run mostly or entirely into whichever division is uppermost for the time being, we place a cock J of running



water, and in each division of this trough at the extreme end we place a syphon K K, emptying into the main trough, preferably through standards E E as shown.

The mode of action is as follows:—The washing trough or box resting on the main trough at one end and on the trunnions in the middle, the upper end of the main trough H fills by reason of the running water till it overbalances, and causes the washing trough C to turn on its trunnions. The water now runs into the other upper trough, the first trough slants the opposite way to what it did before, and the syphon being at its (now) lowest end, the water overflows to the top of the syphon, and is then immediately emptied by the syphon. The water running into the other upper trough in time nearly fills it in turn, and the whole turns over into the original position and remains so till a a like operation takes place on the other side, when it again counterbalances and so on. The water continually running in from the syphons would soon fill the main troughs, so a syphon L is placed on the main trough, so that it shall be periodically emptied entirely or in part. It will be obvious that this idea of two syphons, water supply and oscillating tank once suggested, numerous modifications could be made to act on the same principle.

The main principles of the invention being the supporting of the washing trough on trunnions, and supplying it with separate ports, one on each side, which, being filled and emptied alternately, keep up an intermittent see-saw action in the perforated tank, which action causes the water to rush up through the perforations and thus gently move the prints in a wave, thus separating and moving them very quickly without the crushing or tearing action so prevalent in most tilting machines where the prints all wash to the lower end.

Having now particularly described and ascertained the nature of our said invention, and in what manner the same is to be performed, we declare that what we claim is:—

1st. The divided trough H with a syphon at or near each end in combination with a source of water supply J, and a pivoted washing trough D in an outer trough or reservoir B, substantially as and for the purposes described.

2nd. In a photograph washing apparatus the pivoted trough *c* suspended in water receptacle B having perforated bottom and automatic means for periodically tilting it, whereby the water is caused to rise through the perforations and gently stir up the photographs.

3rd. In a photographic washing apparatus the application of the constant water supply to first actuate the stirring or shaking mechanism and then to fall into the washing apparatus and be used for washing, substantially as described.

Our Editorial Table.

The Patent Simplex Slide and Reversible Camera Back.

We have had submitted to our inspection by Messrs. John and Alfred George Hopkins, the patentees, a model of this apparatus, which was described in the patent column in our issue of June 6th last. The chief feature lies in the plate carrier and the method by which the plate is placed in position for exposure in the camera. The back of the camera closes with a door, rendering it perfectly light-tight. The carrier consists of a plain wooden envelope, into which the plate slides in a frame that completely closes the aperture by which it is inserted, and this carrier is attached to the top of the camera by suitable fasteners. In order to focus the picture, the door of the camera back is opened and the detached focussing glass placed in position; when the operation is complete the ground glass is removed, the door closed, and by means of a rod inserted in a screw hole in the upper part of the carrier the frame containing the plate is pushed into the position previously occupied by the focussing-glass, and after exposure withdrawn in the same manner. The entire absence of hinges and dangerous joints seems to promise immunity from any chance of light reaching the plate at any stage of the process except during exposure; and the general construction is so simple that the slide may be constructed at a very small cost.

How to be a Successful Amateur Photographer.
By W. J. Lancaster.

Still another guide for beginners in photography—this time issued by the energetic Birmingham firm of opticians and manufacturers of apparatus. It consists chiefly, of course, of a description of the principal articles supplied by Messrs. Lancaster and Son, supplemented by a variety of useful and practical information, which, combined with its small cost, will recommend it to a large section of intending amateurs.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
August 19	Bolton Club	The Studio, Chancery-lane.
" 20	Photographic Club	Anderton's Hotel, Fleet-street.
" 21	London and Provincial	Masons' Hall, Basinghall-street.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society, held on Thursday, the 7th instant, the chair was occupied by Mr. W. H. Prestwich.

Mr. J. B. B. Wellington mentioned that he had tried the effect of Mr. Farmer's ferridcyanide reducer on over-printed albumen proofs, and found that it answered perfectly in lightening them; whilst he thought that the tone was a little improved, being made warmer.

Mr. A. Cowan had also used the same means for reducing chloride transparencies with similar results.

A question from the box was read:—"The querist, having obtained fog in a dark slide in which leather was used, is desirous of knowing the chemical composition of leather."

Mr. W. E. Debenham said that when fog was attributed to the leather or leather cloth of dark slides it was supposed that the pigment or medium used with the pigment was the cause of the mischief.

Mr. W. H. Ashman had found that fog had arisen from storing plates in a box that had been coated with spirit black to which a certain amount of castor oil had been added. He also stated that the emanations from pine would cause fogging in plates left in a box made of that wood.

Mr. Cowan showed a series of transparencies printed from negatives taken by him during the photographers' outing on bank holiday.

A vignetting arrangement of American construction was shown and explained to the meeting. It was what was known as "Singhi's," and consisted of a light frame just fitting on to the ordinary printing frame, to which it was held by an india-rubber web passing over the back of the press at either end. The front of the frame was a sheet of fine, smooth millboard, with a central opening and two strips of the same millboard running down the sides. These strips serve to keep in place another piece of millboard, but allow motion when required. This second front of millboard was similarly fitted with strips, but these strips were placed in the contrary direction from those in the undermost sheet. A third piece of millboard, sliding on the face of the second piece, could, by means of the slips mentioned, be adjusted in any position in the same manner as a lens in a camera furnished with vertical and horizontal sliding movements. The piece of millboard mentioned as the third piece was the one which actually performed the vignetting, and a set of these, with openings of different sizes, was supplied with each frame. If in order to make the vignetting more gradual it was desired to raise the opening, so as to make it more distant from the negative, this was accomplished by inserting a strip of wood at either end or both ends of the vignetting arrangement, between the latter and the front of the printing-press.

Mr. Cowan mentioned having shown a similar arrangement some nine months previously, but it was stated that Singhi's apparatus as now shown had been in use in the United States some time earlier than that.

Mr. Debenham had for many years used an arrangement in many respects similar, but he thought more convenient, as in his the fronts did not extend beyond the edge of the printing-frame, and so did not require additional space at the printing light. He would bring one to a future meeting.

Mr. Ashman had shown in his lecturette *On Printing* some vignetting forms made of what was known as "empire cloth." The great secret of obtaining soft vignettes was to have a small opening and to keep it at a distance from the negative.

Mr. W. Coles, referring to Mr. Wellington's experiments in removing green fog with Mr. Farmer's ferridcyanide reducer, stated that his experiments in the same direction supported the conclusions of Mr. Wellington.

Mr. W. Turner showed some paper negatives produced by using drawings or tracings as originals in the pressure-frame and printing by contact upon salted paper sensitised with nitrate of silver and fixed in an old hypo. bath. Prints from these paper negatives were also shown. These prints were by the ferro-prussiate or blue process, such as will be found described on page 756 of our last volume.

EDINBURGH PHOTOGRAPHIC SOCIETY.

The annual excursion and pic-nic of this Society took place on Thursday, the 10th July, when about sixty ladies and gentlemen visited the grounds of Arniston House by the kind permission of R. Dundas, Esq. On arrival luncheon was served, and this was followed by the company being photographed in a group under the fine old leaning larch tree, which, as indicated by the nurseryman's bill (still preserved), was planted in 1735.

There was an interesting series of competitions for both sexes. In the following list of successful competitors the name of the donor and the nature of each prize is placed in a parenthesis:—High leap—1st, Mr. Calder (handsome pipe, Mr. Bertram); 2nd, Mr. M'Kean (series of twelve carbon prints, Mr. Dougall). 100 yards race for ladies—1st, Miss Mary Tunny (parasol, Mr. Bertram); 2nd, Miss Tunny (twelve carbon photographs, Mr. Dougall). 150 yards ditto—1st, Miss Pearson (hand-bag, Mr. Crighten); 2nd, Miss Raynor (box of biscuits, Mr. Middlemas). 150 yards race for gentlemen—1st, Mr. Calder (illuminated album, Mr. M'Kean); 2nd, Mr. M'Kean (box of biscuits, Mr. Middlemas). Barrow race—1st, Miss Taylor (graphoscope, Mr. Turnbull); 2nd, Mr. Dougall (pair of skates, Mr. Johnston). Hopping race—1st, Miss Raynor (album, Mr. Cox); 2nd, Miss Pearson (one dozen photographs, Mr. Dougall). Photographic competition—Best "Bit" taken in the Ground at Arniston—1st prize, Mr. Briglemen (one bottle fifty years' old brandy, Mr. Baillie); 2nd prize, Mr. M'Kean (opera glass, Mr. Wardale).

A small string band discoursed excellent music during dinner, which was served at two o'clock, the President, Mr. William Neilson, occupying the chair and proposing the usual loyal toasts.

Mr. William Dougall gave "Prosperity to the Society, and the Health of the President," which was happily replied to by Mr. Neilson. Mr. Brodie gave the "Council and Office-bearers," replied to by Mr. Bashford, Hon. Secretary. Mr. John Gardner proposed "The Committee for the Pic-nic," coupled with the name of Mr. Thomas Wardale, the convener, who suitably replied. Mr. J. G. Tunny proposed the "Health of Mr. Dundas," of Arniston, who had personally welcomed the Society to his grounds and granted them every liberty and accommodation. Mr. Dundas said he had studied photography thirty years ago under Mr. Tunny, and was much pleased to see the Society at his place. Mr. Crighton gave "The Ladies," which was replied to by Mr. Scott.

LEEDS PHOTOGRAPHIC SOCIETY.

The ordinary meeting of this Society was held on Thursday, the 7th inst., —Mr. J. W. Ramsden in the chair.

After the confirmation of the minutes the subject of outdoor excursions was introduced by Mr. S. A. Warburton; and it was resolved, on the motion of Mr. Marshall, seconded by Mr. F. W. Branson, that the Committee be requested to arrange for outdoor excursions, to take place not less than once a month nor more frequently than once a fortnight. The announcements of the excursions are to be made on the Society's board in one of the windows of the Philosophical Hall, and kept two or three weeks in advance —the place of meeting and time to be arranged as best suits the excursion.

It was then arranged that an excursion should be made on Saturday (tomorrow), the 16th inst., to Meanwood Valley and Adel Moors. The party to meet at the "Three Horseshoes," Headingley, at 2.30, p.m.

Mr. F. W. Branson called the attention of the meeting to some chemical reactions involved in the treatment of a bleached image (produced by bichloride of mercury) with a half-saturated solution of recrystallised sodium sulphite, as mentioned and commended in The British Journal of Photography of July 25th. From experiments made the following facts were deduced:—

1. That a solution of bichloride of mercury is not reduced to calomel, nor is a sulphide formed when cold solutions of bichloride of mercury and recrystallised sodium sulphite are mixed.

2. That freshly-formed and washed silver chloride is not blackened, but is dissolved to a very appreciable extent, by a solution of sodium sulphite of the strength recommended.

3. That mercurous chloride (calomel) is readily blackened, with production of a sulphide of mercury, by a solution of sodium sulphite.

It was explained that the white image caused by the action of a solution of bichloride of mercury consisted of both mercurous chloride (calomel) and silver chloride, and that when sodium sulphite solution was added the silver salt dissolved, and the mercury salt became blackened to form the photographic image. The removal of the silver salt probably explained the small degree of intensification given by this method, as contrasted with some other methods in use. That a strengthening of the image does occur is certain, and that no part of the plate is discoloured except the photographic image constitutes an important advantage. It was also pointed out that a fact of considerable practical importance remains to be proved, namely, whether a sulphide by mercury, as produced by the action of sodium sulphite, &c., or an oxide, as yielded by treatment with ammonia, gives the most permanent negative.

After a short discussion on Mr. Bransen's communication in which the Vice-President, Messrs. Teasdale, Thornton, Wilday, &c., took part,

Mr. W. L. Wilday passed round some prints on ferro-prussiate paper, and recommended the process as very useful to amateurs as well as professionals in a number of ways. He (Mr. Wilday) gave the following details as to his mode of working the process:—

Ammonia citrate of iron	15 drachms.
Distilled water	8 ounces.
Ferridcyanide of potassium	10 drachms.
Distilled water	8 ounces.

Mix the two solutions and keep in an opaque bottle. Take unglazed paper of a fine grain and damp the sheets you propose to sensitise with a sponge or rubber brush; float the solution over the paper as evenly as possible, and hang to dry in a darkened room. Do not prepare a larger quantity than you are going to use shortly, as the paper becomes slower by keeping. When printing, expose until the shadows assume a strong, metallic, grey colour, and detail begins to be lost. Wash well in cold water until, when held up by the corner, the drip from the print shows no yellow tinge. If it be desired to write on the print use a saturated solution of washing soda as ink and a clean steel pen to write with.

Mr. Thos. W. Thornton (Hon. Secretary) then exhibited samples of Willesden paper, and spoke of the many uses to which it might be put by photographers. Being perfectly watertight, with a cake of marine glue and a sheet of Willesden paper a tourist could easily make dishes for developing and fixing when away from home, or by its aid a temporary dark room could be readily formed. He said that by the kindness of Mr. W. M. Ashman he had received samples of the vulcanite fibre, respecting which inquiries had been made at the last meeting. These he passed round to the members, saying he had been experimenting with them and found that it was practically unbreakable, and could be worked in almost any conceivable manner. He had grooved, planed, turned, sawn, and bored it with great ease, and he was of opinion that it might be used with advantage in place of ebonite for making shutters, &c.

Mr. Branson said he had used the fibre and found that it was affected by damp.

The Hon. Secretary exhibited a changing-bag for dry plates that he had had made after a design by Mr. W. Brooks, and used every day during a recent tour.

The meeting then proceeded to the examination of a number of transparencies shown by Mr. W. Teasdale by means of the sciopticon lantern. Mr. Teasdale's arrangements and portable screen were very much admired.

Correspondence.

ON PHOTOGRAPHING THE OUTLINES OF COASTS AND HEADLANDS FROM THE SEA.

To the Editors.

Gentlemen,—There is a remark in an article by Professor H. W. Vogel, in your last issue, which might deter many from attempting deck photography, insomuch that he insists upon the stoppage of the engine in order to get a sharp picture. In some cases this may be advisable—if, for instance, the resulting picture had to be enlarged.

But for ordinary pictorial work it is by no means necessary; and, if the shutter be quick enough and not influenced by the wind, as Herr Vogel's was, good views may be taken. I have taken several lately covering a whole-plate, and in some cases cannot distinguish at first sight those taken from a steamer at full speed from those taken on *terra firma*.

I note, also, that the stand used by Professor Vogel seems identical to that patented and exhibited some time ago by Mr. Thompson, of this city.—I am, yours, &c., J. H. T. Ellerbeck.

Liverpool, August 12, 1884.

THE SODA DEVELOPER.

To the Editors.

Gentlemen,—Seeing in your Journal of the 1st instant a very strong recommendation of the washing soda developer, by Mr. A. F. Genlain, I have tried a few plates with it and find the negatives produced to be of good printing quality, though of a very peculiar colour; also the working to be well under control.

But will Mr. Genlain tell us how to avoid frilling? He apparently prepares his own plates especially for the purpose with chrome alum in the emulsion; but what are the thousands of amateurs *and* professionals to do who work with commercial plates?

I tried soaking the plate in chrome alum before developing, without any improvement as regards frilling, though the green colour of the negative was less decided. Possibly in cooler weather this trouble might be reduced to a minimum.

There are, no doubt, several who have been trying this developer, and it would be interesting to know whether they have met with the same difficulty which I have. I may mention that I used the plates of two well-known manufacturers, which have never in my hands shown any sign of frilling with sulphite and pyro. or with ferrous oxalate.—I am, yours, &c.,

Woodley-hill, Reading, August 11, 1884. Charles Stephens.

Notes and Queries.

"Is there any public teacher of photography in London?—B. P."——To this we reply that at the Polytechnic Christian Institute, 309, Regent-street, photography is taught under conditions which may doubtless be obtained on application to the Secretary.

"Novice" inquires:—"If, instead of getting up a club or subscription for oil paintings, I get up a raffle or a drawing, the prize or prizes to be tickets entitling the winner to an oil painting of himself or herself, would there be anything illegal about it, or anything at all likely to bring down the authorities upon me about it? If you can give me your opinion as to the legality of the above affair I would esteem it a favour."——Will some reader versed in the laws which apply to art unions and lotteries please respond?

Unger and Hoffmann (Dresden) writing with reference to our article *On Albumenising Paper* [page 370, *ante*], say that in their experience "the preparation of albumen paper must and can be effected by means of *fermented* albumen; but it must never be in a state of putrescence, because such almost invariably produces in summer the so-called 'blisters;' and, further, the operation is so disagreeable that the workman can scarcely endure the smell. For this cause we have adopted a new method, which excludes the formation of blisters, produced by putrified albumen, and which does not cause any of the disturbances occasioned by fresh albumen." A specimen of the paper accompanied the foregoing letter.

Pembroke Marshall inquires:—"1. Is a high-priced lens considered perfect that has bubbles in it?—2. Have the majority of such lenses, by manufacturers considered first-class, bubbles, or are the latter exceptional?"——In reply: 1. No lens can be considered "perfect" that contains bubbles or any other imperfections in the glass.—2. No first-class manufacturers will issue lenses containing bubbles. In former times, when it was much more difficult to obtain good optical glass than is now the case, defects of the glass mentioned, together with tears and striæ, were not unfrequently to be found in otherwise good lenses; but makers of reputation—and, indeed, of no reputation at all—never now employ glass possessing defects of this nature. At the same time, it must be admitted that defects in glass are of less consequence in photographic lenses, especially those of large dimensions, than in any other optical instruments which necessitate the employment of an objective.

R. S. says:—"I have read your article *On the Economic Production of Cold* in last Journal with special interest. You say that certain bodies when added to the nitrate of ammonia increase the intensity of the cold produced. I have read somewhere that if twenty parts of nitrate of potash be mixed with eighty parts of nitrate of ammonia a degree of cold is produced equal to eighty-seven degrees of Fahrenheit. Now, what I wish to know is this—after these salts have thus effected the desired end by producing the cold, will they not after being again crystallised act in the same manner as before, seeing that no chemical change can have been produced in either of them by the mere act of being dissolved? and, if such be the case, will not the end of economy be obtained in greater perfection by this addition?"——We reply that although the chemical constituents of the two salts named are still present, yet by their having been dissolved in presence of each other a molecular change has been induced, double salts having been formed. These double salts do not possess the same properties as their primary constituents. This is a matter which can be easily verified by our correspondent.

"An American in England" wishes to know if there be any chance of our giving a report of the transactions of the Annual Convention of the Photographers' Association of America. This Convention, he explains, is one that is composed mainly of professional photographers, although there are a few amateurs to be found among them.——We reply: In another page in the present number will be found a report of a portion—we would fain hope a very small portion only—of the transactions of the three days' meeting. But seeing that, according to the report, the social appeared to predominate over the technical proceedings, it may be that there will be less of a solid character resulting from the meetings than we might have hoped. Our present correspondent, "An American in England," is thanked for the kindly nature of his expressions regarding this Journal, and especially for the packet containing samples of the best representative dry plates of American manufacture. When he and his friends favour us with their promised visit we shall not only, in all probability, be able to show them, upon these very plates, negatives of the spots in the vicinity of London which they desire to visit, but also have a small party of kindred spirits organised to accompany our esteemed friends from the New World on some of their intended local photographic excursions.

Exchange Column.

No charge is made for inserting these announcements; but in no case do we insert any article merely offered for sale, *that being done at a small cost in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a* nom de plume *be thought desirable), otherwise the notice will not appear.*

I will exchange a Ross's *carte* lens, four and three-quarter inch focus, for a sixteen-inch focus triplet by a good maker. — Address, W. Bray, Sidmouth.

I will exchange a half-plate camera, double swing back, three double slides, folding tripod, cost £9, for a 12 × 10 camera, also Ross's *carte* lens.—Address, 7, Abbeygate-terrace, Colchester.

I will exchange a Dallmeyer's No. 2B patent and a Ross's No. 1 universal for a Dallmeyer's No. 2A or a Ross's No. 3 rapid cabinet lens.—Address, W. Dakin, photographer, Nether-edge, Sheffield.

I will exchange a good whole-plate portrait lens, three inches in diameter, very rapid, for a Ross's rapid symmetrical or a Dallmeyer's rectilinear, not less than half-plate.—Address, A. F. Clark, Padanarm, Forfar.

I will exchange a whole-plate "J. S." portrait lens, complete, with stops, in perfect condition, cost second-hand £5, for a Lancaster or other outdoor apparatus; or offers.—Address, E. A. B., 10, Wellington-street, Gloucester.

I will exchange a Kinnear camera, 10 × 8, and a half-plate portrait lens, by Squire, for a whole-plate universal camera and small carriers; a Jamin's portrait *carte* lens; and a Grubb's half-plate view lens, for studio accessories.—Address, Fritz Camera, 41, High-street, Sydenham, S.E.

Answers to Correspondents.

☞ Correspondents should never write on both sides of the paper.

Photographs Registered.—

Herbert Henry Dunn, Newport, Lincoln.—*Photograph of Sunset over Lincoln.*

Frederick John Skill, Exchequer Gate, Lincoln.—*Photograph of Lincoln from Panwick Hill.*

William Rochard, Sea View-terrace, Bagillt, North Wales.—*Photograph of Interior of St. Mary's Church, Holywell, North Wales.*

Patrick.—You will find an article on the subject on another page. Take the practical hint there given.

T. Pinder.—You had better communicate with Mr. Philip Magnus, Secretary of the City and Guilds of London Institute, Gresham College, E.C.

D. D.—The particular glass in question may be obtained from Messrs. Chance Bros., Birmingham, or retail from Messrs. G. F. Williams and Co., 36, St. Martins-lane, W.C.

B. Dalton.—The cause of the matt varnish having dried transparent is that you have warmed the plate. All matt varnishes must be applied cold or they will become transparent when dry.

W.—You will find articles on the subject of cloud negatives and their uses on pages 552, 567, and 661 of our last volume. These will give you the desired information. See answer to "Graver" on photographing on wood blocks.

H. J.—To prepare the glass plate for receiving enamel collodion, let it be well rubbed with powdered French chalk. The enclosed print is a creditable specimen of work. Single landscape lenses are best for this class of subject.

G. M. J. B.—1. It is not an article of commerce at present; hence you will have to construct the apparatus for yourself.—2. They are for different purposes. The second is more suitable for small prints and limited numbers than the former.

W. G. Biggs.—The best plan is to write the name of the subject neatly with black varnish on the bottom of the negative; it will then appear white in the print. Of course you understand that the writing must be done backwards, so that it may read right in the prints.

I. I. I.—There is no advantage in using the alum bath stronger than you have been doing. Chrome alum is supposed to render the gelatine harder than common alum; but we see no advantage in the latter over the former for your purpose. Besides, it will slightly discolour the paper.

G. O. Mountain.—The picture is very good, but we have seen some of the same subject that have been considerably better. They were taken from nearly the same standpoint as yours. The lens appears to be a fairly good one, but it is deficient in marginal definition. Possibly a small stop will remedy this.

Graver.—We are unaware how the particular specimen you forward was produced; but the carbon process is capable of producing very successful prints on wood blocks if a suitable tissue be employed. This should be one that contains a maximum of colouring matter and a minimum of gelatine, so as to yield as thin a film as possible when finished.

F. A. Wiltshire.—The prints forwarded are collotypes. They are produced in Germany at a very cheap rate by machinery. You will not be able to get them produced in this country, even wholesale, for anything like the small price you paid, retail, for these. Machined collotypes—judging by any we have seen—are not to be compared with those produced by hand by a good printer.

Z. A.—The sample of paper forwarded certainly smells very offensively; but we have met with some that was much worse. If your employer do not mind its being used, we do not see that you should object. He is the man who is responsible if the prints fade, and not you. It is by no means proved that all paper which smells offensively yields prints which will of necessity fade rapidly.

Puzzled.—If the lens give a sharp picture when used direct, and do not when it is used with the reversing mirror, it is clear that the latter is at fault. See that it fits quite loosely in its frame, as the slightest pressure may alter its figure. See to this, and, if you still fail to get as sharp a picture with the mirror as without it, return it to the manufacturer. The slight scratch will practically make no difference whatever.

A Collotype Amateur.—If, as you say, you are only an amateur, then your specimens are indeed very good. Your present difficulty arises from the paper you are using. The enamelled coating is not hard enough for the present hot weather. Procure another sample with a harder coating for present use, and retain what you have until the weather becomes colder, when you will find it will again work well.

Thos. A. Carter.—So far as we are aware, no optician supplies photographic lenses in aluminium mounts. No doubt any lens maker would supply them to your order; but as they are not articles of commerce, and the metal and the cost of working it is somewhat expensive, such instruments would necessarily be high in price. We have an idea that what you have seen have simply been the ordinary mounts nickel plated.

Jacobus.—By "the merest rinse" is meant that the plate should be simply rinsed under the tap for a few seconds. You appear to have been in the habit of washing for an unnecessary length of time between the development and the alum bath, and between the latter and fixing. One-third the time you have expended in the operation would be ample. After fixing, the washing must be as complete as possible, otherwise the whole of the hyposulphite of soda will not be removed.

H. R. is requested to be more explicit in giving the name of the annual, the year, and the page from which he quotes, as he has got matters so "mixed" as to preclude the possibility of discovering his quotation. He is also requested to address his letters to "The Editors."

C. C.—The mealiness in the prints is due to over-toning. To get them free from mealiness you must remove them from the strong bath at a much earlier stage—when they are only a very warm brown. Clearly the sample of paper you are using will not stand deep toning.

Received.—A. Pringle; J. Archer Clarke; J. Nicol, Ph.D.; Thomas Bedding; "Mahlstick." In our next.

The "Claimant."—Application has been made to the Directors of Convict Prisons by the "Claimant" that he may not be photographed before leaving Portsmouth Prison, lest the likenesses may get into the hands of a local tradesman and copies be disposed of, as was the case when he was at Millbank. The Directors have granted the application, and the "Claimant" will, consequently, not have his prison photograph taken till he reaches Pentonville.

Photographic Club.—At the forthcoming meeting of this Club, at Anderton's Hotel, Fleet-street, on Wednesday next, the 20th inst., the subject will be the adjourned discussion *On Printing through Coloured Media.* Mr. Wellington will exhibit a most ingenious and simple changing-box of his own construction. On Saturday afternoon an outing has been arranged to Chingford, leaving Liverpool-street Station by the first train after 2 o'clock. Meeting afterwards at 6 o'clock, at the Forest Hotel.

International Inventions Exhibition, 1885.—The following particulars have been issued with regard to the entries in the class of photography at the forthcoming International Inventions Exhibition, to be held in 1885. The exclusion of lenses from the apparatus department is due to the fact that they are classed with Philosophical Instruments in a previous group:—In Group XXIX.—Photography—there will be three classes:—Class 159. Processes and their results.—Methods of gelatine-bromide plate-making, apparatus for making emulsion, apparatus for separating the sensitive constituent, coating, drying, and packing machines, emulsion and other processes; printing processes—silver, carbon, Woodburytype, platinotype, gelatino-bromide, collodio-chloride of silver, &c.; apparatus for washing, &c., prints and negatives, methods for making photographic lantern slides. Class 160. Apparatus (excluding lenses).—Cameras, shutters, changing-boxes, slides, tents, lamps, apparatus for making enlargements, and for microphotography. Class 161. Application of photography to various purposes, typography, ceramics, relief moulds, &c.—Method of producing printing surfaces, photographic enamels, photographic printing on pottery, photographic reliefs; use of photography in self-recording apparatus, in scientific observations, &c. Educational apparatus includes appliances used in primary, scientific, technical, and artistic instruction.

Lime-Light Explosion.—The *Irish Times* of Friday last records a very serious lime-light explosion which took place on the evening of Thursday last week at the Curragh Camp:—About 11 o'clock last night (Thursday, the 7th inst.) an explosion occurred at the theatre attached to the garrison canteen. Mr. Frank Montreal's company had been playing to crowded houses for some weeks, and the theatre, as a place of resort, had become very popular in the camp. Last night, as usual, the wooden building was again well filled to listen to "Maria Martin." Just as Corder shot his victim the lime light, which was being lighted for the purpose of enhancing the effect on the stage, exploded. The man employed by the company for this purpose was knocked down, and had his hand so severely damaged that it had to be amputated immediately afterwards by the Surgeon-Major in charge of No. 2 Hospital. His name is Jenkins, 1st Royal Dragoons, and on making inquiries this morning it was ascertained that he is in a very low state. The concussion, it is feared, may prove more dangerous than the amputation. The report of the explosion brought the camp officials to the building, and a scene of confusion prevailed. Every lamp on or near the stage was broken, the wings split, scenery torn, and the heroine herself was severely hurt. Many cases of severe contusion were attended by the medical officers. The explosive fluid took a zig-zag direction, and hurt some women who were in front so severely as to necessitate their removal to hospital at once. Altogether about sixteen or twenty men and women were carried out of the building in such a torn and bleeding state as to give rise to great fears.

CONTENTS.

THE BRITISH
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No. 1268. Vol. XXXI.—AUGUST 22, 1884.

ON THE CARE OF THE NEGATIVE FIXING BATH.

This title may at first sight appear a rather curious one, as it has become too much the fashion to look upon the negative hypo. bath as the one matter in connection with photography that requires neither care nor attention, but that may be left to look after itself. How many photographers, especially amateurs, pay no more attention to the fixing bath than to add a handful of hypo. when it begins to lose its power, or a few ounces of water when its quantity has become too much reduced by evaporation! We have actually seen both these operations performed upon baths in comparison with which the proverbial "bottled stout" would have appeared clear and bright.

And yet how many of these same operators would dare to take such liberties with the fixing bath for prints! The difference between the print and the negative is simply this—that the injury which is likely to arise from such treatment appeals more directly to the sense of sight in the case of the print, but is no more certain to occur than it is in the negative. The latter is, however, only the means to an end; and if it be possible to complete its production with a minimum of trouble, and in such a manner that by hook or by crook it may be made to yield a few decent prints, what matters if it deteriorate with age?

This, we venture to think, is a mistaken policy, for, in any case, if the negative be worth finishing at all, it is worth finishing properly; while in cases where large numbers of prints are required it is absolutely essential that every possible care be exercised. The dirty, brown, muddy-looking "puddles" that too often do duty for negative fixing baths can scarcely under any circumstances be expected to improve either the quality or the permanence of the negative, overcharged as they are with injurious silver compounds, to say nothing of the accumulated soakings of oxidised pyro. from innumerable imperfectly-washed plates. It is this latter cause which principally tends to produce the deep brown discolouration of the hypo.—not the mere saturation with silver, as a fresh solution of hypo., saturated with pure bromide of silver, remains clear and nearly colourless so long as the temperature be not raised much above the normal.

It may be asked, considering the cheapness of hypo.—Why employ the same solution more than once, or, at anyrate, for more than a given number of plates? The answer is simple. It is not for the sake of economy in the matter of hypo., but in the matter of silver. The quantity of silver dissolved out of a plate in fixing forms a very considerable percentage of the total quantity used in the preparation of the film, and this is too precious an item to be thrown away. If fresh hypo., however, is to be used for every plate, the cost of collecting and recovering the silver would be too great for the return; but by judiciously employing the same solution until it contains a notable quantity of silver a considerable economy both in trouble and material is effected. How to employ the hypo. judiciously and economically is what we have to point out.

In the first place, as bearing strictly upon the "care of the fixing bath," we may mention the necessity for a very thorough washing of the negative after development. A mere perfunctory rinsing under the tap is but an excuse. If after two or three minutes of such washing the negative be reared up to drain upon white blotting-paper it will soon be evident that the developer is far from having been removed. Nothing, indeed, short of a prolonged soaking will suffice; and the extra expenditure of time and trouble this involves will bring its recompense in increased clearness and brightness of the negative, as well as in the less filthy condition of the fixing bath.

With regard to the fixing bath itself: the exhibition of care should commence at the very earliest stage. Many of the samples of hypo. met with in commerce are very impure, containing most of them free acid, some few having an alkaline reaction, while all are mixed with mechanical impurities in the form of dirt. Let us commence, then, by making a saturated solution. In our own practice we place (say) seven pounds of hypo. in a large basin, pour on to it boiling water, and allow it to stand for a few hours with occasional stirring, and, if necessary, more water is added, until a saturated solution is formed and only a few crystals remain undissolved. It is now tested with litmus paper, which is nearly certain to be reddened; a solution of washing soda is made, and this is added—a few drops at a time and well mixed before each fresh addition—until the blue colour of the litmus is restored. If the sample be decidedly alkaline it should be *nearly* neutralised with dilute hydrochloric acid. On no account must the solution be employed while in an acid condition.

This matter having been attended to, the dirty-looking solution is filtered into a large, brown stoneware jug, from which the necessary quantities either for prints or negatives are poured off as required. For prints one part of the saturated solution is mixed with three, four, or even five parts of water, and when this dilute solution has served its purpose once for prints it is set aside for negative purposes.

In using the bath much must, of course, depend upon individual circumstances. In large establishments, where a great amount of work—both in negatives and prints—is done, it will be convenient to employ a fresh bath daily, consigning the old one to the waste tub. But this method will not answer for an amateur, to whom we recommend the plan of using two baths—that is to say, of using one bath until it is saturated, when it is set aside for "renovation," if that system be preferred, and replaced by another. If a considerable amount of printing be done it is probable, in the case of an amateur, that very little of the real use of the fixing bath will have gone out of it when it has served its purpose on the few prints required to be fixed at any one time, though it cannot be employed again for the same purpose. In such cases the bath may be placed aside in a special receptacle to form a stock solution for fixing negatives.

Each bath should consist of a quantity of solution considerably larger than is actually required to fill the dish or dipping bath when in use. After each day's work is finished the solution which has been in use should be returned to its receptacle and the fixing dish carefully washed. During the night any sediment will subside, and the clear solution is poured off for next day's use. In this manner and with proper care in washing the negatives it will be impossible for the hypo. solution to go very far wrong, and it will only be when it approaches saturation or its action becomes too slow that it need be discarded.

Many people, instead of discarding altogether a spent bath, prefer to "doctor" it into working order again. Others, again, imagine that a mixture of alum and hypo. possesses the power of recuperation within itself. As we have long since pointed out, alum and hypo. mutually decompose one another, and the only result of such a mixture is to set up a state of doubt as to what is really being used. That alum brings about the precipitation of the dissolved silver is beyond doubt; but if its aid be invoked it is better to apply it by dropping a crystal into the warmed and filtered bath, when a lively disengagement of gas will take place, and the greater portion of the silver will be precipitated and may be removed by filtration. After strengthening from the stock jug the bath is ready for use again. On the whole, we are inclined to doubt the wisdom or economy of the recuperative system.

THE AMERICAN PHOTOGRAPHIC CONVENTION AND ITS RESOLUTIONS REGARDING PRICES.

If the various reports from both newspapers and private individuals are to be credited we fear that the Convention of the Photographers' Association of America for 1884, held in Cincinnati three weeks ago, under the presidency of Mr. W. H. Kent, of Rochester, New York State, must take its place in history as the most unfruitful of all the conventions of which we possess any record.

Here we find a large body of zealous photographers showing their earnestness by travelling many hundreds of miles in order to learn something concerning the technics of their craft, and taking no pains to hide their feelings at the bitter disappointment experienced by them. It is said that some of the members have expressed an intention of discontinuing their attendance at these annual meetings in consequence of the scanty bill of intellectual fare prepared for their reception. A wise executive committee would have taken care to provide something more substantial for their *clientèle* than music, dancing, or a visit to the zoological gardens, even at the doubtless small charge of thirty-five cents, which, from the report in our last number, appears to have been insisted on; but, while these are in themselves most praiseworthy means of relaxation after hard work, the work itself is presupposed. Something more than a *soufflet* is necessary to keep up the strength and physique of an able-bodied man. A dessert implies a dinner, which, if not altogether omitted in this case, does not appear to have been supplied in such sufficiency as to have satisfied the requirements and wants of those who travelled so far in order to learn something. The committee probably knew or had their own ideas as to what the members of an American association had a right to expect; but we venture to say that if a similar convention of three days' duration were held in any town in Great Britain the committee of organisation would have ensured there being from four to six papers, lecturettes, or lectures daily on some topic of interest connected with practical photography.

It is quite possible, however, that, in the interests of the stock-dealers and dry-plate and other manufacturers to whom the treasury of the Association is annually greatly indebted for their liberal donations, the Committee may not prefer to encourage any counter attractions to the great display of new apparatus, which forms a leading and attractive feature of these Conventions, not to speak of the exhibition of photographs, many, if not most, of which are shown in the interests of rival dry-plate makers. It is right and proper that dealers and manufacturers should attend such gatherings to display and sell their wares, being both convenient to the photographer and profitable to the merchant; but certainly it is to the advantage of the former that he be made acquainted in the Conference Hall with matters of chemical, æsthetic, or manipulative interest; and it is the sparseness with which this element of the Convention has been supplied that has given rise to so much dissatisfaction on the part of the members.

But it may be that the Committee neglected to make provision for papers in the expectation of there being a rush of volunteers. It is, however, only a few weeks since a gentleman officially connected with a photographic society in Philadelphia, when on a visit to London, gave it as a characteristic of the American photographer that, while always ready to hear or learn, he was not equally ready to speak or communicate. This being the case, the Committee of Management of this great national organisation should have arranged for essayists and speakers months in advance of the date of meeting, and to have issued an official programme of the proceedings. In a country like America, possessing so many men of undoubted talent, one would think that the difficulty should be in making a proper selection in the midst of such an *embarras de richesses.*

We observe that a large portion of the brief period devoted to the discussion of photographic topics was taken up in a consideration of the prices which photographers ought to charge for their work. The absolute impossibility of arriving at any definite determination in a question of this nature is illustrated in the case of the city of Chicago, in which low prices, unfortunately, appear to prevail. In that city is a certain photographer who alleges that he alone of the fraternity there takes cabinet photographs of a high class, into the truthfulness of which assertion it does not concern us here to inquire. Upon a resolution having been adopted in the Convention to charge hereafter eight dollars per dozen for first-class cabinet portraits, five dollars for second-class, and three dollars for third-class pictures, this photographer—who designates himself "the Dictator"—promptly issued a message to the Convention, relative to this resolution (a copy of which we have received) as follows:—

"Please do not include Chicago photographers in your resolutions in regard to advancing prices, as *I will not* permit them to advance. I will make first-class cabinets at three dollars, your resolution to the contrary notwithstanding. No second-class in mine. Knowledge makes the quality—not the resolutions of photographic conventions. In Chicago first-class cabinets are made at three, second at four, and third-class at six dollars.—E. F. Hartley."

A second communication—this being addressed to the photographers of Chicago—accompanies the one just given. In it Mr. Hartley refers to the "State Photographic Society;" and, as this document is so curious and "cheeky," we give a few extracts from it by way of enabling English readers to perceive the character of some of the difficulties that have to be encountered in an endeavour to arrive at uniformity in prices. The writer says:—

"As my name and the manner of doing business have been criticised at the meeting of the said Society, I consider it my duty to reply by circular.

"At the last meeting the subject of prices came up again, in spite of the fact that I told you it would be impossible for you to advance the price until I consented. It seems to me that you are wasting time talking of prices as long as I am not interested in your 'going up.' * * *

"One photographer said he did not consider me a competitor; that if you paid any attention to me you would never advance. If I am not a competitor why do I have so much influence? Why have I got your noses to the grindstone? Why, it would just be as impossible for you to advance your price unless I advance as it is for you to go down without starving.

"The high-priced galleries discharge their high-toned operators for lack of business, and I hire them and pay them higher wages than they ever paid the same men. I am making, and will continue to make, as fine work as it is possible for any man to make. My knowledge of photography is at least equal to any of yours, and the price has nothing to do with the quality. A man with a limited knowledge of photography could not produce fine work at $10 any better than at $3.

"Photographers outside of Chicago ask:—'Why is it that Hartley can control the prices in a city of 500,000?'

"One man said it is a good time to advance. Yes; that is so—if Hartley will head the list. But consider me a $3 man until further notice; I will let you know when you can go up." * * *

This was signed—"'The Dictator,' Hartley."

The publication of these circulars affords better than anything else a view of the difficulties which must and always will intervene to prevent an assimilation of prices for photographic work.

With regard to the resolution adopted by the Convention, another difficulty arises: certain of the members are said to charge at present little more than three dollars a dozen for their cabinets. Now, unless human nature is different in America than it is in England, such photographers will not find it an easy matter to raise their prices from three dollars to eight dollars per dozen—from twelve and sixpence to one pound, thirteen shillings and fourpence—at a bound; nor will it be pleasant for them, by retaining their former prices, to make the implied confession that their work is of a third-class order. Just fancy a convention of painters adopting resolutions concerning the prices to be charged to the public for artistic work of a certain definite size !

THE USE OF INSTANTANEOUS SHUTTERS.

Our readers need not be alarmed under the impression that we are about to enter into a disquisition upon the merits of the various shutters in the market, for such is not our purpose—the task would require a volume of large size. It was formerly said that there were more gelatine plate-makers than users, and much more truly might a similar remark be applied to inventors of instantaneous shutters. For our purpose, however, it will, nevertheless, be necessary to dwell to a slight extent upon the principles governing their action, in order to give point to our remarks.

Almost every inventor or user of these adjuncts to exposure can point to wonderful examples of quickly-taken pictures—flying birds, galloping horses, acrobatic exercises, &c., &c.—and up to that point each shutter can be said to be a success. But this, we apprehend, is not any real test of the working usefulness of a shutter. A better one would be an answer to the question—"How many failures were there for each success?"

An amateur who starts from home to do "drop-shutter" work does not generally set up his tripod if the weather be unfavourable, and no one is the worse or the wiser; but the case is different with the professional photographer who may be commissioned to take a number of pictures on a given day, and perhaps include among them a horse or two, or, maybe, a favourite dog with a few children thrown in to make a picture. If he do not like the light it is not a difficult matter to click his drop shutter a few times in front of his sitters, and afterwards send word to his clients that unfortunately, quickly though he had worked, the subjects had moved. But this course, analogous to the plan of exposing a few empty slides in taking children sitters—which, we have more than once been credibly informed, was not an uncommon thing—is greatly to be reprehended. Far better would be some power of readily adjusting the exposure at the time of taking a snap exposure if necessary, with the power to prolong it if desirable. Most of the shutters in use have an arrangement for regulating the speed of opening and closing; but few of them have it so completely under control as to enable the photographer to alter the duration of exposure in a moment, as a changing light or a restless sitter may render it necessary.

Let us suggest an example. A photographer wishes to take a portrait of a well-bred horse, but finds when he has it before his camera that it is restless and capricious, as such animals often are. If he make two or three snap exposures he will feel sure of success of a sort; but, unless the light be exceptionally good, he may find when he developes his plate that to get a really good negative he should have given about twice or three times the exposure, or even more than that. His shutter was set to a twentieth of a second, but he had no power to alter it in an instant to a quarter or half of a second when he found his subject was still for that length of time. If he had only withdrawn his diaphragm the exposure would have been right; but then he would have had to re-focus each time the animal moved out of his place a few inches, and, besides, he could not have got into good focus all that he wished to include in the picture.

The result is that he obtains, it is true, a portrait or portraits of his subjects, but one not at all comparable with the class of work he usually likes to do; and one which, like a great many so-called instantaneous pictures, requires an explanation, when shown to anyone ignorant of photography, that it is very difficult work and cannot be expected to be equal to ordinary photographs. It must be admitted that the bulk of instantaneous photographs, though very wonderful, are very poor.

Muybridge's animals in motion, which roused the enthusiasm of the artistic world, were in the majority of cases little better than *silhouettes;* but, then, they were admired, not for their artistic excellence, but for the positive way in which they had solved a problem that had been a vexed question for centuries. They were wonderfully interesting, but, unfortunately, they were "funny" to look at; and we do not suppose that any artist has copied a single position this clever and persevering photographer obtained. His photographs will illustrate physiological works, and will always remain a monument of skill and industry; but they will never be hung on the walls of connoisseurs as works of art, as, we are proud to say, for the sake of our art, so many photographs are nowadays. They will rather be placed in the albums of collectors of curiosities, or relegated to the walls of a zoetrope or peep-show.

It is with the idea of indicating how unfortunate it would be for instantaneous photographs in general to come to such an end that we now write; but we appeal to our readers whether it is not unfortunately true that the bulk of them are worthy of no better treatment.

Whether a complete remedy exists or not is the question. With regard to it we are prepared to say that all existing shutters utilise, from the commencement to the conclusion of the exposure, a portion only of the light emitted by the object and capable of being taken up by the lens. Instantaneity is in photography only a relative expression ; but if a close approach to it characterised both the opening and the closing of the lens, leaving the portion of time required to be available for the full aperture of the lens, better value would be obtained from the lighting of the plates. This, we know, is not the case with shutters hitherto constructed; but, then, it is discovered that "the foreground gets more exposure, which is, of course, a great advantage." We say—"Let the foreground take care of itself, and let the whole subject have the maximum exposure; if necessary the foreground can easily be managed."

Many arrangements could be devised, no doubt, to meet these views, but they would possess disadvantages in practice, not the least being the risk of jarring the camera. With regard to this last important point we may say we have recently had the opportunity of examining a very simple contrivance for preventing its occurrence, and we purpose in resuming this phase of the subject next week to give a description of it for our readers' consideration.

THE DETERIORATION OF PAINTINGS AND COLOURED PHOTOGRAPHS.

The subject of the fading of photographs is one that has of late been treated upon—we had almost said, *ad nauseam;* but is the deterioration of pictures with age confined to those alone which are produced by photographic means? Can paintings themselves be considered permanent? Take, for example, water-colour drawings. Many of these, we all know, if subjected to a strong light, will, in a comparatively short period, exhibit a marked change, and more particularly if at the same time they be exposed to atmospheric influences.

It so happens that some of the pigments employed by water-colour painters, which may be unaffected by light, undergo a manifest change when exposed to noxious vapours, although if the same colours be employed in oil-paintings they would be quite permanent. This is owing to the vehicle with which they are mixed forming, as it were, a protective coating. Notably is this the case with some of the preparations of lead. We recently saw marked examples of this in some elaborately-coloured carbon pictures on opal. The artist, to soften the shadows of the face, had evidently incautiously used flake white (carbonate of lead), and upon this the atmosphere had acted, turning it to a dark metallic colour, with a lustre resembling black lead. We found upon removing this colour carefully with a sable-hair pencil that the photograph was unchanged and intact beneath. Now, white lead, when used as an oil colour, is one of the most permanent pigments that can be employed.

Oil paintings, in many respects, may be considered far more permanent than water colours, inasmuch as the pigments themselves are protected to a great extent from the action of the atmosphere by the vehicle with which they are mixed. They are also still further protected with one or more coatings of a protective varnish.

which, of course, is quite inadmissible in the case of water-colour pictures. It may be said that no artist of repute, if he knew it, would for a moment think of employing colours or other materials which in any way are liable to undergo a change. But, unfortunately, he is dependent upon the artists' colourman for his prepared canvas, his mediums, and his varnishes. We all know that even the most renowned artists' productions do occasionally, after a comparatively short time, become very much deteriorated. The colours lose their brilliancy, the white becomes degraded, and the paint cracks into innumerable fissures. Now, these changes are seldom due to the pigments themselves, but to the vehicle with which they are incorporated, or to the varnish with which the picture is coated.

The rapid deterioration of many modern paintings has now assumed so serious an aspect that the Royal Academy has, we are given to understand, taken the matter in hand; and papers are now being circulated amongst the academicians containing printed inquiries as to their methods of procedure, the vehicles or mediums and exceptional pigments they use, also the varnish employed, as well as the preparation of the ground work on the canvas, &c. These questions, if correctly and conscientiously answered, will, of course, be of immense value to artists generally, because we know quite well that when any material whatever is employed, in the production of a painting, which will not prove permanent it is done entirely through ignorance of the fact or from a want of knowledge of the character of the materials themselves.

A curious example of the rapid deterioration of an oil painting was brought under our notice a short time back. The facts are these:—Some few years ago a provincial photographer received a commission for a life-size portrait on canvas, coloured in oils. As the picture was a presentation one, and a high price paid for it, no expense was spared in executing the commission in the best possible manner. The small negative was sent to a London house, and an enlargement from it was made by the carbon process on canvas. This in turn was placed in the hands of an artist of repute to be painted. Finally, the picture was finished, delivered, and was highly commended. So far all was well; but within three years afterwards the picture was returned to the photographer cracked all over, very much like some oil paintings occasionally met with a century or two old.

The photographer, unable to account for the phenomenon, consulted the painter, who at once attributed the cracking to the carbon basis. This was by no means surprising, seeing that with all carbon prints there must always be a layer of gelatine between the groundwork on the canvas and the oil paint. Although this film, if the carbon picture be skilfully produced, will be excessively thin and very porous through the large amount of pigment it contains, yet there is the fact that the film exists. The enlargers were then appealed to, and they, at once, repudiated any responsibility in the matter, as they were sure that their work had been properly executed, and that the cracking was due to the colour or varnish employed by the artist and not to the carbon picture at all. At this point we were consulted, and, at first, were certainly inclined to suspect the carbon basis, for the reason given above; but upon close inspection, however, we noticed the cracking existed quite as much in the lights—where there could be little or no gelatine—as upon the shadows, where it was the thickest.

Now, the only way of settling the matter was by removing some of the paint to see what was the state of the carbon print and canvas beneath, and whether they were at fault. As the picture in its then present state was of no value, and another had to be done in order to save the photographer's reputation, we obtained permission to make the experiment.

Having selected a place where the cracks were the thickest and most open we commenced rubbing the varnish with the finger, after the manner pursued by picture cleaners, and soon succeeded in getting it off. The varnish being removed we next applied—first turpentine, and then benzole, to the denuded paint, and with patience finally succeeded in removing that entirely from a space of several inches, when we found the carbon print and canvas intact and perfectly free from all trace of cracks. Here was unmistakable evidence that the cracking was due to the vehicle in which the pigments were mixed, or to the varnish with which the finished picture was coated—most probably the latter; for it may be here mentioned that in removing it we noticed that it came off much easier than good mastic varnish usually does from a picture.

It is to be hoped, now that the Royal Academy has taken the deterioration of oil paintings into serious consideration, the authorities will ultimately issue a report upon the subject, which will, doubtless, be very instructive to artists generally; for it is indeed lamentable to see the way some valuable paintings, of modern production, have become deteriorated. When the report is issued, as we hope it will be without unnecessary delay, we have little doubt those who make a speciality of colouring photographs will profit by it, and so obviate cases such as that just referred to, which, we are informed—and we regret to say it—are by no means an uncommon occurrence.

THE LATE MR. C. JABEZ HUGHES.

We regret to have to announce that the publication of the portrait of our lately-deceased friend, which was promised for this number, must be deferred for another week. We have received, at the last moment, a telegram from Messrs. Sprague and Co., who are printing the portrait, giving reasons why such a delay is imperative.

From a private source we learn that Mr. Cecil V. Shadbolt has succeeded in securing a fresh series of balloon photographs. An ascent was made by himself and Mr. Dale on Wednesday, the 13th inst., from the Crystal Palace grounds, in the new balloon "Monarch," and in the course of a trip of an hour and a-half's duration several plates were exposed successfully. The voyage was brought to a successful termination at Doddinghurst, about four miles from Brentwood, Essex, at 1.17 p.m. A photograph of Blackheath is said to be a maplike one, and another, taken over the Royal Albert Dock, at a very low altitude, will, it is expected, prove "a regular gem." A new "sensation" connected with the ascent was the interesting fact that the *voyageurs* "lunched together up in the clouds!" We congratulate Messrs. Shadbolt and Dale on the results of their "aëronaut holiday."

The Convention of the Photographers' Association of America is next year to be held in Buffalo, N.Y., under the presidency of Mr. Landy, of Cincinnati. The vicinity of the Falls of Niagara will, doubtless, prove one powerful incentive for eastern (American) photographers, as well as those from other quarters, to be present at the next annual meeting.

Her Most Gracious Majesty the Queen not only sent a kind letter of condolence to Mrs. Hughes upon the death of her husband, the late Mr. C. Jabez Hughes, but also forwarded a beautiful floral wreath to be placed on his coffin when being carried to the grave.

Under the heading of "The Beautiful Snow" the *Microscope* points out the kind of organic impurities found in snow, which, added to what we recently quoted on the same subject, very conclusively shows the fallacy of the idea that melted snow forms a good substitute for distilled water. The impurities are as follow:—Living infusoria and algæ, bacilli and micrococci, mites, diatoms, and great numbers of fungi spores; also fibres of wood, mouse hairs, pieces of butterfly wings, skin of larvæ of insects, cotton fibres, pieces of grass, epidermis, pollen grains, rye and potato flour, grains of quartz, minute pieces of roofing tile, and bits of iron and coal!

We must, however, give the other side of the question a hearing In the account of the Conference on Water Supply, as published in the *Journal of the Society of Arts*, we find Dr. Odling saying—"So exceedingly difficult is it (pure water) of production, even if it ever has been produced in a pure state, that it may be regarded rather as an ideal than a real chemical substance;" and, a little further on—"Chemists speak of pure water irrespective of the fact that, for all the needs of life, the water is benefited, though to the prejudice of its chemical purity, by the presence both of its dissolved gases and of a proportion of dissolved saline matter."

We have often had the pleasure of chronicling the exploits of one or two of our contributors who, forsaking the trodden paths, have mounted in the air and used their camera, looking down upon ordinary mortals, and now, if the papers are to be believed, ballooning will become so simple an affair that we should no more think of giving an account of photography from a balloon than we should of photographing from a dog cart or the window of a railway carriage. There seems no real cause for doubting the accuracy of the account given; yet it seems to have been received with singular coolness by English journals, who might have been expected to consider a great achievement to have been performed. Neither more nor less is claimed than that the problem of aërial navigation has been solved—a question that has agitated mankind for ages. It is stated that M. Krebs, captain of infantry, ascended in a new balloon of novel shape, fitted with a director, or, in other words, a rudder; that he sailed for two miles, then, turning the rudder, retraced his path and returned in five minutes, alighting at the very door of the wooden house whence the aërial vessel started.

The subject of varnish is one of very great importance to the photographer. At present shellac is the "sheet anchor" of the photographic varnish manufacturer; but, at the same time, it may be said that other resins possess advantages that might well be made use of for the purpose. The mode of treating them, however, is not well known; hence, the few details that follow will be of advantage to those wishing to experiment:—

"Calcutta copal, and others of its class, as well as amber, which forms the basis of varnishes, are not in their crude state soluble in either oil of turpentine, benzine, petroleum, or other hydrocarbons, nor in vegetable oils. They become soluble when, by a preliminary distillation or incineration, they are deprived of 25 per cent. of their weight. This result was announced some time ago to the Academy of Sciences of France by M. Violette. The following results are from recent experiments:—1. The above resins, when heated to a temperature of 350° or 400° Cent. (about 600° to 750° Fahr.) in a closed vessel, acquire after cooling the property of dissolving in the above liquids, and constitute excellent varnishes without any loss of material.—2. When heated as above mentioned *alone*, or mixed with one or more of the liquids named, these resins dissolve perfectly in them and constitute very fine varnishes.—3. Calcutta copal, heated in this manner with one-third of its own weight of boiled linseed oil, and three-quarters of its weight of oil of turpentine, gives at once, without loss, a thick varnish, clear, limped, of a fine colour, slightly yellow, and quite fit for carriage varnish."

Some years ago a number of photographs of tree trunks, exhibited at one of the London societies, passed the ordeal of criticism unchallenged, though scarcely one of them was ticketed with the correct name, owing, if we remember rightly, not so much to the want of excellence in the pictures as of knowledge in the spectators. It has been proposed that not only tree trunks or, rather, the barks, but also their leaves, should be photographed so as to enable anyone, by comparing a disputed sample with a photograph of an admittedly-genuine one, to ascertain at once its authenticity or the reverse. The plan is certainly worth trying. A book of photographs of leaves of economic and medicinal plants would be interesting, to say the least of it.

It is, as we have said, only the other day that oxygen was produced in a liquid state, and now its density, boiling point, state of purity, &c., are matters of common information. M. S. Wroblewski, who has given so much time to the study of this subject, is in doubt whether the crystalline precipitate, when oxygen evaporates, is formed of pure crystals of oxygen, or is derived partly or entirely from possible impurities of the gas. We presume, seeing that liquid oxygen is promised as a regular article of commerce, we shall have manufacturers advertising liquid oxygen as "commercial" and "pure" qualities.

The telephone has lately been made to subserve a new purpose—the measuring of heat at a distance. As an automatic recorder of changes of temperature the new apparatus may possibly be of use in the laboratory, where every contrivance that may facilitate the regulation of temperature or the recording of its variations is naturally of value.

TOURIST CAMERAS AND LENSES.

Two articles in the issue of this Journal of August 8th particularly arrested my attention—the first a mysterious contribution by Mr. Herbert S. Starnes, and the second a complaint by Mr. W. H. Harrison about tourist cameras. I began a sort of criticism of and answer to Mr. Starnes' revolutionary doctrines, but the unusual and oppressive heat of the weather has, for a time at least, given a *quietus* to my pen on that subject. I should like, however, to give the readers of The British Journal of Photography a sort of commentary on Mr. Harrison's remarks about cameras.

As to the importance of the subject of which Mr. Harrison treats there can be no two opinions. It is a matter of the utmost concern to us that we should have apparatus light to carry and easy to bring into action. Even for those who prefer deliberation and care in their selection of views and focussing of views when selected, it is often a great object to lose no time in getting the camera ready for action at the shortest notice. Though, as a rule, I myself exercise considerable care and patience in putting my view to the best pictorial advantage on the ground glass, yet I have frequently had to hurry my selection and position on account of the time taken to erect and make ready my apparatus. During the short halt of a coach or even of a train, during the limited duration of a pleasing effect of light, and on many other occasions when time has been valuable, I have felt the force of arguments such as those of Mr. Harrison. I must say, however, that my cameras seem to be more handy than those of Mr. Harrison, who gives ten minutes as the minimum time for preparations. With my largest camera I should be inclined to put three minutes as about the average of time required for erection, screwing in lens, and opening up dark cloth; a minute may be expended in focussing, and a minute in getting a plate out of the changing-box, while, if slides are used, the last minute need hardly be counted at all.

I cannot tell what size or kind of camera Mr. Harrison uses, but the time I have guessed at suffices to "rig up" a 10 × 8 camera, by Mr. George Hare, on a stand whose lower parts turn up, when not in use, outside the upper part. The screw of the triangle is a fixture to the triangle, and by practice I can without fumbling hit off the camera hole in an instant. This possible fumbling is one of the weak points of the present system, which Mr. Harrison points out with his usual acumen. The camera travels in a knapsack canvas case, and two pulls of two straps lay the camera bare and ready to be lugged out of its waterproof nest. It is placed on the stand and screwed on closed, two brass bars are pulled, the front pushed up and clamped, and the back drawn back to a marked line in much less time than I take to write this.

But now comes the slowest, silliest, and most exasperating part of all, and delay and vexation are possible at this stage to the handiest and most experienced operator—of course I refer to the screwing of the lens into its flange. If the lens be a large one, if the screw be not a thoroughly good one, if the hands be hot or cold, but chiefly if there be any cause for haste, the lens is sure to quarrel with the flange, and the operator to "cuss" both and lose time and temper. I remember one time at the Pissevache Fall in Switzerland my hands were so benumbed with cold that for ten minutes I fumbled and stormed at the lens before it would go into its flange, so that on that occasion my waste of time amply justified Mr. Harrison's complaint. For this trouble I have now a cure that I shall at the close of these remarks bring before my readers. By the adoption of this little dodge any of my lenses can in a moment be stuck into place, and clamped there by a turn of the wrist.

Mr. Harrison seems to suggest that our cameras should be so made as to pack ready for use. I fear an ordinary camera (say 7 × 5) opened up to the approximate length required for use would be a rather bulky article to carry, and the shape would also be inconvenient. If the lens were fixed in its flange ready for action its longevity would be at stake as a useful optical instrument. But, put into my hand my present $7\frac{1}{4} \times 5\frac{1}{4}$ camera closed up as for travelling, and in three seconds I will undertake to have it rigid and ready for the stand, in three seconds after it is fixed to the stand I will have it approximately focussed, and in two seconds more I will have the lens in its place if it has not been rolled up in a cloth or closed up in a bag. I do not think Mr. Harrison could expect anything quicker than this. If I were in the habit of being in furious haste I should have a medium stop fixed in, and a shutter on, my lens, and a mark on my base-board to show the focus for that lens on an object at a given distance; by this means delay in focussing would be avoided. At present I have put matters so that the screwing of the camera to the stand is the weak point; but I have seen arrangements such that no screw was required, the camera base having plates that slid below corresponding plates on the triangle. I see nothing to prevent such a "dodge" being contrived and adopted by anyone. In my own practice very little time is occupied by the screwing operation, which Mr. Harrison's suggestions of a bayonet catch or a hollow would still further facilitate or do away with. As Mr. Harrison says—Why do not apparatus makers turn their attention to this point at once? A threaded screw is apt to be a nuisance wherever it is.

I agree "some" with Mr. Harrison about slides. They should certainly not slide, but push and catch with a spring, as he says. But I do not at all like the shutter of the slide to pull right out; that is a capital way to lose both time and plates. If the shutter be not put in absolutely square light will certainly get in; and in the attempt to put in the slide accurately time is lost, nerves are strained, and fumbling occurs. I speak from experience. The shutter should have a double hinge, and turn right back to the slide where a spring should catch it—not an elastic band, as I have seen, but a metal catch-spring. The shutter, too, should close with a spring—not a mere makeshift of a piece of bent brass, as is so common. During my Italian campaign my 8 × 5 camera had a revolving slide-shutter made of a whole lot of slips of wood glued on to leather, like things for lifting a hot kettle. This kind of shutter is, I admit, apt, but by no means certain, to let in light sometimes. Mine kept light-tight during a year of hard work.

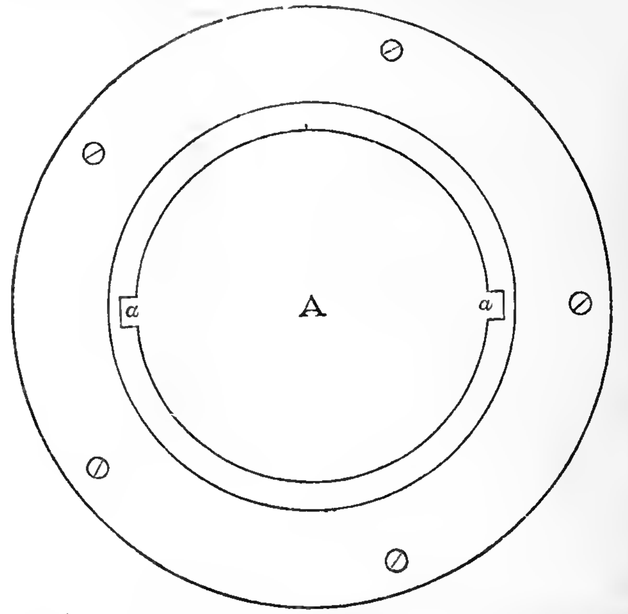
As to turning the camera on its side for vertical pictures: I much prefer to turn the back of the camera only when it can be so done, but for this action the camera requires to be square, which adds both to weight and expense. With Mr. Harrison I opine that slides might be made much lighter than they are without a sacrifice of strength; but if there is one thing that must be well and strongly made it is a dark slide, and I do not at all fancy some of the gim-crack affairs I have seen put forward as efficient slides.

A very old theme of mine is touched upon by Mr. Harrison—the weight of glass plates. So long as we have to carry dozens of these plates an incubus and a serious drawback will be felt by amateur photographers. I cannot conceive how it is that films, or pellicles, or paper with sensitive coating, have not become universal. Any-one can make films of the kind I have myself described; but it would be a burden on amateurs, and even on professional men, to make their own films, on account of the time necessary and the space required. But manufacturers ought to have less difficulty in these matters, and I am certain that films coated with good, clean emulsion would pay the makers enormously, even were they sold at a much higher price than glass. I have often thought of making a lot of films myself, leaving them on the glass, getting a manufacturer of emulsion to coat my plates, and then stripping off the films myself for carriage on my more extended tours. There are in the market films of more than one make, but my slight experience of them led me to the conclusion that the emulsion was far too slow for me, and too dirty for anyone. I hope I was unfortunate in my trial of films, but I have stated what my experience was. I do not now remember by whom the films were made. But a day will come when films will be exclusively used; and happy the manufac-turer who first turns out perfect films coated with perfect emulsion, and happy the maker of apparatus who first turns out a perfect receptacle for these films.

I have frequently noticed a great deal of time lost in changing a camera front to suit various lenses. My front has fixed to it the flange of the largest lens I use, and adapting rings enable me to put in at once any lens I possess without shifting the front. This holds good for the arrangement I mean to describe later. I am fairly satisfied with the make of my lenses for portability and safety combined; but I see no reason why the tubes should not be made of something lighter than metal, and collapsible like an opera hat. This idea will probably frighten the opticians, but I can't help it; they may rest assured I have no intention of trying to make a collapsing lens. What I do intend to suggest may give them enough matter for thought.

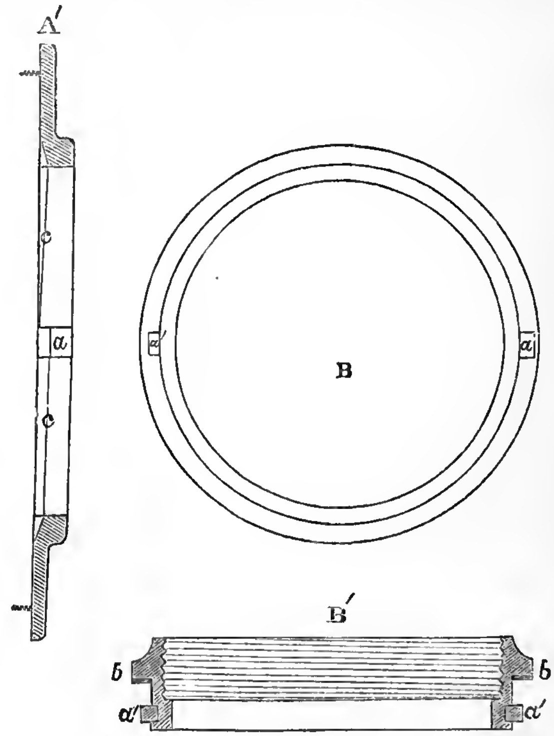
To conclude this subject: I may say that for the most part I agree with Mr. Harrison, and consider that he has done well to bring the matter of tourist cameras into public notice. I am inclined to think that he has not seen some of the cameras lately produced by our best makers. These cameras seem to me to com-bine portability and strength, lightness, and facility of use in a manner that leaves less to desire than Mr. Harrison may imagine. In all such matters we have to endeavour to strike the happy medium between lightness and strength, and such circumstances invariably leave much to the taste and judgment of the purchaser. With Mr. Harrison I urge the use of a long extension of the camera, of ample play in rise and fall of the front, of a double or circular level, of catches instead of screws, and of the insepara-bility of all parts, as well as of double-swing backs to a consi-derable extent. Slides must be light-tight first and light after.

Now for my lens idea—indeed, I do not know that the idea is mine. Mr. H. Gifford (a young engineer and an amateur photo-grapher) and I were talking over the frequent trouble of screwing a large lens into its flange, when the idea of studs slipping into a hole and then turning a little bit came up, and the lid of a gun-



A, is the flange screwed to the camera. B, the adapter into which the lens goes. A', section of A.

makers' box was instanced. After a short conversation Mr. Gifford went home, and shortly after sent me the drawing here reproduced, telling me at the same time that he had had an arrangement of the kind made for him in Edinburgh by Messrs. Kemp and Co. The arrangement may briefly be thus explained. The flange A has two sharp cut holes, *a a*, behind which are two inclined planes, *c c*, as



B' section of B.

seen in the section A'. A ring, B, fits the lens, and has two studs, *a' a'*, hard-soldered on, which slip into *a a*, the lens gets a short turn when the studs move along *c c*, an inclined plane, and clamps itself. On the section B', *b* is a leather washer, which not only helps to keep out light, but makes the clamping more secure. Nothing can be simpler or more efficient; in a moment the lens is in its place and tight, and all my lenses, with their adapters, fit B, so that it is all the same what lens I use—it is in in an instant. I have not seen Mr. Gifford's arrangement, but mine is faultless, and was made by Mr. W. Hume, of Edinburgh, to whom I can refer anyone wishing to know more of this labour-saving "dodge." When about to make a landscape photograph any means of preventing distraction and loss of temper is of great importance; it takes me all my time to think of my picture without anathematising my fingers or my lenses. ANDREW PRINGLE.

DEVELOPMENT.

THAT it is very possible for even an experienced operator to incorrectly expose a plate by 100 per cent., giving it twice the correct exposure or only half the same, will, I think, be admitted by those who work much in dry plates. For the portrait operator with his dark room at his elbow this assumption does not hold good; but for the worker in the field, with his large stock of dry plates with him, it seems to be the usual custom to carry a small developing *impedimentum* as his everyday companion, in order to be able to develope a plate or two now and then to ascertain and satisfy himself that his work has been rightly timed. This plan is certainly effective, but at the same time is a decided nuisance. When an industrious searcher after the picturesque has returned to his hotel subsequent to his long day's ramble it is quite trouble enough for him to have to change his plates and mark them. He should not need to engage in the subtleties of development, which ought, in all conscience, to be deferred to a more fitting occasion.

A plan I have had long in practice for the attainment of this end—the more effective assuring of a correct exposure—may not be without interest to many of my readers, more especially as I have not seen anything of a like nature hitherto published.

It consists, then, in using for a standard a developer which shall have a reserve power for an under-exposed plate equal to (say) 100 per cent. In case this should not be quite clear I will take an instance:—Suppose the proper exposure to be twenty seconds, and the plate has only had ten seconds. Now, by omitting one of the component restraining parts of our developer the operation yet proceeds satisfactorily, with the same result—a perfect negative. Over-exposure, on the other hand, does not present to us any grave difficulties, it being dealt with up to any reasonable limit by augmenting the restrainer. The invaluable citrate of soda of Mr. G. Watmough Webster, to which I should like to draw the attention of your readers, is here of great use to us.

I mix my developer as follows, although I do not recommend anyone to depart from a formula with which he is familiar, but rather to modify it so as to attain the same principle:—

A.

Ammonia fortis	½ ounce.
Bromide of potassium	60 grains.
Water	20 ounces.

B.

Bromide of potassium	120 grains.
Bass's pale ale and water, equal parts	20 ounces.

C.

Pyrogallol	80 grains.
Salicylic acid to saturation ......(about)	3 grains.
Water	20 ounces.

D.

Citrate of soda	1 ounce.
Ale and water	20 ounces.

The standard developer consists of half-an-ounce of A, B, and C. When we wish to fall back on our reserve of developing energy solution B is omitted in whole or in part. For over-exposure D comes into use; but it must be added very cautiously, one drachm to the above having a powerful effect. It may, however, be employed until the required action is obtained. Bitter ale I find a most valuable adjunct to the alkaline development of gelatine plates. JOHN M. CARROLL.

PHOTOGRAPHERS AND PHOTOGRAPHY IN AMERICA.

No. I.

I NOW respond to the request you made that I should furnish a few jottings of my adventures in America, so far, at anyrate, as photography is concerned.

Nothing of special photographic interest occurred on the voyage except a "shot" at the S.S. "Austral" in mid-ocean a mile off in half a gale, requiring the aid of two persons to hold the camera to the deck, the cord and elastic door-spring "dodge" being almost useless. The arrangement for stopping out the light in my cabin was somewhat novel, namely, stuffing a pillow in the port-hole, another in the electric lamp, and a portmanteau over the grating ventilator. Thus my dark room was complete. Towards the end of the voyage the weather moderated so that I was induced to try a couple of plates to show the lazy life led by passengers on board of a "Cunarder." Had the light been sufficiently good I would have taken the saloon and the smoking-room: the expressions on the gamblers' faces would have formed an interesting picture.

In New York I lost no time in visiting Mr. F. C. Beach, the President of the New York Amateur Photographic Society, who kindly showed me his newly-designed dark room; and a more complete and carefully-arranged laboratory I have seldom seen. By-the-bye, he uses professionally (as a patent agent) a large quantity of bromide paper for reproducing his drawings. These are made on the ordinary paper. The sensitised drawing-paper is placed wrong side to the front of the drawing (to avoid transposition), the whole put in a printing-frame and exposed to daylight for a couple of seconds, and developed with ferrous oxalate. By this method an inventor can have a copy of his machine by return of mail for inspection or correction, and I am informed that many copies are required, thereby bringing more "grist to the mill." Mr. Beach's dark room is about ten feet square and twelve feet high. All the waste hyposulphite of soda is poured into a square water-tight box for reduction. In answer to a question as to whether the fumes of the potassium sulphide were not obnoxious, I was told that by the method of mixing the sulphide this was entirely obviated. The sulphide is broken up into small pieces and placed in the bottom of the solution. I am rather inclined to think that the perfect ventilation of the room has a great deal to do with it, as the box or precipitating vessel is placed about midway between the floor and ceiling, and a perfect system of ventilating and heating is arranged close to the floor, thereby carrying off the fumes.

Mr. Beach has asked me to give a demonstration on making emulsion at the next meeting of the Society, which takes place on the 9th of September, and concerning this I will have something more to say in a future communication.

My next visit was to Boston. There I was cordially received by Mr. Black, well known as the "acid bath Black." He showed me many negatives he had just taken in the Yellowstone Park, or People's Park. The scenery is, I am told, beyond description, and Dame Nature has been very lavish in this quarter. The extent of the park is about 3,000 square miles; it includes several mountains, and geysers are freely distributed. I am told that the difficulties of photography are very great, especially as the hot springs set up so much steam that very clear photographic results are almost impossible; yet, upon the whole, the negatives secured by Mr. Black are wonderful. They were taken on plates specially prepared for him by Mr. Eastman, and do not bear the appearance of being very rapid. I had almost forgotten to say that the negatives are intended for lantern slides for a lecture.

After leaving Mr. Black I visited the gallery of Allen and Rowell, where, to my surprise, I saw great things. In the first place, it is seldom I have to look up to a photographer; but in this case I had literally to look upon a giant in the person of Mr. Rowell, who met me with open arms and kindly showed me all over his works, where I saw the making of dry plates, carbon tissue, &c. Mr. Rowell is happy in having the assistance of an Englishman, Mr. Derham. This latter gentleman is one of the few whom I consider a good all-round man. Mr. Rowell and I compared our emulsion experience, and in nearly every particular we agreed. This, I have no doubt, will by some of my friends be considered marvellous, as it is so seldom I run parallel with any one.

Mr. Rowell's arrangement for coating plates and his steam power for exhausting and changing the air are certainly very good. I had also the pleasure of seeing his machine for coating carbon tissue, and it struck me as being suitable for bromide paper. He kindly made some in my presence to show me that, although the thermometer in the room stood at 86° Fahr., no difficulties were experienced in setting the gelatine. The coloured carbon gelatine is placed in a trough and the paper is rapidly drawn over the surface and then over long, wide canvas bands. In a few moments it is set, and an assistant stands by cutting it off in pieces with a large pair of scissors, placing it on wooden rods to dry. I saw the tissue coated about 10 a.m., and about 2 p.m. it was nearly dry. Mr. Rowell often prepares paper in the morning, and prints, mounts, and sends out copies the same day. I mention this to show how dry the air is in Boston. Mr. Rowell has an outlet for all his surplus plates and paper, as he supplies the trade. An adieu with many good wishes from Mr. Rowell.

I "Jules Verned" to the City of Providence to visit a friend. There I found a dry-plate manufactory admitted to be somewhat disguised on account of a dissolution of partnership. Their card bears the names of J. P. Ourdan, Geo. Stillman, and J. W. Stillman. Mr. Ourdan made himself known to me as Mr. Colton, late of Burrows and Colton, of London. Judging from the size of the factory I could see no reason why a large quantity of work should not be sent out. He also had steam power employed.

From Boston I took the Fall River boat for New York, *en route* for Washington, D.C. When there I did not visit many Washingtonians, except Mr. Bell, and he seems to do good work and commands good prices. I did not learn that anyone in Washington made plates.

My next move was to Cincinnati to join the Convention (twenty-four hours' ride). On my arrival I learned that a grand *fête* was to take place at the Highland House that evening in honour of the Convention. I "made tracks" there to find some thousands of persons listening to the strains of music and the booming of fireworks. I subsequently learned that after I left many indulged in the "light, fantastic toe." Next morning I made my way to the Music Hall, accompanied by Mr. Inglis and Mr. George Croughton (old friends). The former had been up early and obtained for my wife and self the Convention "badge," showing my profession and no mistake. I was somewhat bewildered and dazed to see such a display of photographic apparatus. The Music Hall is an enormous building. I am almost afraid to venture a guess as to the numbers it will accommodate, but from the floor to the ceiling it was crammed with exhibits; and on the screens in the galleries was the exhibition of photographs, many of which were in competition for medals and money prizes given by the plate-makers for the best pictures on their respective plates. Mr. Inglis gave four medals and money prizes. Mr. Cramer also gave several. My impression, on the whole, is that, considering the short time that gelatine plates have been used in the United States, the Americans are ahead of the English. I have seen some large instantaneous studio groups which I do not think could be done in England, owing, I have no doubt, to the difference of the quality of light.

From this Exhibition I made my way to the lecture hall attached to the Hall. It is capable of seating about 2,000 persons. Here I was introduced to the President, Mr. J. H. Kent, of Rochester, N.Y., who presented me to the members. I was received with tremendous cheering. I had no idea that the few jottings and remarks I had made from time to time in England had impressed the Americans about me in such a way. I am sure that my oratorical powers have not "improved the occasion;" but I did my best, and apologised for my deficiency by stating I was no speech-maker but a photographer. I listened to an interesting paper by a gentleman (whose name I forget), and a discussion which, although suggestive, is not likely to bring forth fruit.

The following day and last of the sitting no business was done except the nomination of officers for the ensuing year, and an announcement made that the members would be photographed at three o'clock on the steps of the Music Hall.

On my proceeding to these steps a strange sight presented itself. About a dozen cameras were arranged on the opposite side of the street, their sizes varying from stereos. to 24 × 18. There was no sunshine, and the exposures varied from the fraction of a second upwards. The most noticeable was one exposed by Mr. Inglis on an 18 × 22 plate with euroscope lens, No. 8, $1\frac{3}{8}$ inch stop; diameter of lens $4\frac{1}{4}$, and 28 inches back focus; length of tube 8 inches; exposure by chronograph, half-a-second for the first two plates and six-tenths of a second for the third, three plates having been exposed. I saw one developed and it was fully exposed.

Nothing of any practical value took place at the meetings, except a demonstration of posing by Mr. L. W. Seavey, of New York, and this was evidently an advertisement for his backgrounds. I may mention that, after the nomination of officers, one gentleman on the platform rose and said he had found a good thing—that if any photographer wanted to make a gelatine negative look like a wet plate they were to add a certain amount of ammonia sulphate of iron to the hypo. bath, and allow the negative to remain in the solution until the desired end was obtained (a "mare's nest").

Great dissatisfaction all round seemed to manifest itself that so little practically was done, and expressions to the effect might be heard that they would not attend another Convention. Some good, at all events, has come out of it: the principal dealers and exhibitors have sold all their numerous exhibits.

Comparing numbers and distances travelled by photographers (many having come a thousand miles to attend the Convention), what should we English photographers have to do to draw 1,500 photographers together and from such distances. I have to thank many ladies and gentlemen for their great kindness, and for the numerous invitations I received to visit them and receive their hospitality. If I could have accepted even a tithe of them I would not have been here to tell the tale.

I am now in the "garden city" (Chicago). In my next I will have something to say about Mr. Inglis's plate factory at Rochester, as from what I hear I have reason to believe that his factory is the best organised in the United States. A. L. Henderson.

PHOTOGRAPHY IN BELGIUM.

[From Our Special Correspondent.]

Brussels, August 13, 1884.

Having arrived but a few hours ago in this city, it is not possible on the present occasion to deal with the subject of photography in Belgium; but the question may be raised whether it would not be a beneficial step to establish a Photographic Tourists' Club, open to photographers of all nations. The advantages to working photographers would be many. In the holiday season a rest on the continent would be better than one at a home seaside watering-place, because the change in life would be more thorough, the scenes to photograph more novel, the expense of the vacation less, and the opportunity would be afforded of obtaining commercial novelties of value to the profession.

For instance: here in Brussels artistic frames for photographs are commonly on sale in the shops, and in course of time they are likely to take the place of common frames altogether as the public taste improves, which taste something should be done to educate. For a painting a gilt frame is eminently inartistic. In Italy—the home of high art—artistic frames for oil paintings are coming into public use, and do as much to heighten the general features of the picture as a suitable light or appropriate surroundings in public galleries; indeed, a good frame, out of the common run, will do much to isolate the picture and to neutralise the effect of unsuitable adjacent subjects and colours. Added to this, the more cultivated patronisers of the art-science will have their attention drawn more particularly to those who take the earliest steps to elevate home art-standards.

Belgium is a good country for photographers to visit when a change on the continent is desired at the minimum of expense. Of late years the Great Eastern Railway has been most energetic in providing excellent accommodation on land and on water at very moderate charges. Antwerp is neither a fashionable place nor one in which exceptionally-high charges for the benefit of the English prevail; and English is so commonly spoken in the shops that the many who stay at home from unreasonable fear of difficulties of language will find themselves as well off as regards any information or accommodation they may require as in England. It is the same in Brussels and in the other large Belgian towns. Very little linguistic ability is necessary for foreign travel; enough French may be learnt in a week or two for the purpose. England is isolated in the general want of knowledge of the industrial part of its population in foreign languages.

At Antwerp there are many shops in which even youthful assistants speak three or four languages—Flemish, English, French, and Dutch. An English tourist is said to have made a reputation throughout Germany, and even a part of the Grisons, by travelling with the knowledge of two German words only—those for "bread" and "bed." Continental tours tend to break down home prejudices and home conceits, and to let the wanderer see how people live in free countries, where they are not generally subject to private taxation, but personally own the little portions of land on which their farms and houses are placed. One reason why, generally speaking, a smaller amount of money has a larger purchasing power abroad than in England is that the people, being in great part free from private taxation, are not forced to put a higher price upon the goods they sell. Belgium, however, is but partially more advanced than England in these matters; land is more divided in countries further south.

In the French seaside towns most accessible from England special prices for the inexperienced English are but too common, and some of them—like Calais, for instance—have nothing particularly enticing in the way of good accommodation. The railway services in France are also conducted far more in the interests of the shareholders than of the public, the trains being so arranged as to almost force those who wish to go long distances expeditiously to take first-class tickets, and no others. It is not so in Belgium, where all fares are much lower than in France or England for the same distances; added to which, if twenty persons band together to take tickets and to apply for them beforehand, they can have them at half-price. Thus it is possible to get from Antwerp far down towards the centre of Europe for a mere trifle in railway expenses. If fine scenery be desired the south-east of Belgium is mountainous and picturesque; nearer the sea it is as flat as Holland. In arranging international visits the advantages of a Photographic Tourists' Club would be felt.

Belgium is a small and prosperous country, overflowing with milk and honey. It was once the chief battle-ground of Europe. Its history teems with massacres; its very rivers ran with blood. When Spain was a rich and powerful nation it overran all this part of Europe, butchering men, women, and children in all directions in those bad old times; but now all is changed. At the same time, Belgium is now in the midst of a very serious political crisis. The clerical party having obtained an accidental majority at the last elections are making laws to put all the public schools, founded on other principles, under the authority of the priests; the feeling throughout the country is dangerously bitter in consequence. The progress of events may be watched by means of the occasional telegrams in *The Times*.

The captains of several channel boats by various routes to the continent have told me that the opening of new steamboat services and new lines of passage have not thinned down the annual number of their own passengers, but that foreign travel is becoming more general among the English. This is a healthy sign, morally and educationally good in every respect.

The Photographic Establishment of M. de Blochous.

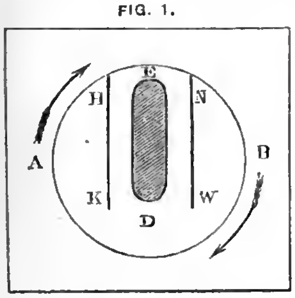
Brussels, August 20, 1884.

M. A. de Blochous, President of the Belgian Photographic Association, devotes himself chiefly to industrial and engineering photography. His works are at 73, Rue Keyerweld, Brussels, in the upper part of the city. The newest and best part of Brussels is upon the top of a hill; the older and business part of the city is upon the hill side and upon the plain below. M. de Blochous has a wide, open space of about one acre for his operations. Near its sides are his studios, photolithographic rooms, and a dwelling-house. He has been professionally connected with engineering and photography for twenty-two years, was one of the most active founders of the Belgian Photographic Association in 1874, and is now its President. Each president holds office for three years.

The *salon de reception* of M. de Blochous contains various specimens of his work. One of them is a photograph of a railway terminus at Brussels—that of the Gare du Midi—taken a little more than fifteen years ago with one of Harrison's globe lenses of 38·5 centimetres focal length, producing a circular picture 23½ inches in diameter, sharp up to the edges. This photograph is in sharp focus at all points, whatever their distance from the lens, and even in these days of advanced optical appliances M. de Blochous finds that old lens to be occasionally useful for special purposes. His photographs of oil paintings are taken chiefly with a Dallmeyer's triplet; he never retouches these in the slightest degree, but in justice to the painter gives them as they are. Among his industrial photographs is one of a tramway car built in Brussels to run in Algiers; the same Belgian company has made tramcars for Milan and other distant places, this being but one instance among many of the extended trade of Belgium with its thriving industrial population.

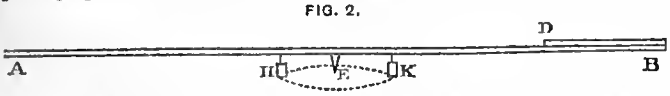
Several useful improvements in photographic apparatus have been designed by M. de Blochous, and are in constant use at his establishment. By means of one of these, each of his cameras has not only the advantages of a rising and falling front (the latter of which is so commonly absent in English cameras), but he can place the lens in any position he pleases in relation to the plate. His plan may be explained by *fig.* 1, which represents the square front of the camera carrying the circular wooden disc A B, which can be rotated either in the direction denoted by the arrows or the other way. The wooden front carrying the lens, with its flange, slides in the grooves H K and N W, whilst the orifice E D permits free motion of the lens from the centre to the circumference of the wooden turn-table. Thus his lens can be placed in any position in relation to the plate, as already stated.

FIG. 1.



In his grounds M. de Blochous has a long platform on a turn-table, used to catch the best light, whatever the position of the sun, when photographing paintings. *Fig.* 2 shows the principle. The platform B A is of skeleton framework except at D, where it is boarded to afford foothold for the operator and camera-stand. It turns upon a central pivot E, and is kept in a horizontal position by means of small wheels, two of which are represented a H K; the wheels run upon a circular iron rail denoted by the dotted lines. Removable light framework is fixed upon the end A when desired, which framework is so constructed as to hold the painting in any desired position and at any desired angle. The platform A B is about twenty-four yards long by one yard broad.

FIG. 2.



In a shed close at hand is a photographic travelling van—of more use in the days of wet collodion than at present. A portrait studio also stands in the grounds; this branch of the business is now in the hands of the successor of M. de Blochous. Among the collection of negatives in this studio are some of difficult subjects, namely, numerous specimens of jewellery upon one plate, the specimens being of the most varied kind as regards colour and materials. The lenses have rotating shutters made ten years ago by M. de Blochous; they drop in between the entrance groove in the lens mount so that no light can enter, and are worked by pulling a string.

The chief branch of business at the establishment is that of photolithography, by the process of M. Joovey, a Belgian. Heliochromy was tried for a time, but was not found to be remunerative. Joovey's photolithographic process is one of the many in which the properties of bichromate of potash are utilised, and which usually differ from each other but in small matters of detail. The plan by which large sheets of paper are evenly and completely covered is both ingenious and useful. A long V-shaped trough (*fig.* 3) is employed, with a heavy glass rod, rounded at the ends, lying free in the bottom of the trough. The paper to be coated is passed under the rod from the B side, and drawn up with the fingers from the A side, the rod rotating meanwhile by the friction. The horizontal line represents the level of the solution of bichromate of potash. This sensitising may be performed in full daylight, but the paper must be dried in the dark. The trough is lined with water-tight paper.

FIG. 3.

The base-boards—which in Belgium are called "the chariots"—of several of the cameras of M. de Blochous are on the American principle, with quick and slow motions for obtaining the focus, and the means of locking the camera when the focus is obtained. An exceedingly-useful device, especially for tourists, has been invented by M. Blochous for locking the dark slides, so that they cannot be opened in his absence by curious "young ladies" of both sexes to see what pictures he has taken. It is done by means of a little spring catch let into the woodwork of the slides—very simple, and not liable to get out of order by long usage. Directly the slide is in position in the camera the shutters pull out freely, a spring-pin in the camera pressing down the locking detent.

The plate-boxes in use by M. de Blochous are not grooved in the ordinary way, but thin slips of ebonite are let into cuts in the wood; thus the plates pack as closely as in boxes made with a double thickness of tin between the plates. The grooved slip on one side of the box is not fixed in position, but movable, so that after all the plates are in they may be fixed so as not to rattle in the box by means of a little wooden wedge then inserted between the movable slip and the true side of the box. A piece of caoutchouc tubing is placed on the top of the plates before the lid is closed; the plates, being thus steadily kept in position, are less liable to fracture in travelling.

In his developing room M. de Blochous has plenty of simple levelling-stands, every wooden shelf being utilised for the purpose. This is done merely by the use of the iron screws made from thickish wire, as represented in *fig.* 4. These are here and there screwed through the wood of the shelves; a sheet of thick plate glass may be placed on any part of any shelf on the top of three such screws, which are then adjusted until the plate is accurately level.

FIG. 4.

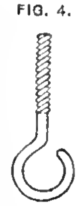


FIG. 5.

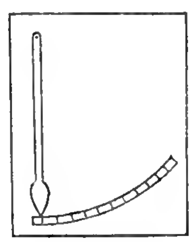
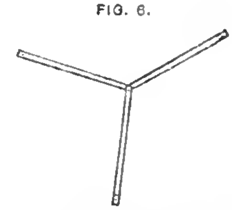


FIG. 6.



By means of another device M. de Blochous gets the base-board of his camera into a truly horizontal position on uneven ground without the use of a spirit level. The plan is represented in *fig.* 5, in which a small rectangular piece of copper carries a pendulum which points to its zero on a curved scale, when the upper part of the copper rectangle is placed against the base-board, in a direction in which the camera is level. If it point to zero in two positions at right angles to each other the camera is in a horizontal position. If it be desirable to tilt the camera its angle of elevation is indicated and can be recorded, thus introducing more precision into records of photographic operations.

A method devised by M. de Blochous for obtaining a firm footing for a camera-stand on smooth boards consists of three pieces of thin crinoline hoop joined by a central pin (see *fig.* 6). The pieces at the three ends are movable, so that the lengths of the arms can be varied; the arms also move round the central pivot. Thus the ends of the legs of the camera can be fixed in any relative positions desired, and the whole appliance for effecting this occupies small space; it is also of light weight.

The International Congress of Photographers.

The International Congress of Photographers, founded under the auspices of the Belgian Government, will not be held until May next year, when the International Exhibition will be opened at Antwerp. A preliminary programme of the work of the Conference has been drawn up, which, as yet, is necessarily private; but in a few weeks it will be submitted to the chief photographic societies of various countries

ROYAL CORNWALL POLYTECHNIC SOCIETY.

THE fifty-second Exhibition of this Society was opened on Tuesday, the 12th inst., in the Polytechnic Hall, Falmouth. Thanks to the exertions of the Secretary, Mr. E. Kitto, and of the Curator, Mr. R. N. Worth, the general arrangements were completed early in the morning, and when the public were admitted at eleven o'clock the Hall presented a neat and attractive appearance.

The Exhibition is not restricted to the Polytechnic Hall only, but a large drill hall has been engaged for the heavy mechanical exhibits, such as machinery in motion, &c., while the Polytechnic Hall is confined to the fine arts and the like, including photography. Although the Exhibition is not quite so full—especially in the mechanical department—as on some former occasions, it embraces many objects of peculiar interest. Certainly the promoters have done their best to make the Exhibition popular during the week it remains open. Lectures on scientific and other subjects were arranged for each evening, whilst for Thursday an attractive concert was announced.

There was a large and influential attendance at the opening ceremony, which took place at one o'clock. The President, the Earl of Mount Edgcumbe, presided, and there were also present on the platform the Revs. Canon Philpotts, C. W. Carlyon, W. Jago, G. Bull, F. Cole, and A. H. Malan; and Lord Renshaw, Sir John St. Aubyn, M.P., General Aylmer, Colonel Carlyon, Major Ross, Major Pender, Major Haye, Captain Bridges, R.N., Captain B. Reid, Messrs. T. B. Bolitho (High Sheriff of Cornwall), H. Liddicoat (Mayor of Falmouth), T. S. Bolitho, Jonathan Rashleigh, Barham, M.D., Jago, M.D., Howard Fox, R. Fox, W. H. Williams, R. N. Worth, F.G.S., C. Davidson, J. H. Collins, F.C.S., W. Brooks, and E. Kitto.

The Earl of Mount Edgcumbe, in opening the Exhibition, said they would forgive him if he performed that duty in the most formal manner, because he was sure they did not come to hear desultory remarks from a person who had just arrived in town, and had scarcely been able to look through the Exhibition. They came there to see an exhibition which Falmouth had made peculiarly its own, and of which that town and the county had every reason to be proud. It was an exhibition partly practical and partly artistic. One section was specially devoted to gas lighting. Gas lighting, as all knew, was introduced a century ago by Murdock, who at one time lived at Redruth, was agent in Cornwall for James Watt, and was practically the inventor of gas lighting. The first house so lighted was his own house at Redruth. Having referred to the various departments, he said the Photographic Department was quite equal to former displays, both in numbers and excellence; but no doubt they would hear more about that department from Mr. W. Brooks, who had taken so much pains to collect the exhibits.

Sir John St. Aubyn, M.P., moved a vote of thanks to the Earl of Mount Edgcumbe, which was seconded by Mr. Jonathan Rashleigh, who said it was really a privilege to have the noble Earl presiding at any gathering (applause), because he always brought wisdom, judgment, and discretion to bear on the proceedings. (Renewed applause.)

His Lordship briefly returned thanks and declared the Exhibition opened.

On the same afternoon the foundation stone of the new Observatory at Falmouth was laid by the Earl of Mount Edgcumbe, in the presence of a very large assembly. Nearly all the records are made by means of photography. The Observatory is under the management of the Polytechnic Society, and is presided over by Mr. E. Kitto, who is the chief observer, and a Fellow of the Meteorological Society. All those who attended the opening of the Exhibition in the morning were present at the laying of the stone. The total cost is estimated at £1,300. A subscription list was sent round. About £81 was promised by those present, and the ceremony closed.

The proceedings on Friday evening were rather lively, owing to the annual drawing of the Society's art-union. This art-union is established with the view of promoting the sale of professional artists' and photographers' works. The prizes are allotted in money, the winners being bound to select from such works (of professionals only) as are on exhibition; and it behoves photographers to assist in the future by taking a few shares.

At nine o'clock p.m. the drawing took place, with the following results:—

935—Mrs. Kitto	£2	0	0
1068—M. Liddicoat	3	0	0
342—Robert Fox	5	0	0
931—J. Still	2	0	0
748—Miss Steel	3	0	0
487—B. Brett, M.P.	2	0	0
1085—Rev. W. Rogers	5	0	0
954—Mrs. Harris	3	0	0
461—B. Brett, M.P.	10	0	0
991—F. Spry	5	0	0
1486—C. E. Ruse	3	0	0
1500—Miss Lake	1	0	0
96—D. J. Jenkin	1	0	0
1086—Rev. W. Rogers	1	0	0

JUDGES' REPORT.

PHOTOGRAPHIC DEPARTMENT.

THE judges have great pleasure in announcing to the Society that the exhibits in this department and its sections are fully up to the average—not only as regards numbers, but also the excellence of the exhibits generally. Of late years there has been a falling off in the professional portraiture department—that is, in the large-sized portraits. The landscapes are exceedingly fine, especially since the introduction of the rapid gelatine plates, and at the present time their manipulation is much better understood than it was a few years since. There are a few specimens of instantaneous work which possess merit that was unattainable until the introduction of the rapid plates. The amateur section is exceedingly well represented.

The judges also beg to call special attention to a series of large photographs of America, which possess great merit as photographs and are very interesting from a geological point of view. This collection has been presented to the Royal Institution of Cornwall by Mr. Richard Pearce, Jun., of Denver, U.S.A.

In the photographic appliance and magic lantern department several ingenious inventions are to be found.

PROFESSIONAL SECTION.

Mr. H. P. Robinson, of Tonbridge Wells, is amply represented by a large series of very fine studies in his well-known style. They are most admirable as gems of photographic art, and each one tells its own tale, the expression and gesture of the figures being perfect. Mr. Robinson's large picture, *The Cuckoo* (No. 695), carries off the first silver medal, the subject being a very difficult one and exceedingly well treated.

Mr. W. W. Winter, of Derby, takes also a first silver medal for a portrait study, *Sad Moments*, which, in the opinion of the judges, is simply perfect in pose and expression. He is also represented by several other charming studies, which fully illustrate the high state of perfection of the photographic art at the present day.

Mr. W. Gillard, of Gloucester, is again to the front, and has been awarded a first silver medal for his magnificent composition picture, *The Miser*, and in its favour the judges cannot speak too highly. He has also several other exhibits which are very perfect.

Mr. C. H. C. Harrison, of France, sends three frames of instantaneous studies printed in carbon, which show careful manipulation.

Mr. W. P. Marsh receives a first bronze medal for his frame No. 665, *High Seas* (instantaneous)—a series of pictures which represent in a marvellous manner heavy seas breaking over beach and esplanade.

Mr. E. C. Bowker sends a frame of cabinet pictures (No. 666), some of which are very good; but the judges think it a mistake to pose one individual so many times. The frame contains upwards of thirty pictures, and one-third of that number are of one lady.

Mr. F. Whaley sends some very good studies, the best of which is *This Little Pig Went to Market* (No. 667).

Mr. J. Milman Brown is again represented by several productions, the best of which is *Autumn Sunshine*. It is highly commended.

Mr. R. Faulkner, of London, shows a frame of very skilful studies of children in his well-known style, and also some highly-finished vignette portrait studies; but the judges regret that they are unable to award a medal (but highly commend them), owing to the high artistic finish which is put upon the photographs.

Mr. J. P. Gibson sends some clever little artistic studies, principally river scenes.—Mr. J. Tevias also contributes some excellent little studies.

Mr. A. Hendrey is represented by some studies of flowers, and also a river scene, *The First Bite*, which is very pleasing and highly commended.

Mr. John Jackson sends three frames of views, the best being No. 696, but all are of considerable merit.

A frame of interiors of *Lincoln Cathedral*, by Mr. G. Hadley, has been awarded a second silver medal, being well rendered.

Mr. P. M. Laws exhibits a frame of ceramic enamels, which are well worthy of notice.

Mr. Luke Berry sends several charming pictures, both landscape and figure. To his *Llanberis Pass* has been awarded a second silver medal, being a most charming artistic production, and full of atmosphere.

Messrs. Byrne and Co., Richmond, are represented by some very fine portrait examples printed in red carbon; but the judges notice that several of the same studies of this firm have been exhibited in former years.

Mr. G. Renwick sends two large studies of snow and frost scenes, which are interesting; and also a frame of children's portraits possessing much merit.

The award for enlargements is a second silver medal to T. J. Dixon, of London, for a *Tiger*. In the opinion of the judges it is the best enlargement they have ever seen from so small a negative. There is another one by the same exhibitor of an *Eagle*, equally good.

Mr. G. Honey has a very clever little composition picture, *Children in a Boat Feeding Swans*, but it is to be regretted that the picture is not of larger size.

AMATEUR SECTION.

The Rev. H. B. Hare has sent examples of good work of river and wood scenery.

Mr. A. Pringle's productions are very perfect and are fully up to that gentleman's former work. To his frame Nos. 805–809 has been awarded the first silver medal. The pictures are full of atmosphere, and the artistic treatment is perfection in every way.

Mr. A. Millar contributes a very careful figure study.—Mr. D. Barnett sends two frames of landscape and rustic studies. They would have been more effective if skies had been printed in.

T. H. Morton, M.D., shows two very good interiors.—A. G. Tagliaferro sends frames of interiors, &c., the best of which is frame No. 812, which has been awarded a second silver medal, the subject being well treated.

Mr. W. J. A. Grant has been awarded a first bronze medal for a frame of his well-known Polar subjects.—Mr. R. Hopkins sends three large-sized pictures printed from paper negatives, but which appear a little too heavy.

Mr. P. H. Emmerson, B.A., contributes one frame of seascapes (instantaneous), to which has been awarded a second bronze medal. The same gentleman has also sent two lifelike pictures of heads printed in red carbon, which are highly commended.

Appliances, &c.

Mr. G. Atkinson, of Chester, sends a retouching desk, which is, no doubt, effective.—Mr. F. B. Dagley sends a plate-washing cabinet, which is well adapted for the use of amateurs, and to which has been awarded a second bronze medal. The same exhibitor has also sent a plate-box so arranged that plates may be examined by the Customs without injury.

Mr. R. R. Beard, of Bermondsey, exhibits a very ingenious self-centering lantern-slide carrier, to which has been awarded a second bronze medal. He has sent also a case of so-called "safety-tubes," the workmanship of which is very good; but, as to their utility, in experienced hands their use is superfluous. The same contributor also exhibits a drawing of a screw-regulating back-pressure valve and gas tap.

PHOTOGRAPHERS' ASSOCIATION OF AMERICA.

FIFTH ANNUAL CONVENTION.

[From a Special Correspondent.]

Cincinnati, August 1, 1884.

Not having been present at any of the former conventions I am unable to speak from comparison. I am, however, told by many photographers whom I have met here that this (the fifth) is far ahead of any of the others in respect to its exhibition of photographs, both in quality and quantity, but that the actual work of the Convention was a failure. My own impression, as an Englishman, is that the work exhibited in the Music Hall during the last three days is the best I have ever seen, and the whole Convention, with one or two exceptions, was something which far surpassed my anticipations. Certainly, among the "big things" done in this great country, the annual Convention of Photographers is not one of the least.

The Convention is supposed to consist of two parts—the exhibition of the works of its members aud specimens of every kind of apparatus and accessories, either directly or remotely connected with photography, and the meeting in convention of the members for lectures, papers, and discussions upon photography and photographic matters generally.

The Music Hall—one of the largest buildings in the city of Cincinnati—was literally crowded with exhibits from all parts of the United States; while the members present—estimated variously at from eight hundred to one thousand—represented almost every State in the Union, while Her Majesty's dominion of Canada was also represented. You would think there must be some very strong inducement, indeed, to bring photographers many hundreds of miles from their homes; and, from what I could learn from mixing with the members, both in the hall and at the hotels, the main inducement for coming together was this year entirely omitted from the proceedings. The Convention itself was nothing but a squabble, continued from day to day, over amending the constitution and bye-laws and electing officers for the ensuing year. The only paper of any photographic interest that was read at any of the meetings was a very excellent communication by Mr. Ryder, and which I send you. The President's address, and one on the *Progress of Photography*, by Mr. Gentilé—who was selected at the last moment to write this paper in the place of Mr. J. T. Taylor, who was appointed last year for that duty but who was believed to have resigned since—both of which I send you.* Mr. Taylor's paper subsequently arrived, and was taken as read by a vote of the Conventiou. There was no discussion upon processes or methods of working, and dissatisfaction was very strongly expressed in all quarters.

As many of the names of exhibitors here would be unknown to your readers I purpose to confine my remarks to those things and circumstances which struck me as a stranger and an Englishman.

In the first place, then, it is one great noticeable feature that, on every hand, inducements aro offered in the way of reduced fares by rail and reduced rates of accommodation at the hotels. All the railroads (except the Pennsylvania, which would not make any reduction whatever) made the double trip at about one fare, and one of the first hotels in Cincinnati (the Palace) reduced its rates to members of the Convention to two dollars per day, which charge included bed and the usual American three meals per day.

Arrived in Cincinnati after a ride of nearly five hundred miles I made my way to the Union Hall. On entering I exchanged my annual dues (two dollars) for a white badge with gilt letters, which every member of the Convention wore upon his breast, and which was his passport to the interior of the building. Passing through with this badge I found myself in a perfect maze of photographic backgrounds upon frames stuck up in every imaginable way, and forming alleys through which I had to pass to get to the floor of the hall, but which seemed designed to lead the unwary away from the door and cause him to lose himself among backgrounds and accessories, such as balustrades, cottage porches, &c., &c.

While trying to pass through this maze I came upon what the attendants told me was the most successful accessory ever made for children. This was a very wonderful profile of a pony with a saddle on. It certainly was "most fearfully and wonderfully made;" for, while one of the attendants was screwing his head in various positions, the other was putting his legs in the several attitudes of galloping, trotting, and walking, and I should be puzzled to tell you which was the most unnatural.

Having escaped from this thing I found myself at the door of the hall—certainly the largest building of the kind I have ever seen—and paused to take in a general view. It had the appearance of a fair. All over the floor were stands and booth-like places, occupied by the various stock dealers. Some were exhibiting great pyramids of dry plates from 20 × 24 to quarter size, cameras, lenses, camera-stands, and, in fact, everything wanted (and somethings not wanted) in a photographic business.

To the right of the centre door Mr. L. W. Seavey had his stand for exhibiting his backgrounds, accessories, &c. One of the principal novelties of his exhibit was backgrounds and accessories (exterior) in colours. The landscape and the set pieces—consisting of tree stumps, rocks, &c.—were coloured after nature. Mr. Seavey was giving a lesson to a large crowd in the art of posing, using a trained female model before his background, illustrating the use of his accessories, &c., &c., with apparently great success.

Passing down the centre of the hall, where was the stand of the well-known Scovill Manufacturing Company, we come to another familiar name—Anthony and Co. Both these houses are known in England as very large stock houses, and both were here represented by very large exhibits in apparatus of all kinds. Mr. T. H. McCollin, of Philadelphia, exhibited some splendid platinum enlargements, and others in the gallery by Hoyt and Siebert, New York—these last-named exhibiting, also, prints on fabrics of great brilliancy and pleasing tone. I shall have more to say about these platinum prints further on, so passing these libels on a process which, in my opinion, is to be the process of the future for enlarging, I reach the platform.

Here, on the right, is the stand of the St. Louis photographers, presided over by Mrs. Fitzgibbons, who had a pleasant smile and hearty greeting for all. Behind the stand were two large barrels, which were kept filled with lemonade—Mrs. Fitzgibbons' contribution to the refreshment of the members of the Convention. On the other side was a stand surmounted by a gigantic "eye." This was the stand of that named newspaper, which is now a photographic publication—not, as formerly, a newspaper with a photographic section attached to it. The *Eye* is, I think, the only weekly journal devoted to photography in America; and this has to be filled up with stories, extracts, &c., which are not photographic. Mr. Gentilé is, I believe, both proprietor and editor.

At the back of the platform is a large collection of pictures, the work of Mr. McEntee with the air brush, the largest of which is an immense head of the President of the Convention, Mr. Kent, of Rochester, N.Y.; but it is not by any means a flattering portrait of that gentleman. Mr. McEntee is here surrounded by a crowd of photographers who are watching the growth of various portions of the human face by means of the air brush, manipulated by that clever gentleman. The air brush has quite a brisk sale; but I followed in thought the purchaser to his home, and imagined his disappointment when he found that the *man* had a great deal more to do with the result than the *brush*. I must do Mr. McEntee justice and say that he does not claim anything for the air brush, but that it is a tool which, in educated hands, will produce effects of high finish upon a photograph with a great saving of labour. It is, undoubtedly, an ingenious invention, and in capable hands produces a certain class of effect in a marvellously-short space of time.

Leaving the platform and passing into the corridors on each side of the main hall I am again among backgrounds, interiors, exteriors, and combinations, the quantity of which is enormous, and the quality above the average of English background painting. The exteriors have more ornament about them than we like in England; but as American rooms are more ornamental than the average of English apartments it is accounted for. Mr. Ashe, of New York, has here a fine exhibit of backgrounds of more than average quality. But in all the backgrounds—not excluding Mr. Seavey's—there is too much of the picture and too little of the background; that is, the artist pays more attention to making the background look pleasing in itself to the eye of the purchaser than to the fact that it is to be used simply as a support to, and accessory of, the portrait. Leaving the backgrounds I pass up the stairs to the upper floor, where are more backgrounds and some screens, with the competition pictures for the Inglis prize. Mr. Inglis is one of the dry-plate makers who has offered large prizes for the best collection of portraits and views upon his plates. And a very good collection is here exhibited, indicating as much the skill of the manipulators as the quality of the plates. Mr. Elton, of Palmyra, N.Y., appears to have taken both first and

* We regret to say that the President's address and Mr. Ryder's communication have failed to reach us up to the moment of our going to press.—Eds.

second prizes; at anyrate, he has two prizes—one for the best general collection, and the other for portraits on 14 × 17 plates. They are all very fine, the last-named demonstrating, both by position and expression, that the exposure was very rapid. Passing this collection I find a number of exhibits of various qualities, all being good average work, with here and there some fine instantaneous work—street views and yachts.

But this gallery is only the approach to the Exhibition proper, which is reached by crossing a kind of bridge that is over the place on the ground floor where the dark rooms of the various dry-plate makers are situated. Passing over this bridge I find myself in the largest and most important portion of the exhibition of photographs, a description of which I must reserve for my next communication.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 11,212.—"Photographic Cameras." JOHN V. ROBINSON, 33, Lower Sackville-street, Dublin.—*Dated August* 13, 1884.

No. 11,274.—"Changing-Boxes for Plates." J. B. B. WELLINGTON, Chancery-lane, London.—*Dated August* 14, 1884.

No. 11,346.—"Adjustable Camera Stand." J. ASHFORD, 77, Colmore-row, Birmingham.—*Dated August* 15, 1884.

PATENTS SEALED.

No. 4,144.—"Improvements in Colouring Prints." W. B. ANDERSON, Aberdeen.—*Dated February* 29, 1884.

No. 7,281.—"Improvements in Means and Apparatus for Distributing Paint." W. P. THOMPSON; a communication by the Air-Brush Manufacturing Company, Rockford, Ill., U.S.A.—*Dated May* 6, 1884.

No. 7,191.—"Improvements in Rings for Portraits." A. J. BOULT; a communication from E. Diamant, Budapest, Hungary.—*Dated May* 3, 1884.

PATENT ON WHICH THE SEVEN YEARS' RENEWAL FEE OF £10 HAS BEEN PAID.

No. 1,957.—"Improvements in Magic Lanterns and Lamps to be used therewith."—*Dated May* 18, 1877.

EDWARDS'S MACHINE FOR COATING PLATES.

THE complete specification of Mr. B. J. EDWARDS's Apparatus for Coating Photographic Plates or Paper with Gelatine Emulsion is now published, and is as follows:—

MY invention relates to an improved method of, and apparatus for rapidly applying an even layer or coating of gelatine emulsion to sheets of glass, metal, paper, or other surfaces for photographic purposes.

In carrying out my invention I make use of a trough or vessel containing the emulsion, and also of a metal roller working in bearings and made to revolve in the trough which contains the emulsion with which the plates are to be coated.

The length of the roller and trough must be slightly greater than the width of the largest plate to be coated, and I fix the said roller and trough above and across a travelling band or table, which carries a continuous train of plates to be coated.

In order to carry out my improved method of applying an even coating of emulsion to the surface of the plates, I make a scraper—preferably of sheet metal or ebonite—of suitable length and thickness, and I fix this scraper parallel to the roller so as to turn on pins or centres at or near the lower edge, and, by means of a lever, weight, or springs, the upper edge of the scraper is made to press against the roller, which revolves in the trough; and I make the scraper of a convenient shape and width, and fix it at any suitable angle, so that the lower edge rests upon, or nearly in contact with, the surface of the plates or paper to be coated.

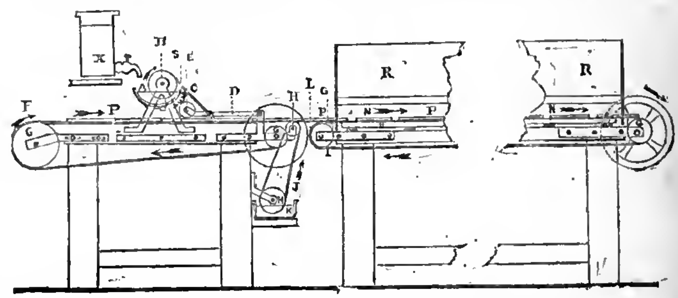
When the roller is made to revolve in the emulsion, the solution which adheres to the surface of the roller is taken off by the upper edge of the scraper towards which the roller revolves. The emulsion then flows down the scraper to the surface of the plates, which are carried by the travelling band below. By this means the plates are coated with an even layer of emulsion, the thickness of the coating being regulated by the relative speeds of the roller and the travelling band which carries the plates. In order to coat plates of various sizes I make the above-described scraper removable, and when required I replace it by another similar scraper of the length required to correspond with the width of the plates to be coated. In order to admit of coating plates of different degrees of thickness I make the centres or pins at the lower edge of the scraper to work in bearings fixed to a movable frame or pair of side rods, pivoted or hinged at one end, and carrying at the other end a roller or guide, which rests upon the surface of the plates as they pass beneath the scraper. By this means the frame or rods carrying the scraper rises and falls in proportion to the thickness of the plates, which are thus allowed to pass under the scraper without obstruction. Sometimes I attach the scraper to the side of the trough, and support the trough itself with the scraper attached by means of pivots or bearings upon the movable frame or side rods before described. In order to facilitate the cooling or setting of the emulsion after it has been spread upon the surface of the plates, I cause the travelling band carrying the plates to pass over a table or slab artificially cooled by being kept partly immersed in ice water or other cooling substance contained in a metal tray within which the slab rests, and I cover the table or slab with a metal tank containing ice or other cooling substance. The tank is supported so that the under side is only a short distance above the slab, thus forming of the space between the slab and the under side of the tank or cover a cooling chamber or tunnel through which the plates pass. The cover or tank also serves to protect the plates from light and dust after they have been coated with emulsion. By the above-described means the emulsion is rapidly set, and the plates are very quickly ready to be removed from the travelling band and placed in racks to dry.

In practice I prefer to make the travelling band in two separate portions of unequal length; that is, I make two endless bands to travel in the same direction. One of these bands, which I call the "coating band," is used only to carry the plates under the trough and scraper. The plates then pass on to the other band, which I call the "setting band," and which carries the plates over the cold slab and through the cooling chamber before described. Each of the above-mentioned bands works over a pair of rollers or drums, fitted at one end with a driving pulley, by means of which the band is made to travel in the required direction, the setting or cooling band being made to travel at a slightly greater speed than the coating band in order to cause the plates to separate from each other as they pass into the cooling chamber.

For the purpose of cleaning the back or under surface of the plates, and removing any emulsion which may have been spilled on to the coating band, I make another endless band of rubber cloth passing over a pair of rollers of suitable diameter, and I fix one of these rollers so that the cleaning band just touches the coating band and the under side of the plates after they are coated, and I arrange the other roller, which is driven by a pulley, so that it revolves in and carries the endless band through a trough of warm water. By this means the back or under surface of the plates is cleaned, and the travelling bands, which carry the plates, are kept free from emulsion.

For coating paper with gelatine emulsion for photographic purposes I use my improved machinery and apparatus, substantially as above described and in a similar manner, with the exception that I dispense with the cleaning band and one of the rollers, and I use the other roller and the trough for the purpose of wetting or damping the paper previous to its being coated; and I use another roller or squeegee for the purpose of removing the excess of moisture and causing the paper to adhere to the coating band before being passed under the trough and scraper. The paper when coated passes through the cooling chamber, after which it is cut into convenient lengths and hung up to dry. In this manner a continuous length of paper can be uniformly coated with a layer of gelatine emulsion of any desired thickness. In using my improved machine for coating plates or paper I actuate the rollers and bands by means of pulleys of suitable diameters to give the speed required, and driven by a gas engine or other suitable motor.

The endless bands may be made of india-rubber cloth or other suitable flexible material; but I prefer to make the band which passes through the cooling chamber of woven wire or thin metal plate, in order to cool or set the emulsion as rapidly as possible. Sometimes, instead of ice, as above de-



scribed, I use a current of cold air or vapour for the purpose of setting the emulsion on the plates or paper in the cooling chamber. In any case this chamber or tunnel must be of sufficient length to allow of the film of emulsion being perfectly set or stiffened before the removal of the plates or paper from the band. The length required will depend greatly upon the speed at which the machinery is driven. With a moderate speed I find fifteen feet a convenient length for the refrigerating chamber or tunnel. By means of my improved machinery and appliances as above described, photographic plates or paper may be prepared or coated with gelatine or other sensitive emulsion with greater rapidity, certainty, and uniformity than has hitherto been practicable by any other method.

The accompanying drawings show the various parts of my improved machinery as described in the above specification. I do not, however, confine myself to the precise details of construction as shown or described, as the same may be somewhat modified without departing from the principle of my invention.

A is the trough containing the emulsion. B is the roller. C is the movable and adjustable scraper. D is the pivoted frame which carries the scraper and sometimes the trough. E is the grinding roller. F F is the travelling band for coating. G G G are rollers carrying the travelling bands. H H are similar rollers to carry the endless band for cleaning the plates. J is the cleaning band. K is the trough containing water for cleaning or washing the band. L L is the travelling band carrying the plates through the cooling chamber. M is the cooling chamber or tunnel, closed at the sides and open at each end. N is the cold slab over which the travelling band passes. O is the metal tray in which the slab rests. P P are the plates, before and after being coated. R is the metal tank or cover over the cooling chamber. S is the spring which presses the scraper against the roller. X is a reservoir of emulsion for replenishing the trough.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I wish it to be understood that I do not claim any novelty in the use of a roller revolving in a trough of emulsion as hitherto used for applying a coating of emulsion to photographic plates and for other purposes, nor do I claim the use of an endless band for carrying the plates, as described in Swan's specification, A.D. 1879, No. 4,607; but I claim as my invention:—

Firstly. The movable and adjustable scraper or scrapers of any suitable shape or size, in combination with the roller and trough, for the purpose of applying the coating of gelatine or other emulsion to the upper surface of the plates, as described.

Secondly. The cooling chamber, or artificially-cooled table or slab, in combination with the endless band carrying the plates, in order to facilitate the setting or cooling of the gelatine emulsion after it has been applied to the surface of the plates or paper by means of the roller and scraper, or by any other method.

Thirdly. I claim the endless band, as above described, for cleaning the back or under surface of the plates after they have been coated. I also claim the arrangement of the pivoted frame or rods which carry or support the scraper, and sometimes the trough, together with the roller or guide, in order to allow of the use of plates of various degrees of thickness.

Our Editorial Table.

PHOTOGRAPHY FOR AMATEURS. By T. C. KEPWORTH.
London: CASSELL & Co. (Limited).

UNLIKE another *brochure* for amateurs which we had occasion to notice a few weeks ago, this bears internal evidence of having been written by one who is quite competent for the duty. Being non-technical, the language employed is such as to be understood by every reader, and, "taken for all in all," it is a manual that can be well recommended for tyros.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
August 26	Bolton Club	The Studio, Chancery-lane.
,, 27	Bristol Amateur	Studio, Portland-st., Kingsdown.
,, 27	Photographic Club	Anderton's Hotel, Fleet-street.
,, 28	London and Provincial	Masons' Hall, Basinghall-street.
,, 28	Liverpool Amateur	Free Library and Museum.
,, 28	Oldham	The Lyceum.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AT the meeting of this Society, held on Thursday, the 14th inst., the chair was occupied by Mr. S. C. Salmon.

Mr. J. B. B. WELLINGTON said that it had recently been recommended to use gallic acid in the development of gelatino-bromide plates. He had experimented with it by making up an ordinary developer, then developed one plate with that, and another with the same to which had been added gallic acid in the proportion of one grain to the ounce. He found that the addition somewhat slowed the development, and caused greatly additional exposure to be required—something like ten times that necessary with the normal developer. He produced plates illustrating the facts to which he had spoken.

Mr. W. COLES inquired whether Mr. Wellington had made comparative experiments with citrate of potassium against gallic acid, which appeared to have a very similar influence.

Mr. WELLINGTON had not made direct competitive trials, but the action appeared to him to be about the same.

Mr. A. HADDON showed some prints from negatives of shipping scenes. The plates had been exposed for an equal length of time; but the first one developed showed over-exposure and weakness, while the second had been restrained in development with a small quantity of gallic acid, and the result was quite satisfactory. In answer to questions, he (Mr. Haddon) continued that he had not made direct comparative experiments with gallic acid against citrate of potash, and that the plate developed with gallic acid had taken longer to develope than the other.

Mr. WELLINGTON thought that with gallic acid the deposited silver was browner in colour than without it.

A question was asked whether difficulty had been experienced during the recent hot weather in the manipulation of gelatine plates.

Mr. W. M. ASHMAN mentioned the case of a photographer known to him who had found his films one hot day dissolve away in the developer, and this without frilling. All the other plates exposed that day were saved by being kept till the evening, and then employing ice. He had also found recently that films when being varnished were apt to run at the corner where the varnish was poured off. Various suggestions were made, pointing to the accumulation of water in the varnish; but he considered that this was not the true explanation, as there could not be water enough to make the difference.

Mr. E. H. DERHAM, of Boston, U.S.A., was introduced to the meeting, and showed examples of the work of the establishment with which he is connected. These consisted of cabinet photographs of remarkable clearness and brilliancy of tone. In answer to inquiries, he (Mr. Derham) said that the prints were from negatives produced on plates of what was considered rather a slow make for gelatine. They had been prepared by precipitating the silver bromide in the presence of a small quantity of gelatine, and then, after washing, emulsifying for about two hours in the full quantity of gelatine, to which had been added a little ammonia and bromide of potassium.

Mr. W. E. DEBENHAM remarked that that was the Abney process with Stebbing's modifications. In his own experience he had been able to get good, slow plates with the Abney process; but he found that continued stewing, or, indeed, any treatment which he had tried that was expected to confer great rapidity, did not do so, but induced fog.

Mr. DERHAM said that he agreed with Mr. Debenham that fog supervened if rapidity were tried for. In answer to inquiries as to the method of printing he adopted, he said that he used, as was customary in America, ammoniacal fuming and toned with the borax bath. The prints were well washed and salted before toning, and after fixing the hypo. was washed out in about ten minutes by a rotary spray washing machine.

Mr. DEBENHAM then said that he had a suggestion to make. They had seen displays of transparencies for the lantern produced by different methods; but as the negatives employed had been different any exact comparison of the processes used was difficult or impossible. He proposed that (say) three negatives should be selected—one portrait, one view, and one architectural—and that these should be printed from in various processes. Perhaps Mr. Cowan would print in gelatino-chloride by development, Mr. Ashman in citro-chloride, Mr. Wellington in gelatino-bromide, Mr. Henderson or Mr. Ayres in wet collodion, and any other members who would be willing to print examples by other methods should be invited to do so. If no one else volunteered, he (Mr. Debenham) would make carbon transparencies. He proposed that the production of these transparencies should be considered not in any sense as a competition between the members, but for comparison of the results of the various processes; and he suggested that by each method prints should be made of different depths—one such as would be considered suitable for reproduction and enlargement, and at least two of slightly-different depth suitable for lantern display. This would probably allow of a set being shown in the lantern of about the same depth from each process.

The proposal was approved by the members, and it was understood that it would be carried out.

MANCHESTER PHOTOGRAPHIC SOCIETY.

ON Wednesday, the 13th inst., the members of the above Society, in accordance with the previously-arranged programme for summer trips, paid a visit to Kirkstall Abbey, near Leeds.

The morning of the day opened somewhat threateningly, and it was feared by several of the party, on assembling at the railway station, that the object of the excursion was in danger of being defeated by the setting in of rain. Happily, however, as time wore on the clouds began to disperse, and when the train arrived at its destination everything wore as attractive an aspect as the brightest summer sunshine can ever make a smoky, manufacturing district appear.

Kirkstall Abbey is situated on the banks of the river Aire, about three and a-half miles north-west of the busy town of Leeds, and can be reached from the Wellington Station by the tram cars, which run to and fro about every ten minutes. The Abbey was founded by Henry de Laci in 1152, Alexander, prior of Fountains, being the first abbot. At the dissolution of the monasteries in 1540 it passed into the hands of Cranmer, archbishop of Canterbury, and ultimately came into the possession of the Earl of Cardigan.

In 1856 a committee of local gentlemen, with the laudable object of preserving so interesting a ruin, as much as possible, from further depredation and decay, took the ground and building on lease, throwing it open to the public on payment of a small admission fee to cover the expenses of a caretaker and such necessary repairs as might from time to time be required.

The situation of the Abbey at the time of its foundation, in what would then be a charming pastoral valley through which meandered the crystal waters of the Aire, could not have been more wisely chosen, and it requires no great stretch of imagination to picture in one's mind the tranquility of such a scene in which no more discordant sounds were ever heard than the bleating of flocks and the lowing of herds, combined with the music of the vesper bell.

Although the surroundings of this once-sequestered spot have so greatly, and so sadly, changed, there is still plenty of food for the camera, and notwithstanding the smoke and bustle of the surrounding manufactories and ironworks, and the pollution of the river until its waters have acquired the intensity of printers' ink, there is probably no ruin in the United Kingdom where "lines of beauty" in composition can so readily be obtained from so many different points of view. The style of architecture is of the chastest Norman; and, when seen under such favourable conditions of light as were vouchsafed to the Manchester members on the 13th, cannot fail to satisfy the most fastidious view hunter.

After spending a considerable portion of the day at the Abbey, and exposing a large number of plates, the party drove to Adel Church—a distance of about six miles. As none of the gentlemen had ever previously visited the place the ground was quite new, and the drive was consequently greatly enjoyed; but on alighting at the gates a general feeling of disappointment was expressed at the first sight of the church, on account of its apparently severe plainness. A closer inspection, however, soon revealed the presence of various architectural enrichments of great antiquity and interest; and, as time was getting on, cameras were quickly set to work. Much of the church is very ancient, having been erected in 1140, and, like Kirkstall Abbey, the style of architecture is Norman. In the interior is a very fine chancel arch, of which, had time permitted, it would have been a great pleasure to many to have obtained negatives. The south doorway is very imposing, and an unique corbel runs round the upper part of the exterior walls; but the south wall has been somewhat marred by the introduction of two modern three-light windows quite out of keeping with the rest of the architecture. Some good negatives were obtained of general views as well as of details.

Tea having been ordered at the "Star and Garter," Kirkstall, the return drive was commenced about five o'clock. On passing through Headingly, "Jehu" pointed out the famous oak of that place, and also its "faithful representation" as limned on the sign of the village inn hard by, which establishment has adopted the oak as its patron saint.

On arrival at the hotel Mr. McKellen volunteered to occupy the interval during the preparation of tea by taking a group of the party with his newly-invented, and admirably complete, camera, the size being 12 × 10. Careful note being made of the time consumed in unpacking and opening out, it was found that the unstrapping of the stand, taking the camera out of the case, and fixing all up ready for focussing, occupied but one minute, and that without the least hurry.

The party returned to Leeds in time for the 7.20 train to Manchester, and on the way unanimous expressions were made of the great satisfaction and pleasure which had been derived from the day's excursion and work, and not a few encomiums were passed on "mine host" of the "Star and Garter," who had catered with so much courtesy and reasonableness.

On Saturday afternoon last, the 16th instant, another trip of the above Society was made to Middlewood—a charming sylvan clough lying to the right of Buxton-road, between Hazel Grove and Disley. The place being easy of access from Manchester, and also having two railway stations, has long been a favourite resort for the neighbouring townspeople. The valley, through which runs a footpath for about a mile in length, abounds in choice "bits" of wood and water, and is admirably suited for small plates or stereoscopic pictures. A few open spaces afford opportunities for taking large pictures; but generally the trees are too crowded for sizes much larger than half-plate. On the occasion referred to, under the able leadership of Mr. Coote, a considerable number of plates were exposed, the light being of the very best, and the foliage at occasional periods being perfectly still.

On Saturday next, the 23rd instant, Messrs. Chilton and Pearson will lead another excursion to the Bollin Valley. As it is thought desirable in this case to make a slight departure from the programme as to the time of starting, members will please note that the train leaving the Central Station at 12.43 for Peel Causeway is the one by which the party will travel. It is further desirable to call attention to a special excursion which has been arranged to Ashbourne, for Saturday, the 30th inst. The train will leave London-road Station, L. and N. W., at 9.20 a.m. Excursion tickets—3s. to return on the same day, and 4s. 6d. to return on the following Monday—can be obtained at the station on the morning of departure. The members of the Derby Photographic Society will join the Manchester members at Dovedale.

ST. HELENS ASSOCIATION FOR THE PURSUIT OF SCIENCE, LITERATURE, AND ART.

PHOTOGRAPHIC SECTION.

THE annual meeting of this Section was held at the Association Rooms, on Wednesday, the 9th ult., Mr. Heather occupying the chair.

The minutes of the previous meeting having been read and confirmed, the Hon. Secretary read the

ANNUAL REPORT.

The Photographic Section entered upon the second year of its existence this month. Eight new members have been added to the list since its formation, whilst, on the other hand, four have resigned. Up to the present we have entirely relied upon Mr. Heather for demonstrations, of which he has brought before you the following:—*Enlarging on Gelatino-Bromide Paper* (twice), *Preparation of Gelatino-Bromide Emulsion*, *Preparation of Lantern Slides*, and *Reduction of Negatives*. One evening was devoted to photography by artificial light and was fairly successful. The Section took part in contributing to the interest of the proceedings of the *conversazione* on January 24th, 1884. A large collection of photographs were shown, and Messrs. Heather, Morton, Taylor, and J. F. Houghton were busily engaged in photographing the visitors by the collodion method on ferrotype plates. One outdoor meeting has been held at Knowsley, which was very well attended. Besides the above a number of interesting exhibits of apparatus, lantern slides, prints, &c., have from time to time been laid before you.

The Hon. Treasurer's statement was then laid before the meeting, and showed a balance of £1 13s. 10d. in favour of the Section.

Mr. SHERLOCK moved, and Mr. BROOK seconded, that the annual report and balance sheet, as now submitted, be adopted. This was carried unanimously.

The following officers were elected for the coming year:—*President:* Mr. Heather.—*Hon. Treasurer:* Mr. Crooks.—*Secretary:* J. F. Houghton. —*Auditors:* Messrs. Bewley and Loader.—*Committee:* Messrs. Brook, Morton, Sherlock, J. Houghton, Taylor, and Bewley.

It was resolved that a 15 × 12 burnisher be purchased for the use of members.

Mr. TAYLOR said that a few days ago he was making a transparency, and, believing the emulsion to be a slow one, gave a lengthened exposure. When taken out of the frame in the dark room he was astonishsd to find a positive picture on the plate. He fixed at once and got a negative—a negative from a negative.

Mr. Brook exhibited a number of very fine views taken near Leek, North Staffordshire, and the Chairman showed a number taken at Winwick.

The meeting was shortly afterwards adjourned.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—The next monthly technical meeting of this Society will take place on Tuesday next, the 26th instant, at the Gallery, 5A, Pall Mall East. The chair will be taken at 8 p.m.

Correspondence.

THE SODA DEVELOPER.

To the EDITORS.

GENTLEMEN,—Kindly allow me to reply, under the above heading, to Mr. Charles Stephens' very pertinent question in your last issue. Finding that he gets frilling on two different brands of plates with the soda developer, he wishes to know how to prevent the said frilling.

Well, to be candid, with the individual plates he uses I do not know. This much, however, I can say—that the professional photographer alluded to in my article of the 1st inst. uses a cheap commercial plate, which many will identify at once when I say that this plate has no substratum but a line all round the plate of some solution that holds the film firmly, and this plate does not frill with the soda. Yet, in the unusual heat we have had of late, he told me he saw some slight indications of frilling, upon which I advised him to use alum solution plentifully, both before and after development. Another thing, too, in the very height of summer: the developer proper may be diluted with double the quantity of water without any ill effects whatever, while the frilling tendencies will then be much reduced. The washing of the negative, also, was best effected with very cold water, to minimise all risks.

Regarding my own plates: I found it necessary to use ten drops per ounce of emulsion of chrome alum solution—strength: alum three grains, water one ounce. Now, only yesterday (14th inst.) I exposed and developed one of my own plates with the soda developer before a gentleman from Bristol, who, having business in Gloucester, pushed further to Cheltenham purposely to see me about the treatment of the plate after my own fashion. The plate behaved admirably well, and I should not be surprised to hear that this gentleman had adopted this system of development altogether.

Why I did not name the individual commercial plate which I know to stand soda is because I am aware it is not usual in the Journal; but I shall with pleasure send the name of the firm and plate to anyone on applying to me enclosing a directed and stamped envelope.—I am, yours &c.,

22, *Priory-street, Cheltenham, August* 15, 1884. A. F. GENLAIN.

To the EDITORS.

GENTLEMEN,—My experience with this developer has been somewhat similar to that of your correspondent Mr. C. Stephens. There is no doubt that the quality of the negative produced by the soda developer is very fine. Up to the present week the frilling noticed was almost imperceptible, and in no single instance did it encroach on the picture. This week, however, with the same make of plate—which never by any chance frills with the ammonia developer—I have been unable to obtain a single negative, the frilling being something desperate.

There is not the slightest doubt in my mind that the high temperature we have been having here lately has had to do with it. On finding my first plate going this way I tested the temperature of my solutions, and found them standing about 70° Fahr., while the water from the tap showed a constant temperature of 60° Fahr.

It is very unfortunate that at a somewhat high temperature the soda developer should act in this way, for it is capable of giving very fine results. With the ammonia developer and with the solutions and water at the temperatures above mentioned not the slightest indication of frilling manifested itself.—I am, yours, &c., WILLIAM LANG, JUN.

Cross Park, Partick, August 16, 1884.

NETLEY ABBEY.

To the EDITORS.

GENTLEMEN,—Kindly inform my brother amateurs, through the Journal, that should they have a wish to take a "shot" at Netley Abbey permission must first be obtained. This, I am told, can be done by applying to T. Chamberlayne, Esq., Cranbury Park, Winchester.

For want of the above knowledge I was greatly disappointed and annoyed when refused admission on the 5th inst., as I had been told in Southampton no permission was required.—I am, yours, &c.,

24, *Maxwell-road, Fulham, S.W., August* 16, 1884. P. J. KING.

EMPLOYERS AND ASSISTANTS.

To the EDITORS.

GENTLEMEN,—I beg to be allowed, with your kind permission, to draw the attention of the public (photographic) to a grievance touching sorely assistants in general, and that is the deception practised by some employers when engaging their assistants.

One will often see an advertisement of the following description:—"Wanted an operator and retoucher of first-class ability. State terms, &c., &c., &c." Now this is, of course, answered by one seeking such an appointment, and, everything being satisfactory to the employer, he is engaged. Upon his arrival the assistant is put to work fitting up show-cases with specimens of his skill; but as soon as this is accomplished he is cooly told by his employer that he will have, in addition to his legitimate duties, to perform others, such as "burnishing," "toning," "sweeping-up," "dusting," "rearranging negatives," "cleaning glass," "sensitising," and work from 8 a.m. until 9 or 10 p.m. He is bound, of course, to put up with these indignities for the nonce, as not being a millionaire he has generally to wait until a more suitable position turns up.

If an employer wants the services of an all-round hand, why does he not state it in his advertisement, and not entrap a good man into a position he would never have accepted had he known the true facts of the case?

Against such deceptions I would warn all who are seeking employment in the future, for I feel I am not the only one who has been entrapped into such servitude.

I would also respectfully draw the attention of all those photographers who resort to such nefarious practices to the fact that the assistant is in most cases equal, and in some superior, to his employer in photographic knowledge.

I beg the assistance of all right-minded men to the putting down of such scandalous proceedings. I love my profession, and would like to see it rise above all such petty meannesses.

In conclusion: I would suggest the formation of a club composed of none but first-class assistants, out of which employers could be furnished with the best material and to pay a yearly fee.

Apologising for trespassing upon your time and space,—I am, yours, &c.,
ASSISTANT.

MR. GENLAIN'S DEVELOPER.

To the EDITORS.

GENTLEMEN,—If Mr. Charles Stephens will put a good lump of rock alum in his washing cistern, and mix a little with his developer, he will have no frilling. The colour of the plate will be a rich, tawny-yellowish brown, similar to the double sulphate and ammonia developer by the wet process, and the resulting prints will be very soft and harmonious.

This is my experience with Rouch's plates, which are somewhat analogous to Mr. A. F. Genlain's own make. Amateurs and professionals can procure these as easily as I do. Epsom salts will also prevent frilling.—I am, yours, &c., W. HARDING WARNER.

P.S.—The water in the cistern will possibly come out a delicate cobalt blue on the addition of the alum.—W. H. W.

THE PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN: ITS REPORTS AND THE PHOTOGRAPHIC PRESS.

To the EDITORS.

GENTLEMEN,—The nature of Mr. W. E. Debenham's letter (August 1st) in reply to my last letter on this subject demands that I should not let it pass without notice. I now gather that Mr. Debenham intended to impress upon me that "misrepresentation" is a "serious charge" if brought against *himself*, who had not misrepresented me.

Now, when writing my last letter I had not so understood his words—partly owing to this fact: that I had never intended to include him among "the other writers," and, still more, owing to the form of his sentence, I concluded that he meant that to use the word "misrepresent" as characterising the action of any who have *inadvertently* not stated my meaning was a "serious" and improper thing to do. Mr. Debenham wrote (July 18th):—"Misrepresentation is a more serious charge than Mr. Berkeley seems to think; and, as he has not given any instance of what he calls 'misrepresentation' on my part, perhaps he will think proper to withdraw his charge—at all events as far as I am concerned."

It may be a matter of opinion, but I submit that Mr. Debenham's diction in the foregoing sentence is not calculated to make what I now see must have been his intentions clear. It would have been more plain to have simply written:—"As Mr. Berkeley has not given any instance of misrepresentation on my part, perhaps he will think proper to state that his charge cannot be—or is not—laid against myself." Then, to me, Mr. Debenham's word "charge" seemed too strong an expression to be applicable to any statement of an *inadvertent* misrepresentation on the part of others. I could not but feel that the words "serious charge" could not apply to any less accusation than that of "*wilful* misrepresentation."

Further: "at all events, so far as I am concerned," seemed to make it appear that Mr. Debenham considered that the "other writers" besides himself were improperly charged, but that he was only disposed to claim the withdrawal of the charge as applied to *himself*, leaving the other writers to act for themselves. I considered that perhaps Mr. Debenham repudiated the idea that I had been misrepresented by *anyone;* and being perfectly certain that I had been misrepresented by several I refused to withdraw the term, but, on the contrary, wrote at length to justify my use of it. I refused to withdraw the term as applied to the Editors and anonymous writers, but stated, as I thought, plainly enough, that "I did not include Mr. Debenham among the 'other writers.'"

Did not Mr. Debenham see those words in my last letter? Surely they bear no other interpretation than that no "charge" was preferred against Mr. Debenham at all.

I am glad to be able to make this explanation, for misunderstandings lead to "misrepresentations," and to satisfy Mr. Debenham so far. But he is to blame for not accepting my words:—"I did not include Mr. Debenham among the 'other writers.'" His tirade against me in his last letter was quite uncalled for.

I also wish to state that I used the word "incorrigible" in a tone of banter. I can scarcely believe that it is necessary to point out the significance of the seventh paragraph of my last letter (July 25th). I had explained that Mr. Pringle had endeavoured to fit a "cap on his head" that was not intended for himself. In a bantering spirit I wrote that Mr. Debenham was "incorrigible" no less than Mr. Pringle—the former particularly so, because any who had read Mr. Debenham's first letter (June 20th) in relation to the original matter I had broached *could not possibly have considered* that I included *him* among those who had "misrepresented" my writings, seeing that *he made no allusion to my opinions.*

If Mr. Debenham will refer to my letter of July 11th he will see that after I wrote—"like the other writers, the Editors totally misrepresent my meaning," I proceed to take these writers *seriatim*, and to point out where they are in error. I had endeavoured to dispose of Mr. Debenham's letter and objections to the "slip system" at an *earlier* stage of my letter, and here nothing was written as to Mr. Debenham having misrepresented me.

In my last letter, of which he now complains, I wrote—"I believe Mr. Debenham really *likes* some one to tread on the tail of his coat." But no; "*I did not include Mr. Debenham among 'the other writers'*" (note that). "I did not write 'all the other writers;'" but I acknowledge it would have been better to have written 'like most of the other writers.'"

What could have been plainer than these words? And what could have been fairer than my acknowledgment that my diction might have been better? I have no charge to substantiate, because I intended none; and none to withdraw, because none was made. The "charge of misrepresentation" against Mr. Debenham existed in his own imagination only.

I did *not* "put it" that Mr. Debenham had "no right to object to being accused of misrepresentation" because he "had stated that" he "had been misrepresented in certain reports in the Society's *Journal*" (I use Mr. Debenham's words). I put it that Mr. Debenham had no right to lecture me, as it seemed, upon the "serious" offence of "accusing" others *(not himself)* of misrepresentation, while *he himself* had not long before "accused" the *Journal* of the Photographic Society of "*misrepresenting*" *him.* I believe it is now clear that Mr. Debenham thought himself included among "the other writers," and therefore wrongly "accused," and that his objection was on that account. I am sorry that I did not understand him so.

I can hardly consider that I have applied "epithets" to Mr. Debenham. To say that he is "incorrigible" (in the sense in which I used the term) is at least not a very offensive "epithet." I may remind Mr. Debenham that offensive epithets can be hinted at as well as written, and that *he* is not behindhand in inferring *dishonourable* conduct in me.

My writing in connection with this subject and controversy, from beginning to end, has been so mauled and mangled by the several writers that in order to make my meaning clear to those who will not take the trouble to *read*—though they *write* upon—my opinions, I am compelled to occupy so much space upon a matter which, though entered upon in the public interest with most inoffensive and temperate suggestions, has degenerated, by no initiation of my own, into a personal contest between readers whose interests are really alike. Why cannot writers in this or other journals state their opinions upon a public matter without having anonymous attacks made upon their motives and general conduct? It is open to all to state contrary opinions, and by all means let them.

I shall send the promised answer to Mr. Debenham, on the subject of coloured images, next week.—I am, yours, &c.,

29, Southampton-row, W.C., Aug. 16, 1884. HERBERT B. BERKELEY.

Notes and Queries.

"Is a prism or a mirror best adapted for employment with a copying lens?—F. S. T."——We answer: If the angle to be included be a very narrow one the prism will be the better; but for general use, and more particularly for large angles, the mirror is to be preferred.

"WOULD you kindly, through the medium of your valuable Journal, inform me the best way to mount photographic prints on thin paper for book illustration, so that they will be flat and not cockle?—PRINT."——In reply: Let "Print" mount his photographs with india-rubber paste and he will find they will not cockle. This paste is merely a solution of india-rubber in benzole.

"Is there any patent existing by which I can be prevented from constructing and selling enlarging lanterns, the principle of which consists in having placed behind the negative a plate of ground glass strongly illuminated with gas from behind?—WORKSHOP."——In reply: Our correspondent is at perfect liberty to manufacture lanterns according to the principle stated, there being no patent existing which could operate to prevent him from so doing.

G. HERCUS asks:—"Will you favour me with a formula for an intensifier composed of red prussiate of potash?"——In reply: Try—

Nitrate of lead	4 parts.
Ferridcyanide of potassium	6 ,,
Water	100 ,,

The under-exposed or weak negative, having been fixed and washed, is placed in this solution until it has acquired the requisite opacity.

H. B. G. inquires—"What is an albatype plate?"——We reply: It is a thin metal plate having its smoothest surface coated with a fine white enamel or pigment. When first introduced this class of plate was employed instead of opal glass upon which to print by the collodio-chloride process; but, owing to some mismanagement connected with the selection of suitable albatype pigments, discolouration of the surface took place, and the manufacture of the plates was discontinued.

CHAS. S. STRETTEN experiences some difficulty in getting his sensitive paper at all times to lie in intimate contact with the negative, and asks for a remedy.——In reply: The remedy lies in interposing a sheet of elastic material between the paper and the back of the printing-frame. Let him employ a pressure pad composed of either thin felt or thick woollen cloth, and the elasticity of this will be sufficient to ensure the paper being pressed against the negative "without a wrinkle or a fold."

FRANKLIN says:—"Do you know anything about a new form of gas burner that has recently been introduced, the peculiarity of which consists in a mixture of air and gas being employed to render incandescent a thimble composed of platinum gauze?"——We reply that we *do* know something of this burner, having seen it in action under various circumstances. It is not improbable that we may soon have an article on this subject. We are at present trying its application to photographic purposes, for which we think it well adapted.

F. Goss says:—"I received a formula for the preparation of a developer for ferrotypes in which there was an ounce of baryta and one a-half ounce of protosulphate of iron. Upon dissolving these in a pint of water there is an immense amount of precipitate, even when I employ distilled water. Kindly inform me what is wrong."——We reply: there is nothing wrong. The barium and iron salts no sooner dissolve than they react upon each other, producing sulphate of baryta and nitrate of iron. The former, being insoluble in water, precipitates. It must be removed by filtration.

George S. King asks us to supply a formula for the preparation of a silver printing bath containing some other nitrate than that of silver, with regard to the advantages of which much was at one time written.——To this we reply: Both the nitrate of soda and the nitrate of ammonia have been recommended as an adulterant of, or addition to, the nitrate of silver. If the albumenised paper have been lightly salted try the following:—

Nitrate of silver	4 parts.
Nitrate of ammonia	4 ,,
Sugar	4 ,,
Water	100 ,,

The toning and fixing of the prints are effected in the usual manner.

"With respect to the poisonous properties of the salts of barium, I recollect once reading in The British Journal of Photography that all the salts were poisonous except the nitrate; and yet, upon looking over a classification of poisons, I find the nitrate, and not the carbonate, the poisonous nature of the latter having been specially spoken of by you. —Alex."——In reply: We are aware that some who are quoted as authorities include the nitrate in the list of poisons, while other equally good authorities exclude it. "Alex." will readily hold us excused for declining to make an experiment to decide the question for his gratification. With regard to the carbonate: it is said that it is not a poison *per se*, but becomes converted into one when dissolved by the acid in the stomach. If, therefore, we can suppose the absence of any acid fluid from the stomach, the carbonate, according to this opinion, must be considered innocuous.

Exchange Column.

Wanted, a first-class tourist camera, &c., in exchange for a first-class (new) half-plate burnisher.—Address, Chas. W. Appleyard, photographer, Miall-street, Bradford.

Will exchange cameras, camera stands, and lenses (one a Ross's), for tricycles or bicycles.—Address, Public Loan and Discount Company, Limited, 32, Russell-street, Liverpool.

Wanted, a landscape lens to cover whole-plate up to the corners, in exchange for a good tourist telescope, with strap complete, value £2 2s.—Address, Earnest Ellis, 17, Trinity-street, Ryde.

I will exchange a strongly-made trunk-bodied 10 × 8 studio camera, with rack movement, for a Moulton spray print-washing machine or for outdoor apparatus.—Address, W. E. Debenham, Massingham House, Haverstock-hill, London.

I will exchange a large slab of plate glass, 55 × 25 × ½ inch thick, for coating plates on, ditto 25 × 22 inches, air pump receiver, 8 × 12 inches high. Wanted, plate-boxes 7½ × 5 and 5 × 4, or small gas-fire or stove.—Address, S. Warburton, 12, Waverley-terrace, Leopold-street, Leeds.

I will exchange a whole-plate bellows-body camera, three slides, bellows-body, best maker, fit for studio, mahogany double-swing back, screw focussing, 1000 *carte* mounts, and a few dozen old *carte* and cabinet photographs.—Address, Mr. Kupham, 11, Victoria-grove, Kensington-gate, W.

We will exchange a 7½ × 5 bellows-body camera, rachet and pinion, focussing arrangement, swing-back and rising front, with reversing frame for oblong or upright pictures, six double dark slides for same, all in new condition. Wanted, twenty-inch focus rapid symmetrical lens, or offers.—Address, J. E. and C. Ireland, 14, Methven street, Perth.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

Photographs Registered.—

Messrs. C. and C. Fergus, 36, West Blackhall-street, Glasgow.—*Two Photographs of the Late Daniel Conway.*

Francis Hoare, Coxwell-court, Cirencester.—*Photograph of the "Cathedral Firs" in Oakley Park, Cirencester, Gloucestershire.*

William Pankhurst Marsh, Norfolk Cottage, Bognor.—*Photograph of Sands and Beach at Bognor (West Side of Pier), Sands and Esplanade at Bognor (East Side of Pier).*

Erratum.—In Mr. W. K. Burton's article on page 517, in the sixth paragraph, for "dish" *read* "desk."

W. W. and S. A. J.—We will communicate with you privately.

More Light.—Messrs. Chance and Co., Birmingham; or Mr. G. F. Williams, 36, St. Martin's-lane, W.C.

Benj. B.—Animal charcoal must be employed for the purpose. Your failure arises from your using charcoal made from wood.

J. W. K.—Not *absolutely* necessary with some samples of paper, but far better in every case. In all probability the washing will conduce to greater permanency.

R. S.—Why not apply two or three coats of Brunswick black? That will cover up the rust and preserve the metal—at least for a time, or until you can procure new trays.

J. A. Cundale.—Your communication should be made through the medium of our advertisement columns, as you publish no details of the process. It is purely a business matter.

H. J. Edge.—1. Better consult a respectable optician, who will supply you with suitable spectacles.—2. The larger lens would be very serviceable, but would not fulfil the same end as the spectacles.

A. Tisdale.—The idea appears very good, and, so far as we are aware, original; but we fear you will have some little difficulty in putting it into practice. However, the difficulties, we imagine, are far from being insurmountable.

Cosmos.—Very little consequence. One plan is quite as good as the other. Either way, a certain amount of skill and experience is necessary, as you are aware. As a rule, that plan is preferred with which the operator has had the most experience.

E. B. J.—If you forward us a few examples of your failures in printing we shall understand the cause (with the information you have given); but without seeing them we might possibly mislead you, as the terms you have employed are scarcely those adopted by photographers.

Arthur.—From what you say we judge the prints were sufficiently washed in the first instance. The spottiness appears to be due to the prints remaining moist for so long a time. The many days they remained wet has caused a decomposition of the sizing material of the paper.

H. A. Young.—The dark corners of the picture arise from the lens employed to take it not covering the size of plate properly. Instead of using it for half-plate pictures you should be content with quarter, as that is all it will cover thoroughly. Indeed, for its focal length, it is all that ought to be expected.

A. D.—The marks are caused by the action of the silver paper on the negative through its not being varnished. In all probability the film contained a trace of hyposulphite of soda upon which the silver has acted. There is no remedy now, unless a solution of cyanide of potassium will remove the stain, which is somewhat doubtful.

G. H. Brabazon.—From your description of the studio we do not see how it can be altered and improved without considerable expense, which, as you say your means are limited, we imagine you will be unable to incur. Possibly, if you were to raise the studio your neighbours would compel you to raise the chimneys also; hence you would be no better off.

J. Fox.—Asphaltum and marine glue are both very good as a coating for the insides of wooden trays; but the former material requires the addition of bees'-wax or similar substance to prevent brittleness, particularly in cold weather. We ourselves much prefer paraffine wax to either material when the trays are to contain solutions of nitrate of silver.

Meadow.—Possibly your friends employ more sensitive plates than you do. Drop-shutter exposures are frequently very successfully made with single lenses, and also with the "portable symmetrical;" but, worked with its full aperture, your "rapid" should be the quicker lens. We do not imagine that the lens has deteriorated as you surmise, but that your plates are not sufficiently sensitive for the work in hand.

Received.—S. D. McK.; H. Y. In our next.

Photographic Club.—At the forthcoming meeting of this Club, at Anderton's Hotel, Fleet-street, on Wednesday next, the 27th inst., the subject for discussion will be *The Artistic Mounting of Photographs.* Saturday afternoon outing between Highgate and Hampstead. Meeting afterwards at the "Bull and Bush" at 6.30.

The Recent Explosion at the Curragh.—In connection with this unfortunate explosion, the details of which were given in our issue of last week, we learn that the report of its having been a lime-light or oxyhydrogen explosion turns out to have been incorrect. It was alleged at the magisterial inquiry into the circumstances attending the unhappy event that the disaster was caused by an explosion of a pyrotechnic compound, consisting of chlorate of potash, sulphur, verdigris, and shellac. This mixture, when ignited, was intended to give a brilliant blue light.

Photographic Artists' Co-operative Supply Association, Limited. —The annual dinner of the *employés* of this Company took place on Saturday last, the 16th inst., the rendezvous being Weybridge, Surrey. An excellent repast was served at the "King's Arms," and, favoured with beautiful weather, a very pleasant and enjoyable day was spent. Mr. J. H. Keen (in the unavoidable absence of Mr. H. R. Faulkner, the Manager and Secretary) occupied the chair, and proposed the health of the directors, coupling with it the name of Mr. Faulkner, which toast was drunk with enthusiasm.

Artists and Pictures.—The papers which are just now going the round of the Royal Academicians, with printed inquiries as to the various modes of technical procedure resorted to by each artist, bring again into prominence the important question of the use of pigments, the durability and properties of "vehicles," and the different preparation of grounds. Particulars as to absorbent and non-absorbent ground-priming, and as to the varnish or exceptional pigments used, are asked for in these forms, which, if carefully and conscientiously filled up, should be of the greatest service to the profession at large. The present lamentable condition of many modern pictures should lead artists to give a more careful consideration to their pigments. The present state of Wilkie's "Blind Fiddler" is a remarkable instance of the fatal effect of ignorance or carelessnes in the use of paints which will not stand the test of time.—*Pall Mall Gazette.*

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

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HOW TO AVOID GRANULARITY IN COPYING PAPER PHOTOGRAPHS.

It is seldom that copies from paper photographs turn out altogether satisfactory, however skilfully they may be executed. This is owing to the fibre of the paper always showing more conspicuously in the reproduction than it does in the original. If, instead of the copy being of the same size as the original it happens to be made larger, the fibre is, of course, rendered still more painfully conspicuous by reason of the amplification; and, unless the picture be afterwards finished in monochrome or coloured, it is rarely, as most professional photographers know, that it gives entire satisfaction. The more granular the copy the greater, of course, is the labour of the artist in the finishing, and consequently the more expensive the reproduction becomes.

Many methods of ameliorating this excessive coarseness have at different times been proposed—such as mounting the print to be copied in optical contact with a glass plate; rendering the print itself transparent and then printing by contact to secure a transparency, and from that making a negative; copying the print with the lens slightly out of focus; and numerous other plans or "dodges"—all of which, though they may be theoretically good, still leave much to be desired when put to the test of actual working. The best plan, perhaps, in practice is that of copying the print when it is illuminated with a strong side light instead of a front one. This plan has more than once been advocated in these columns, and is, we know, now regularly adopted by many professional photographers.

We were recently shown some exceptionally-successful copies from paper prints which were produced by a plan that certainly possesses some degree of novelty; hence the reason for our again alluding to the subject. The copies—it may be explained—were enlargements from *carte* to cabinet size, and, although the amplification was considerable, as only a portion of the subject in the original was included in the copy, the grain of the paper was imperceptible. Indeed it was difficult to conceive that they were copies of paper photographs at all. The pictures were sharp, though not microscopically so, and had a brilliancy which copies rarely possess, unless the negatives have been elaborately worked up by the retoucher, which, we were assured, was not the case in this instance.

It may be remembered that a few years back some pictures, the productions of Mr. Denier, a Russian photographer, were shown in this country. These pictures were somewhat peculiar in their characteristics, and were decidedly pleasing. While no part of them appeared to be out of focus, yet they could not be considered absolutely sharp in the strict sense of the term. The lights were pearly and brilliant, and the half-tones soft and delicate; still this quality was clearly not due to the retouching of the negative.

The method by which they were produced was never published, or, at least, verified by Mr. Denier; but at the time it was currently reported that the prints were actually made from double negatives—one thin one being on the back of the glass and another on the front—or that they were printed from two distinct, but thin, negatives superimposed the one upon the other. Another method suggested as that by which they were done was that only one negative was used, and the peculiar effect was obtained entirely in the printing, which was accomplished in the following manner:—After the print had been about half-printed a thin piece of glass, or other transparent media, was interposed between the negative and the paper, and the printing then continued to the requisite depth. Whatever was the method adopted by Denier, we have produced results possessing the same characteristics as his, and equally good, by the method just described.

By this time the reader has, doubtless, began to wonder what the Denier pictures have to do with the copying of paper photographs? Well, a great deal in the case at present under consideration; for the excellent copies to which we have referred were produced by means precisely analogous to that just described. We learn the *modus operandi* was this:—In copying the original it was illuminated with a strong side light, so as to minimise the grain as much as possible to begin with. The negative was made tolerably vigorous, and then slightly retouched. In printing, when the impression had attained somewhat about half its proper depth, it was removed from the negative, and a couple of thin films of gelatine—such as those used in packeting confectionery—were placed upon it, one of these films being tinted a pale blue and the other colourless. The print was then replaced and the printing continued until it was dark enough.

The first printing appeared to have secured all the necessary sharpness and fine detail, while the second caused a certain amount of diffusion which destroyed the granularity without materially interfering with the definition in the more prominent portions secured in the first. Why one of the gelatine films should be tinted we are unable to say, for we should imagine that a colourless film of a corresponding thickness would answer quite as well; but we give the method as it was described.

When we learned the method by which these pictures were made we remembered having seen M. Lambert, in one of his demonstrations at which we happened to be present, adopt a precisely similar course in the case of a great enlargement, from a paper picture, which showed a considerable amount of granularity. After the impression was partially printed a sheet of patent plate glass, nearly the eighth of an inch thick, was interposed between the negative and the carbon tissue. The printing was then continued through the interposed glass to the necessary depth, and, by this means, much of the coarseness was destroyed, and considerable labour saved in the after finishing.

Of course, producing the impression by a double printing entails a little more trouble, and some method must be adopted for securing registration, as it is impossible to remove the print from the negative and replace it in exactly the same position when one or more films of gelatine intervene, with only the eye to guide us.

There are several forms of registering-frames to be had which will answer the purpose admirably. However, by a very simple arrangement, an ordinary pressure-frame will answer every purpose. All that is necessary is to secure the negative rigidly in one corner of the frame with a couple of slips of gum paper. The frame, by preference, should be one fitted with plate glass. The negative being secured, the paper must be cut so that its top and one side, at least, shall be from exactly a right angle. Now if, in placing the paper on the negative, care be taken that it is fitted accurately into the angle of the frame, it may be removed, the gelatine films introduced, and then replaced with the assurance that it will again occupy the same position on the negative—the same precaution, of course, being taken that it is fitted carefully into the angle of the frame as in the first instance.

A NOVELTY IN WORKING DROP SHUTTERS.

In our last issue we dwelt upon several points connected with the use of shutters for quick exposures, and indicated certain principles which should be adopted in their use, though they have rarely been acted upon. Whatever may be the theoretically-perfect form with which a snap shutter should be in accordance, it may be taken as a fact that, so far, such a form has not been made. All that have hitherto been constructed may be looked upon as compromises between accepted principles, the exact form having been governed by other factors than the inventiveness of the constructor. Some have been practical successes, and others literal failures. Most of us have seen the electric shutter which would not go, and there is many a photographer, no doubt, who could point out a mouldering glass jar and a rusty piece of mechanism as the sole relics of a few guineas' expenditure. There are all shades of usefulness between the practical worthlessness of this instrument and the success attending upon more simple contrivances.

We need scarcely remind our readers that the class of shutter more commonly seen is not the most complicated, though the more complicated patterns are not necessarily the less perfect on account of their intricacy. The truth is that they are very heavily handicapped in the race by the increased weight of the parts having a tendency to cause vibration during the action of exposing and closing. It is quite evident that many forms possessing features of usefulness might be devised if this particular property could be ignored; but, as absence of vibration is a *sine quâ non* in the use of a shutter, a certain amount of restriction has hitherto had to be placed upon inventiveness in this direction.

A well-known contributor to our columns has, however, shown to us a very simple arrangement which quite does away with the difficulties of tremor when the photographer can take a little extra trouble in his work. The additional apparatus is of the simplest description, and, so far as we can judge, will be a useful and eminently practical addition to any photographic outfit. It consists merely of a separate stand for holding the shutter, and is light, portable, and devoid of complication.

To construct such a one nothing is required but a portion of a bamboo fishing-rod, two brass ferrules such as are sold for ordinary fishing-rods, and two thin bars of wood a few inches long. The labour of an hour or two would enable anyone to fit it up. The two bars of wood—one twelve and the other six inches long, by two broad, and half-an-inch thick—form the foot, the smaller one being let into the side of the other so as to form a flat, T-shaped base. At the point of junction a circular hole is cut to form a socket, into which is fitted the handle of the bamboo rod (the two first joints only being used and the rest rejected), which has been trimmed so as to fit readily in and out of the socket. At the other end of the shortened rod the larger of the two brass ferrules is firmly fastened, and on to the shutter the smaller one. It is thus seen that the extra luggage required is merely a portion of a bamboo fishing-rod weighing a few ounces, and a small, light, wooden base.

To set up the apparatus the rod is pushed into the socket hole, the shutter with its attached ferrule fitted into the end of the rod, and, when the camera is fixed and all is ready, the shutter-stand is placed before the camera, and the inner rod—that to which the shutter is attached—moved up till exactly opposite the centre of the lens. A thin wooden wedge is then inserted to prevent the rod slipping down, and the whole is ready with the exception of making the junction with the lens, the mode of doing which we will describe.

The particular shutter employed was the Cadett "drop shutter," which, when used with some very light cameras, is apt to produce a tremor. It works guillotine fashion—an ebonite plate moving up and down in front of the lens—and at the back is a small curved piece of rubber-covered wood to fit the curve of the lens hood, the whole being fixed by a strong rubber cord, and the light kept out by a short velvet tube fastened round the lens by a piece of thin elastic cord and a button. To use the shutter in the manner described this latter arrangement would be useless, as the sole object is to remove the camera from the sphere of the influence of the shutter; consequently this piece of wood is removed. Further: the velvet sleeve also is taken away and replaced with a much longer one, so as to avoid the necessity for any very accurate adjustment of the shutter before the lens, as such a necessity would totally destroy the practical character of the arrangement.

When the stand and shutter are placed before the lens at the right height the velvet sleeve is slipped over the lens, and secured by the elastic cord or button; or it may be left unfastened, as the sleeve appears to fit quite light-tight enough without any special fastening. The fitting up and getting ready is the work of a few seconds only.

Our contributor informs us that though the apparatus is of the slightest description it yet answers perfectly and requires improvement only in two points. He would prefer to supply three sharp spikes or studs to the base to secure it more firmly on rough ground or long grass, and the sleeve should be provided for an inch or two of its length near the lens with a few cane or wire rings to keep it from swagging and possibly interfering with the field of view. He had not found it to do so, but he has thought it desirable to spend a little time in adjustment so as to avoid that defect; this time might be saved by the adoption of the rings. Though he has but recently fitted up the arrangement, which in its present form is more of a "makeshift" character, he informs us that he has used it on several occasions in photographing dogs, horses, and children, and is highly pleased with its action, the stand in each of these instances being placed either on a loosely-gravelled path or on a well-mown lawn. It is evident that he places faith in its usefulness or he would not have employed it (as he wrote us he did) on a recent occasion when taking a family group of the Premier and the whole of his family, including seven grandchildren.

It is for each of our readers to judge for himself whether the arrangement we have described is likely to suit his own particular class of work or not. Certainly it is cheap, simple, and light. We do not doubt that if it should be thought useful it will be made in one shape or another by the manufacturers of photographic apparatus, to suit those who have not the leisure or the inclination to make their own apparatus.

DIRECT LARGE PORTRAITS.

When, twelve years ago, the late Mr. Robert Crawshay offered prizes for a series of large portraits, which were to be taken direct in the camera, the result was a collection that elicited much more wonder than admiration. It was abundantly evident that the time for ushering in photographs of that class was not yet ripe. This was rendered still more apparent by an imposing display of *enlarged* portraits, which were also the same year submitted for competition, and proved the means of giving the *coup de grace* to direct-taken, life-size pictures.

Many, if not most, of the faults inherent in such portraits in those days arose from the necessity that existed for employing large portrait lenses, working with an aperture so great as to render uniformity of definition difficult, if not impossible, especially when, owing to the exigencies of dimension of the scale of representation, the sitter had to be brought unusually near to the lens.

As between a direct life-size photograph and an enlargement of the same dimensions there is clearly no comparison, the latter having the advantage. This was true in an emphatic sense in the times to which we have referred. It is still true, although in a more modified degree, at present, when, owing to the greater sensitiveness of the plates, portrait lenses of large dimensions are not now, as they formerly were, a necessity in connection with the production of large portraits.

Our readers do not require to be informed that in America the element of size in portraiture is more thoroughly recognised than it is in England; and in this connection they will peruse with much interest the graphic details, given by our American correspondent in another page, of the very large portraits he saw displayed at the exhibition connected with the Convention of the Photographers' Association of America recently held in Cincinnati. The account given by our correspondent—who, as a practical photographer, is well able to form a sound judgment—of the pulling about of backgrounds, cameras, and accessories, in order to show to the assembled hundreds in what way a large negative of a sitter was taken, is exceedingly amusing. Mr. J. H. Kent, the President, who is well known to excel in the arts of lighting and of posing sitters, undertook to give a demonstration of the method of taking a *large* portrait. How an hour was discovered to have been devoted to preliminary operations, how a 24 × 20 camera with a large lens attached got smashed, and how it was subsequently announced that for the large cameras no lenses could be got to suit—that the dark slides repudiated all connection with the cameras, and that even the plates were found playing at cross purposes with the dark slides—behold! is it not to be found narrated in the letter of our "special"?

But here arises the question—What difference is required in the artistic lighting and posing of a figure that is to be taken on a 24-inch plate, or even one much larger, and that on a plate which being only one half or one quarter such dimensions may therefore, by contrast, be designated a small plate? Emphatically none! The care and skill required in the posing of a figure are all one, whether the resulting picture is to be large or small; and this also applies to the lighting of the figure, the selection of a suitable background, and the introduction of appropriate accessories. Art is art in one case equally as in the other; and the artistic outcome of the demonstrator's skill in these essentials might just as well, one would think, have found expression in a 12 × 10, a whole plate, or even in a cabinet, as in a plate two feet in length. Indeed, the smaller dimensions would have proved most convenient to the greater number of photographers, as it would have served for illustrating the national journals, and thus have proved an educational means of more extended application than under other circumstances would have been the case. But it would seem as if in the plethora of cameras on exhibition there were none applicable for even the minor duty at which we have hinted.

It is significant to learn that these large direct portraits are not found to pay. The real "bread-winners," it is well known, are the portraits of moderate dimensions. Apart from the fact of there being more harmony and equality in the definition of the various planes in a small than in a large portrait, the cost of a plate varying from twenty to thirty inches in dimensions necessarily becomes somewhat high, while there is a far greater risk of the negative being imperfect on account of the sitter's having moved, or of manipulatory difficulties, than in a smaller plate, in which the extra expense entailed by having to give a second or even a third exposure is inconsiderable. When to these drawbacks we add the serious cost of a lens, camera, and general outfit for direct large portraits, and contrast all these with the excellence to be obtained in an enlargement from a good negative of small dimensions, it is indeed matter for surprise that there are those still to be found who produce large portraits direct, even for the sake of advertising.

However, if any photographers *will* "go in" for portraits of this class they have at the present period a consolation which did not exist at the time referred to in our opening remarks. They do not now require large and expensive portrait lenses, as was formerly imperative, to enable them to effect the end desired; because, owing to the greater sensitiveness of the plates, a class of lenses originally introduced for a different purpose may be relegated to the purposes of the portraitist, in fulfilling which function they are found to far surpass, in the excellence of their results, the more costly and cumbrous instruments they have superseded. To these, however, as they have of late formed subjects for comment in these pages, we shall not here further advert.

In his address delivered before the American Convention the President is reported to have said that the time was when the profession of photographer was not held in as high esteem as that of statesman or expounder of the law; but that at the present time quite a different condition of things existed. It is, we think, satisfactory to learn that in America, at least, photographers have attained a position of equality with "statesmen;" but the question remains to be settled whether it is by a process of levelling up or levelling down.

Some interesting details upon the properties of the sulphites of soda have been published in the *Comptes Rendus*, by M. de Forcrand, and from them we extract so much as will be interesting to photographers. In keeping solutions of pyrogallol and sulphite—the normal sulphite—of soda it is usually recommended to add some kind of acid to neutralise any alkalinity of the solution, the acid to be selected is usually said to be immaterial. The writer in question, however, states that a solution of sulphite of soda is partially decomposed by hydrochloric acid, for instance, the base dividing itself between the two acids, with formation of chloride and acid sulphite, in a manner similar to that observed by Berthelot in the case of potassium sulphite. To obtain a pure sulphite for experimental purposes a known weight of carbonate was saturated with sulphurous acid, an equal weight of carbonate added, and the whole put to crystallise in an atmosphere of nitrogen. The crystals contain seven molecules of water, which, it is found, is all given off at a temperature of 150° C.

In asking for sulphite of soda it is very desirable to "see that you get it." We know of many instances where, on the presumption that the purchaser was ignorant of what he really wanted, sulphate of soda was substituted by the dealer without remark. In other cases the sulphate has been supplied through the ignorance, or worse, of the seller; and we know as a fact of one instance where an amateur going to a chemist's for a-quarter of a pound of sulphate of soda was supplied with "hyposulphite," the seller calmly informing him that he had made an error and that the latter was what he wanted. Taking the chemist's word he added the salt to an ounce bottle of pyro. He did not achieve any success in his development with this fluid, and when we informed him how the matter stood he seemed annoyed with the chemist.

It is expected that the "Inventories" of next year will surpass in interest either the "Fisheries" or the "Healtheries." No doubt photography will play an important part there, and would-be exhibitors must remember that only a month now may elapse before applications for space will be too late—the 1st of October being the last day for sending them in. The inventions, excluding music, will be confined to those invented or brought into use since 1862. No charge will be made for space, and motive power will be supplied free; but gas and water will have to be paid for, if used. It is a satisfaction to know that one element of the shopkeeping character will be abolished, as exhibitors and their assistants will not be allowed to invite visitors to purchase their wares.

The Liverpool Astronomical Society, at their third annual meeting, recently held, had a good account to give of work performed. The work done for the last twelve months had been mostly stellar photography. The large camera had been set up in March, and from some of the plates the catalogue of stars recently published had been taken. Attention had been given to the photographing of star-clusters and nebulæ; but the most important work had been the comparison of star magnitudes, and for this purpose photography had been largely used. Every month certain stars were photographed, and if any change appeared a systematic observation was at once commenced, several such observations being carried on at the present time. As our readers are aware, this Society is and has been doing real, substantial work; and it is gratifying to hear of the part played by photography in the work of a society whose home is a city that has always been in the van of photographic inventions and progress.

Professor Bischoff's spongy iron filter is an admitted success for purifying water; but experiments show that a portion of the iron is dissolved and carried away in the effluent water, thus rendering it unsuitable for photographic use. The principle has been adopted on a large scale in Antwerp for the town's supply, the water having been filtered through a mixture of the finely-divided iron and gravel. An improvement has lately been made upon this system, as it was found it would be too costly on an increased scale; the water is now passed through a revolving cylinder containing the iron and a series of shelves or ledges for scooping it up. We draw attention to this fact more especially to show the chances of water being contaminated with iron, as the inventor of the system states that when water was in contact with the iron for forty-five minutes it was very heavily charged with that metal. When a much larger quantity of water was passed through in the same time it still issued containing 1·2 grains of iron per gallon; and even when sixty gallons passed through per minute nearly one grain of iron per gallon was dissolved. It is thus evident that no system of iron filtration of water would be likely to be suitable for photographic purposes—a fact which is rather unfortunate, seeing that very complete purification otherwise is effected by such means, water so purified being almost freed from ammonia and nearly as colourless as distilled water.

It is well known that chloride, as also iodide, of silver is capable of forming a precise chemical compound with ammoniacal gas, but hitherto the compounds have not been obtained in any definite form. Lately, however, according to the *Bulletin de la Socièté Chemique de Paris*, M. Terreil has obtained them in a crystalline shape. To do this he introduces them in their amorphous form, along with a saturated solution of ammonia, into a flask sealed at a lamp, and then exposes the whole to the temperature of boiling water.

Our contemporary, *La Nature*, describes a process of "photography without apparatus," which may not be entirely beyond the reach of their non-technical readers. It is founded upon the action of light upon bichromated albumen. The reader is directed to obtain two pieces of glass, clear and flat—to paste upon one a sheet of thin black paper with a square aperture in it, and to join the two plates by an elastic band at two opposite ends. A few pieces of albumenised paper are to be purchased, and sensitised by coating the back with a six-per-cent. solution of bichromate. The prepared sheets, it is explained, will keep for several days. The photograph to be reproduced is to be removed from its card by soaking in cold water for twenty-four hours, and then drying between folds of blotting-paper. Then this "*cliché*," as it is now termed, is placed, face upwards, within the square formed by the black paper; next the sensitised albumenised paper, face downwards, upon it; and the papers kept *in situ* by placing the second plate of plain glass over all, and binding the whole together with the elastic bands. The next step is to expose to light for about twenty minutes, until an image appears at the back of the albumenised paper. Taking the arrangement into a darkened room, the paper is removed and placed in a deep dish filled with rain water, so as to dissolve out the unacted-upon albumen. The next step, after spreading the print upon a sheet of glass and allowing it to drain till almost dry, is to flow over it a quantity of ordinary writing ink, taking care not to let it dry upon the shadows, for the action is very quick. Then it is again washed gently for about as long a time as was required to dissolve out the bichromate. The image should now appear of a violet colour, which takes a warm tone by a prolonged exposure to light. It is quite permanent, seeing that it is produced by an actual colouration of the coating of albumen, certain parts of which have been rendered insoluble by the action of light, while the rest only absorb the colouring matter, which is retained by the interstices thus created. The process is summed up by saying that it consists simply of—1. The sensitising of the albumenised paper in a six-per-cent. bath of bichromate. 2. The exposure of the proof to the sun until the image appears at the back of the sensitised paper. 3. The washing of the proof and its development with common ink. "What is most remarkable," *La Nature* states, is the fact that "by a single operation a positive proof is obtained from a positive." Further: the colouring agent (the ink) can be replaced by any other coloured substances, though the ink is both best and simplest. Our readers will know the difficulties that must attend every step of this apparently-simple process; still, at the same time, it may be said that there is no reason why presentable copies might not be obtained under favourable circumstances by the unskilled reader.

THE LATE MR. C. JABEZ HUGHES.

The late Mr. Jabez Hughes, whose decease we announced a fortnight ago, and whose portrait we present in the present number, was interred on the 14th instant at Abney Park Cemetery, side by side with his only son, the late Alfred J. Hughes, and within but a short distance of more than one old friend. By the special request of Mrs. Hughes the arrangements were made as quietly as possible, and consequently the ceremony did not partake of the public character that would have been expected in the case of one so well known and universally esteemed as Mr. Hughes. Her Majesty immediately upon hearing of the death addressed an autograph letter of condolence to Mrs. Hughes, and also forwarded a beautiful wreath for the coffin. The latter was of polished oak, and bore at the foot a plain brass plate with the inscription:—"Cornelius Jabez Hughes, died 11th August, 1884."

The late Mr. Hughes was born in London in 1819, and when quite young took great interest in debating societies and similar associations. He became a lecturer and teacher on memory, and in that capacity made the acquaintance of Mr. J. E. Mayall, then in business in the Strand as a daguerreotypist, whose secretary he became, and with whom he obtained his first knowledge of photography. After remaining two or three years with Mr. Mayall, Mr. Hughes in 1849 established himself as a daguerreotypist in Glasgow, purchasing the business of Mr. Barnard, in Buchanan-street, which he raised to the front rank in that city. Though strictly a daguerreotypist during his sojourn in Glasgow, he adopted and worked the collodion process to a small extent soon after its introduction. In 1855 he returned to London and commenced business as a photographer in the Strand, working here nothing but the collodion process; but this venture not proving a success, in 1859 he opened a warehouse in Oxford-street. He was one of the earliest to recognise the future field for photography which the "*carte* mania" foreshadowed; and, as the business of a dealer was not congenial to his temperament, he cast about for a new opening as a photographer. This presented itself towards the end of 1861, when upon the death of Mr. Lacy, of Ryde, the business was offered for sale, and Mr. Hughes became the purchaser, being succeeded in Oxford-street by his friend and previous manager, Mr. John Werge. He very shortly afterwards rebuilt the studio and reception rooms in the Arcade, Ryde, erecting in their stead the handsome suite of business premises that have since become recognised as amongst the most perfect in the kingdom.

His contiguity to Osborne and the high-class character of his productions secured for Mr. Hughes the patronage of the Queen, for whom he executed a large amount of work. One of the latest pictures taken for Her Majesty, a copy of which is in our possession, consists of a group of twenty figures—composed of the Queen, her children, and grandchildren. By order of Her Majesty Mr. Hughes produced a series of portraits of the late Earl of Beaconsfield, which are said by those who were personally acquainted with the late Earl to be the most truthful portraits of him produced in late years.

Ever ready to avail himself of what seemed to be improvements, Mr. Hughes some years ago adopted the carbon process to the almost entire exclusion of silver printing from his establishment; new forms and sizes of pictures were also readily taken up if they possessed the features of artistic novelty.

The death of his only son in 1878 was a great blow to Mr. Hughes, and since that time he had never recovered his old business energy, though he was seldom absent from the meetings of the societies, much of his time being spent in London. His long photographic connection with the metropolis had necessarily familiarised him with all the societies, in the management of most of which he had taken part. We find his name on the committee of the now defunct North London Photographic Association up to 1862; he was on the council of the Parent Society from 1866 to 1871 inclusive, and again from 1876 until last year. He was also a vice-president of the South London Photographic Society from 1873 until the time of his death; and, though not an officer of the Photographic Club, he presided at the inaugural meeting, journeying from Ryde for the purpose, and never missed the ordinary meetings when he happened to be in town. He was, in addition, one of the oldest members of the Solar Club.

In connection with the literature of photography Mr. Hughes was also well known; for, in addition to the numerous papers read, and articles contributed to our columns, he was a constant speaker at the various meetings he attended, being ever ready to share with others the knowledge his extended experience had given him. There was not a branch of photography—scarcely a branch of science—on which he was not qualified to speak; and the fluency of his diction combined to render his discourses especially interesting and instructive.

But the chief work by which he will be remembered is his *Principles and Practice of Photography*, originally published in 1860, and which has run through many editions. This is, perhaps, the most complete practical instruction book that has ever been published in connection with photography, as, while dealing with every branch of the science, it gives descriptive details without

THE LATE C. JABEZ HUGHES.

INK-PHOTO, SPRAGUE & Co LONDON

prolixity and without shirking minor points, while it is a model of conciseness.

Our portrait is an ink-photo. from a photograph taken in Mr. Hughes's own establishment at Ryde, I.W.

AIDS TO THE ADVENT OF THE CAMERA OF THE FUTURE.

There is much that is useful and suggestive in the recent articles by Mr. W. H. Harrison and Mr. Andrew Pringle on the subject of increasing the effectiveness of the portable camera, and we take up the theme by way of keeping such a desirable ball in a state of motion; for out of a full discussion of the subject something of practical benefit is certain to result.

By way of classifying the various qualities that ought to be possessed by the tourist's camera, we commence with one the value of which will be evident to every one who has been out in the field: we allude to *rapidity of unlimbering*. We have seen a photographer take quite as much time to undo the straps of his case, get the tripod-stand put together, and the camera unpacked and placed *in situ* ready for action, as it did for another pleasure-seeking party in that vicinity (Epping Forest) to alight from a conveyance, unpack sundry hampers, spread a cloth upon the ground, and arrange all the preliminaries for the enjoyment of a substantial *al fresco* dinner.

It is not quite easy to say in what way the camera and appliances should be packed, because the packing-case which would prove sufficient when the scenes of the pictorial campaign lay at no great distance away from home would be inadequate for the Himalayas, the Alps, or the Rocky Mountains. For home work we have seen a very convenient, cheap, and strong case, capable of containing camera and six double slides, made of thick pasteboard or thin millboard, as follows:—The tail-board of the camera ($7\frac{1}{2} \times 5$), which was sufficiently long to suit a lens of long focus, was kept distended, but the body of the camera was pushed close up to the front. When in this condition the case was so constructed as to receive it when placed side lowermost. This left a large square space unoccupied, in which was fitted a canvas satchel containing the six dark slides, leaving still space enough to accommodate the camera top, focussing-cloth, and other odds and ends.

The case, we have said, was formed of thin millboard; but it was lined, both inside and out, with cloth such as that employed in the covering of books, this having been pasted on with thin glue. The lid was attached to the back by a strip of stout linen which acted as a hinge, and it had a ledge round the front and sides about two inches deep. The front of the case was hinged at the bottom, so that when the cover was raised the front fell down, exposing the interior to view through the top and front. It is useless to speak of *minutes* in connection with the opening of the case and lifting out the camera; for it was only a matter of seconds, and very few even of them, three motions of the arms serving to open the case and remove the camera.

The lens was attached to a front capable of being reversed in position, by which, when thus reversed, the lens itself was placed inside of the camera, safe out of the way of harm. The whole time occupied in its reversal was five seconds, which included the undoing and refastening of a strong bolt that ensured the lens being securely fixed. The extension of the camera body was effected by means of a simple sliding motion, which could be arrested at any stage by pressing a brass button. A fine adjustment, consisting of about an inch of rackwork, could then, if requisite, be brought into operation by the action of the finger and thumb upon the milled head of a brass nut. But when the subject to be photographed was such as not to necessitate the employment of the swing-back, then the focussing was effected by merely sliding out the camera body to correspond with a small black line on the base-board. This having been determined for objects at a distance, an oblique line, graduated by experimental trial, served to ensure the sharp focussing of objects closer at hand. A folding sight on the top served to show the amount of subject included by any of the lenses belonging to the camera, so that should an accident befal the ground glass one need not discontinue working in consequence. It only remains to be said that the dark slides do not "slide" in, but are stepped-in from behind into a suitable recess, in which they are held by means of a spring.

The camera, as thus described, although not a commercial article, has been exhibited at certain of the societies and clubs of the metropolis, since which time, however, an improvement has been effected in that portion of the base-board by which it is attached to the stand. This, instead of being single, as before, has been made double to a small extent longitudinally, yet so as not to add to the thickness of the base-board. The head of the stand is attached to the outside portion, which, in turn, is fixed to the main base-board by strong hinges at one side with a stop, by which it is capable of being turned over on its side after having been erected on the stand; and in this way the picture (in the case of a panorama) may either be taken with the plate placed horizontally or lengthwise to the horizon, or be immediately thrown on its end should a tall spire in the vicinity prove a more attractive subject at the last moment, and all this without undoing a single screw.

We leave it to our numerous friends interested in this subject to say to what extent the camera here described comes up to the ideal camera of the future.

PHOTOGRAPHY IN BELGIUM.

[From Our Special Correspondent.]

Brussels, August 26, 1884.

Attention was drawn in my last to the general isolation of British photographers in the matter that comparatively so few interchange visits with their professional brethren on the continent. The objections frequently urged of difference of language and expense were then examined. Another objection sometimes urged against an autumn vacation abroad is that of sea-sickness. The sea is not usually rough in the autumn, but one way of cheating it of its due is, when the weather is rough, to wait one or two days at the English port and cross when the water is smooth. Another plan is to make the horrors of sea-sickness as brief as possible by crossing by one of the two short routes. The average time of crossing by Dover and Calais is seventy minutes; the average time by Folkestone and Boulogne is eighty minutes. The latter passage is nine miles longer, but in going to Paris it shortens the railway journey on the other side of the Channel by about thirty miles. All the boats are exceedingly fast. The "Mary Beatrice" on the Folkestone line is claimed to be the fastest vessel afloat. A rival and perhaps an equal in speed is the "Violet," between Holyhead and Dublin. The distances being short, the passengers many, and competion strong, expense of coals is no impediment. On these Channel boats men are incessantly stoking all the way across. Two of the boats between Harwich and Antwerp are propelled by twin screws. These boats are not only fast, but the engines have not the best part of the ship, as in paddle boats. The passengers are placed amidships, and this reduces sea-sickness by about one-third. In the centre of a see-saw there is much less rising and falling motion than at the two ends. Just so is it with the position of passengers when they can occupy the space usually allotted to paddle engines. In time none but twin screw boats are likely to be used between Harwich and Antwerp. The boats leave Harwich every week night about ten o'clock, and usually after a comfortable night's rest the passenger wakes up in time for breakfast as the steamer makes its way up the river Scheldt to Antwerp. The lace-like spire of Antwerp Cathedral is seen across the flat country long before the city is reached. Antwerp is about one hour from Brussels by rail.

The Relationship of Photography in Belgium to the State.

At the present time, among the public placards on the walls of Brussels are some announcing that a series of fifteen experimental lectures, to educate in photography those who choose to attend, are given at the Royal Museum of Industry. There is no charge; these lectures and others on scientific subjects are delivered at the expense of the State. All the would-be learner has to do is to enter his name and address. In the more free countries of Europe great care is taken by some of the States that if any of their sons possess ability, no money impediment shall stand in the way of their obtaining the highest education they are capable of receiving. In Switzerland a boy fresh from the plough can, if he wishes it, find door after door of the mansions of education freely opened to him one after the other, if he can and will give a few years' time and application, until at last he has a thorough university training. At the Polytechnic Institute at Zurich he can learn professions useful to him in life, such as civil and mechanical engineering, chemistry, the scientific aspects of agriculture, forestry, and so on. As in practically learning chemistry and other scientific subjects he must use up materials in his experiments, he has to pay for them a fixed sum of four pounds a year and that is all; the time he has to devote to the study of the selected subject is three years. With broad generosity the Swiss Government has not limited the benefits of the institution to its own subjects, but admits young men of other nations without raising the terms to them. A few English students have taken advantage of these facilities, and many from Italy and Austria. Preliminary examinations have to be passed to obtain admission.

Facts like these serve to give some idea of the degree of civilisation attained by nations versed in the art of self-government, and to show that Belgium does not stand alone in placing a good scientific education freely before all its subjects for acceptation.

The Professor of Photography and Chemistry at the *Musée de l'Industrie*, at Brussels, is M. L. Rommelaere, who, in his younger days, pursued his studies at the University of Ghent. After completing those studies he worked at that University without remuneration for pure love of the occupation, and afterwards received his present appointment in Brussels.

The following is a translation of a circular issued early this year to the people of Brussels:—

"ROYAL MUSEUM OF INDUSTRY.—LESSONS ON PHOTOGRAPHY IN 1884.

"Public and gratuitous lessons on photography will be given, as in previous years, at the Royal Museum of Industry, by M. Rommelaere, chemist to the Museum. They will commence on Thursday, June 5th, 1884, at half-past three o'clock, and will be continued on following Saturdays, Mondays, and Thursdays, at the same hour.

"As for practical experiments the times will be decided hereafter, in order as much as possible to suit the convenience of the majority of the listeners.

"In order to give more attention to the numerous discoveries and processes brought forward of late years, the Minister of the Interior has decided that the number of lessons, previously fixed at twelve, shall be increased to fifteen. The following is the programme:—

"I. History.—Summary of the different processes in use.

"II. Light.—Its physical and chemical properties.

"III. and IV.—Photographic apparatus. The optical portions. The cases. The camera and its accessories.

"V., VI., and VII.—The negative process. Wet collodion. Dry processes on paper. The gelatino-bromide process.

"VIII., IX., X., and XI.—Positive processes. The salts of silver. Enlargements. Proofs without silver. The products: their preparation; their assay. The carbon process.

"XII., XIII., and XIV.—Industrial processes. Photolithography. Heliotype. Photo-engraving. Enamels.

"XV.—Scientific applications of photography.

"An important collection of choice instruments gives the power of making the lessons more clear by experiments and demonstrations. A library, entirely at the disposition of those who enter their names for the lectures, consists of works relating to photography, and of prints of all kinds obtained by the different processes.

"It may be stated, in relation to the object of the lectures on photography, that they are useful to all—as much to those who desire to learn the first principles as to operators who already understand the manipulations but who desire to learn about the newest inventions and the latest improvements.

"The endeavour will be made, above all, to popularise by explanations and experiments all the applications, which are growing every day more important and numerous, of photography in industry, the sciences, education, and art.

"The necessary augmentation of the number of lectures demands that three shall be delivered per week, in order not to prolong the total period given to this subject, as well as to meet the wishes of the majority of the listeners.

"For admission to this course of lectures on photography it is sufficient to enter one's name at the house of the Director of the Royal Museum of Industry, Place du Musée, Brussels."

The whole establishment having been formed for the benefit of the public, individuals among the latter may, under certain necessary restrictions, make use of the chemical and photographic laboratories at the Museum to carry on their own researches. They have to satisfy the authorities they know how to use the apparatus they wish to employ and are not likely to injure it. They have to pay for any damage done, and for any chemicals or other materials they use. In some cases where the individual is not well known he has to deposit a certain amount of money as security. Some of the instruments are of great value. The microscope, for instance—a magnificent instrument by Dallmeyer—cost somewhere about £200.

The site of the Museum was originally a small lake, which was filled up in 1336 by the Seigneur Devenvoorde to erect a mansion. This building was subsequently enlarged and became the residence of the governors of the Low Countries. It was renovated and enlarged in 1731 by the Duke of Lorraine, who gave it its present aspect.

The *Musée de l'Industrie* was reorganised under a royal edict, dated April 7th, 1841, in consequence of its previous inadequacy to encourage scientific research, and the application of scientific principles to practical purposes. A National Library existed previously, but the library of the present Industrial Museum consists solely of scientific and artistic books which may be consulted by day, and in the evening up to ten o'clock. It resembles the English Patent Office Library, except that the latter closes at four o'clock, and is inaccessible to the industrial population after their working hours are over. The Brussels Industrial Library is in the same range of buildings as the chief National Library. Gas is burnt in it, in which it differs from the British Museum Library, warned by the irreparable loss to the world, due to the destruction of the Alexandrian and other libraries by fire. On the other hand, the books in the Industrial Museum at Brussels are such as, for the most part, can be at any time easily replaced. The building is solidly constructed of stone, with very little wood, and one of the city fire engine stations is on the premises. The chief National Library is not in the same wing of the building. When the Industrial Museum was reorganised it was placed under the control of a permanent committee of ten persons, several of whom were large manufacturers with works in various parts of Belgium; in 1841 they elected as their president M. Fréderic Basse, member of the Provincial Council of Brabant. At the same time M. Jobard, engineer, was appointed director by the Belgian Government. In the following year, 1842, the Industrial Museum began the publication of its *Bulletin*, which has all along been rich in information in relation to the progress of the arts and sciences. Its first number contains the translation of an article by Robert Stephenson, on Derrider's locomotive.

The "installation," as it is called here, of M. Rommelaere, for the teaching of photography and chemistry, consists of three lecture theatres, a chemical laboratory, and a variety of large rooms well stocked with apparatus and fixed appliances for experimental work. The wooden end of one of the lecture theatres can be raised or let down by mechanical means, allowing those in the theatre to see the whole interior of the adjacent laboratory, and between the two halls there are arrangements for carrying off, by means of a chimney, any chemical fumes which may be either poisonous or objectionable. In one wall of the laboratory are also a variety of small furnaces and muffles, with arrangements for carrying off the fumes; the upward draught of air in the chimneys is produced by burning jets of gas. In this laboratory the chairs and tables only are of wood; everything else is as much as possible of brick, iron, or stone, to avoid danger from fire to the national library close at hand. The ceiling is of stone. The laboratory contains a water tank, from which water may be obtained at a more even pressure than direct from the mains. There are several pieces of apparatus in this laboratory, by which ninety cubic centimetres of water may be boiled in three minutes for experimental purposes, by means only of the single flame of a Bunsen burner. The principle of construction is such that the heat of the flame is distributed over a large surface of metal, in contact on the other side with the large surface of a small quantity of water. The even pressure of water in the laboratory is used when desired to produce a current of air to urge a blowpipe flame; it is also used to produce an imperfect vacuum quickly. There are several Sprengel pumps on the premises—one of them with glass joints, to give a good vacuum when required.

During the past season 230 persons attended the lectures of M. Rommelaere on photography, among whom were eight or ten ladies. As the light of the sun falls on one side of the lecture theatre in the afternoon, apparatus is sometimes fixed in one of the windows to exhibit experiments with the solar spectrum.

There are many rooms in which physical and other apparatus is stored under glass cases. There is plenty of electrical apparatus of all descriptions, including a large induction coil which will give a spark fifty centimetres long. A barograph and a thermograph are also on the premises.

An instrument for exhibiting to a public audience the method of recording meteorological changes by photography consists of a paraffine lamp, the light of which is collected by a plano-convex lens and sent through the upper part of a barometer or thermometer tube. A lens on the other side sends the image of part of the tube with the level of the mercury through a long wooden tube, until it falls upon a photographic screen moved by clockwork, which thereby registers the changes in the level of the mercury during twenty-four hours. A gelatine plate, from thirty to forty centimetres in length, is usually employed to register the indications. The total length of the apparatus is two and a-half metres.

In a room in the lower part of the building, devoted to specimens connected with the iron and cotton industries, are some remarkable specimens of what appear to be pieces of sculpture in solid stone, but are in reality but sheet zinc coated with oxide of zinc and silicate of soda. It resists the action of the weather exceedingly well; indeed, with it a man may make a carved stone front to his house at little cost, and almost carry it away on his shoulders, like another Samson, should the design displease him.

The valuable Dallmeyer microscope already mentioned is used for photomicroscopic work, and arrangements are made for directing and controlling the light of the sun upon its field of view. In the same room is a superb instrument for photo-spectroscopy, made by Hilger, of London. It contains six prisms of Iceland spar, that substance having but little power of absorption of the chemical rays. Iceland spar, being like chalk in chemical composition, is very tender; the whole instrument is, therefore, kept in a case nearly air-tight to protect it from moisture and acid gases in the atmosphere. The prisms would be difficult to clean if soiled, so M. Rommelaere gets over this objection by not attempting to clean them at all. A portion only of the case is usually removed when the instrument is in use, the remainder of the case then serving to partially screen the instrument and the eye of the observer from extraneous light. This spectroscope rests, like an astronomical telescope, upon a stone pillar. Three pieces of steel, with highly-polished hollows at the top, are let into the stone pillar; the three feet of the spectroscope rest in these polished steel cups. The spectroscope is thus maintained in a truly firm and horizontal position. It gives a spectrum about a yard long, such is the amount of dispersion, and shows two lines between the two sodium lines. The floor of the chamber in which this spectroscope stands is of tiles, which rest on the solid ground.

Photography was first recognised by the Belgian Government in 1870, when M. Rommelaere received his present appointment. He teaches engineering drawing, as well as chemistry, photography, and physics, and those who learn mechanical drawing at his classes usually obtain appointments in works as soon as they have attained proficiency.

Specially delicate balances are employed in the establishment. Some of them are so delicate that they have to be protected from the heating effects of light when in use; also from the heating effects of an adjacent human body in particular positions in relation to the weighing apparatus. M. Rommelaere has devoted much attention to the investigation of the chemistry and properties of the platinum group of metals. At one time he gave great attention to the collodio-bromide emulsion process, and says that he is convinced that it can be made to produce as rapid results as the gelatine process. He has several developing-rooms on the premises. In an open yard is apparatus on a turn-table for taking photographic copies of the valuable paintings in the national collection. This turn-table is at the back of a large case with glass front, in the open air, containing a restored gigantic skeleton of an iguanodon, which seems to be a connecting link between birds and reptiles. It carries its head like a bird. Brussels has the only skeletons of these as yet unearthed, except that a leg bone, or some other bone of one of them, is in London.

M. Rommelaere took the chief part in founding the Belgian Photographic Association. He has translated into French one of Captain Abney's works. The translation is published in Brussels under the title of *Cours de Photographie.*

At present men's minds in Brussels are deeply agitated about politics. Next Sunday there will be a public procession here of tens of thousands of persons, to request King Leopold II. not to sign the nearly-passed law for placing the public schools within the influence of the clerical party.

A CHAPTER IN THE HISTORY OF COLOURED IMAGES.

I now redeem the promise made in my letter (July 25th) that I would answer Mr. W. E. Debenham's queries and objections to a communication of mine which appeared in the May number of the *Journal of the Photographic Society* partly in relation to coloured images produced by means of bromide plates. I would have done so earlier had I not been away from home.

Mr. Debenham (July 18th) makes it appear that I claimed in that letter that I had originated and published a method for producing coloured images upon bromide plates. I flattered myself that I had stated plainly enough what I could prove to be a fact, viz., that it was *not* "Mr. Wellington who first *produced* colours on bromide plates."

Mr. Debenham's statement, as reported at a technical meeting of the Society, was that it is Mr. Wellington who "first *produced* (not published) colours on bromide plates." In my letter to the *Journal of the Photographic Society* I simply stated that this was not so, but that I, among others (I claimed no "special early knowledge"), had produced various colours on bromide plates, including gelatino-bromide, as early as the year 1877 (in truth 1876), and that I could bring proof of the correctness of my statement. I laid no claim to priority of publication. Mr. Debenham writes (page 462, July 18th):—"Mr. Berkeley refers to having published the matter some years earlier." I challenge Mr. Debenham to quote any words of mine to that effect. I confined myself to writing that *my* "knowledge on the subject dates from as far back as about seven years ago."

But Mr. Debenham is apparently determined to place me in as unfavourable a light as possible ("give a dog a bad name," &c.), and does not write fairly; indeed, his unfairness is only equalled by his loose reading of my letters. I did not, as Mr. Debenham writes, "refer to a *print*" in the possession of Captain Abney, but to a *negative*. This Mr. Debenham might have seen on reading Captain Abney's footnote (see page 132, *Journal of the Photographic Society*, where the latter writes:—"It was a negative showing a group of oxen"). Captain Abney is in error; but this error should be quite unimportant. This negative represented a *single cow*. I have stated this because if the negative should be still in existence, and it should be necessary to identify it, the truth on this point might be important. Captain Abney goes on thus:—"The sky was almost crimson" (ruby or claret-coloured I called it) "by transmitted light." Your readers will gather that it was something rather out of the ordinary way, even at a more recent date, if I say that Captain Abney, after a public exhibition of it at a technical meeting, thought it worth while to ask me whether he might retain possession of it as an *example of colour* in reduced silver.

Now, it is not everyone who *admires* "claret-coloured" pictures, whether positives or negatives; and as for myself, since I was interested in the production of *negatives* by various means, I did not attempt to apply my knowledge to the making of coloured *positives*, whether desirable or not. Let me here say that I consider that Mr. Wellington is entitled to some credit in departing from the usual groove, and in producing upon bromide films the tints Dr. Eder had produced upon chloride, and upon the lines laid down by the latter for the sole and peculiar treatment of the chloride; also in publishing his method of so doing. [It must not be forgotten, though Mr. Wellington may be quite unacquainted with the fact, that in a controversy I had with Dr. Eder in the columns of the *Photographic News* I stated that colours *could* be produced upon *bromide* films equally as upon chloride; and Dr. Eder had shown how to produce them upon chloride plates. The method of production, therefore, had been pretty plainly indicated—not that "iron development" is necessary to obtain brilliant colours, since "pyro. development" with fine bromide films in the powdery condition will also give rise to them.]

Mr. Debenham touches upon other points. If he will turn to volume xxiii. of this Journal he will find, in the number for February 4th, 1876, page 58, towards the end of a letter of mine, that my theory was "that chloride of silver has less sensitiveness to the less refrangible rays than the bromide;" and "that in a 'well lighted,' open view chloride would follow close upon bromide of silver." On other occasions, too, I have reiterated my opinion that chloride is particularly affected by the more refrangible rays. [See also the last paragraph of my letter referred to.] That my view was not a mistaken one we now know; and we have Captain Abney and Dr. Huggins using chloride in preference to bromide for scientific photography where a selective sensitiveness to the blue is particularly desirable.

No doubt I modified my views from time to time, as most experimentalists do, if they are worth anything; and I have written both highly and rather disparagingly of silver chloride at different times. The words Mr. Debenham places between brackets (page 463, July 18th) make it appear that I only *suggested* that silver chloride would be more sensitive than bromide "when a proper developer was *discovered*," whilst it remained for Dr. Eder to publish any *practicable* method of development.* If Mr. Debenham really infers this he is in the wrong, for I showed that silver chloride in gelatine could be *satisfactorily developed* by alkaline pyrogallol. I also showed that silver chloride in albumen (albumenate of silver was present, the paper being sensitised upon a bath of silver nitrate and washed) could be successfully developed by what I stated was the "hydrosulphite developer," but which I have since had reason to believe was a hydrosulphite of soda developer with sodic hydrate produced by means of metallic zinc.† The method of making and developing the chloride paper (as well as bromide) I described. It was very simple and perfectly successful from a photographic point of view.

As regards the comparative sensitiveness of silver chloride and of silver bromide under *suitable* conditions: it may be said that this still remains a moot point. There are arguments and facts which may well lead the best among us to take somewhat "mixed" views on the matter.

Then, as regards the use of "excess of silver:" Mr. Debenham would find, if he took the necessary pains, that I have written both for and against the use of "excess of silver" nitrate in gelatino-bromide. Even that point still seems to remain moot, if we accept the evidence of recent writings on the subject. The fact is that circumstances alter cases very much, and the same thing may be good or bad under different conditions. Mr. Debenham may like to make it appear so, but there is really nothing derogatory to myself in having upheld views which are not at the *present time* generally accepted. It may be, too, that my views, quoted by him, may still turn out correct; it may be that they are delusive; but *at the time my words were penned* my views were as far advanced as those of any other writer on this particular subject.

Mr. Debenham would do well not to try to pin me down to any writings of mine of several years ago without acquainting himself with whatever I have more recently written on the subject in hand, but at, perhaps, almost as distant a date. For instance—whether rightly or wrongly time will show—long before most of the present writers had any ideas at all on gelatino-bromide work I *publicly* condemned the use of excess of silver nitrate in making gelatine emulsion, though a method involving its use had previously been worked out and advocated

* Dr. Eder's method is really a step backwards so far as the application of chloride to *camera* purposes is concerned.

† The following particulars may seem out of place; nevertheless they may not be amiss:—Contrary to the apparent opinion of the Editors at the date of the publication of M. L. Sammann's method (January, 1877), bisulphite of soda cannot be kept in the form of crystals; and solid salts that may be purchased as "bisulphite" are in reality, at least mainly, the "neutral" sulphite. It decomposes thus:—

$$2\,SO_3HNa = SO_3\,Na_2 + OH_2 + SO_2.$$

Further: the Editors gave directions that the solution of bisulphite should be made neutral to test paper, so that the "free acid" (?) should be eliminated. Now, to make a solution neutral to test paper would be to make the solution *mainly* composed of the "*neutral" salt*—not entirely, for the "neutral" salt is alkaline. The sulphites at the time referred to were not familiar to me; and, as is too commonly the case, I am afraid, I ordered a supply both of "neutral" and "acid" salts from a well-known London firm, and trusted that I had the "genuine article." To cut a long story short I am convinced that this was not the case. The action of metallic zinc upon bisulphite is presumably as follows:—

$$\underset{\text{Sod. bisulphite.}}{3\,SO_3\,H\,Na} + \underset{\text{Zinc.}}{Zn} = \underset{\text{Zincic sulphite.}}{Zn\,SO_3} + \underset{\text{Sod. sulphite.}}{Na_2\,SO_3} + \underset{\text{Sod. hydrosulp.}}{SO_2\,H\,Na} + \underset{\text{Water.}}{OH_2}$$

zinc sulphite and sodic hydrosulphite being produced. The action of zinc upon the neutral salt is thus:—

$$\underset{\text{Sod. sulphite.}}{SO_3\,Na_2} + \underset{\text{Zinc.}}{Zn} + \underset{\text{Water.}}{2\,OH_2} = \underset{\text{Zincic hydrate.}}{Zn\,(HO)_2} + \underset{\text{Sod. hydrate.}}{Na\,HO} + \underset{\text{Sod. hydrosulp.}}{SO_2\,H\,Na},$$

sodic and zincic hydrates and hydrosulphite being produced. There is no zincic salt in solution, but the white hydrate adheres to the metallic zinc. It would appear that a developer made by the latter method owes its energy largely to the presence of sodic hydrate, and that, time being allowed for the reaction and weight for weight, the neutral sulphite would produce the larger quantity of hydrosulphite. The bisulphite, though, is far the more soluble in water. The foregoing will explain how it came about that the developer contained sodic hydrate.

by me. This will show how misleading are the insinuations of Mr. Debenham in the matter he somewhat unnecessarily introduces into his letter.

It is no easy matter to go through the whole of my writings during a period of over ten years; but sometimes, when turning over the pages of an old volume of the Journal—or, as at present, having to look up my own writings therein—I find "ideas" put forward by me which might, perhaps, even be termed "luminous." Thus, I just notice the following; and if anyone cares to turn to page 335 of the volume for the year 1875, and to page 83 of that for the year 1876, he will find that I indicated the use of decoction of cloves for preserving gelatine emulsion, and, further, was the first to use and to publish the use of chrome alum for preventing frilling. At the latter date I wrote:—"I believe I have succeeded by a method not before published in this connection;" and I proceed to show how I used one per cent. of chrome alum as compared with gelatine, and to state the result—prevention of frilling without loss of sensitiveness. How much chrome alum is even still used in the preparation of plates most of us know; and we further know how many at one time stated that it destroyed sensitiveness. But I am digressing. My object has been to try to illustrate how little many of us are aware of what was written years ago.

While I am now writing I am looking up what I have written upon the production of colour in bromide or chloride plates. On page 57 of the volume 1876, I write:—

"I have found some difference in the colour of negatives produced by bromide and chloride of silver; the latter inclines to a bluish-grey, metallic colour, while the former is warmer in colour. It is exceedingly likely that under different conditions of development a change of colour would be apparent. In the plate I shall mention further down—that developed with the smaller quantity of soluble chloride—the reduced silver is very clear* and metallic" (steel-coloured).

It will be seen that I showed that of two emulsions, prepared as similarly as possible of bromide and of chloride of silver, the *former* gave the warmer tone, and thus rather indicated—as for further reasons I held out, subsequently, in reply to Dr. Eder—that warmth of tone was at least as much an attribute of silver bromide as of silver chloride. I also showed that *reducing* the amount of soluble chloride in the developer made the tone *colder*—made it "very clear and *metallic.*" My readers will know that Dr. Eder and others now produce *warmer* tones by *increasing* the quantity of restrainer.

I have incontestably shown at the beginning of this communication that in this letter to which Mr. Debenham takes exception I laid no claim to *publication* of a method by which coloured images could be produced. I had merely to show that Mr. Wellington was not "the first to *produce*" various bright colours on bromide plates. However, there is no reason now why I should not state further what I find is a fact, viz., that I did publish the method by which such results could be obtained by using a pyro. and sesquicarbonate of ammonia developer, such as had (April 21st, 1876) been recommended by a writer of *nom de plume* of "Franklin."† I direct Mr. Debenham to the foot of page 203, and to the third paragraph of another letter of mine, page 250 (both 1876), but more particularly to the paragraph at the bottom of next page (251). I there stated that "I believe that the colour of these negatives is much more determined by the kind of developer used than by the process of their preparation." (This has reference to free haloid or free silver nitrate in excess. Fineness of division, I stated, did influence the result.) I go on:—"It seems to me likely that the red-brown colour is not caused by the action of silver in excess, but by the carbonate developer; for the hydrate gives an image not to be distinguished from that of a 'Kennett' plate, except by its density," &c. The plates referred to were those which had lately been introduced independently by "Franklin" and myself, and prepared with excess of silver nitrate. (See also second and twelfth paragraphs of letter, page 274.) There was nothing, therefore, to prevent anyone from producing negatives or positives of varied tints, either with ammonic carbonate or ammonia, or with a combination of both of these. I have at other times stated the colour of images obtained by other developers and plates. I may add that I stated my objection to the sesquicarbonate of ammonia—that it induced frilling on the plates I then made.

Mr. Debenham thinks it "unaccountable that the matter was not taken up and made much of at the time, and largely employed since." Is every valuable matter, then, "taken up," even at the present time? Further: does not Mr. Debenham know that at the time to which I allude "gelatine" was a by-word with most amateurs, and probably with all professional photographers. The process was worked at only by a few enthusiasts, and the general body of photographers, who might now "largely employ" a gelatine process for positives, had not then developed their first *negative* in a similar material. Old readers will be aware that many points in dry-plate work were published eight or ten years ago which scarcely received passing observation, but which, had they been announced at the present time, would have created a "sensation" at the photographic clubs and technical meetings. Even at the present day how difficult it is to get any to take up the simply *published* methods of another! It is generally necessary to force a method or production upon a community, and this is generally to be done only by introducing them commercially. Very practical directions for producing coloured images upon bromised collodion plates have been published by a variety of writers—among them Major Russell, Colonel Stuart Wortley, and Mr. Wm. Brooks; but no sensation has been created, neither has "the matter been taken up" or "made much of."

I do not think that any good end would be served by going more deeply into my writings, though among these—which are very voluminous, and contain, as I am now able to see, many valuable suggestions and facts—may be found further reference to coloured images. I do not know that I am entitled to much credit. I have shown that "Franklin" produced images of a somewhat similar nature, though whether he produced tints as brilliant as some obtained by me I am uncertain. I have only intended to show that I did *more* than "produce" coloured images, having also *published* eight years ago, or more, the method by which others might have done the same. I have proved more than I originally attempted to state. Readers of the present day may now have some conception of the reason I had for objecting to Dr. Eder's statements that colours could not be produced by silver bromide to compare with those to be obtained by iron development on chloride plates.

But here is another "appalling" letter! May I hope that Mr. Debenham will rest satisfied with it? HERBERT B. BERKELEY.

* Instead of "clear," "*translucent*" would have been the more correct term.

† "Franklin" stated that ammonia carbonate and pyro. gives a negative of a light drab colour by reflected light, and of a rich reddish-brown by transmitted light.

PHOTOGRAPHERS' ASSOCIATION OF AMERICA.

FIFTH ANNUAL CONVENTION.*

[FROM A SPECIAL CORRESPONDENT.]

August 4, 1884.

THE side gallery overlooking the Winter Garden was filled with screens covered with photographs, while the walls had their share of the display.

Along the edge of the balcony overlooking the garden was a very fine show of negatives, so arranged that the light was reflected through them. These negatives were made upon Cramer plates and were from various studios, but most of them were Mr. Cramer's own work. They were of large size and of first-rate quality. Here also was a very fine display of transparencies of large size made on Mr. Carbutt's special transparency plates, which are gelatino-albumen; and on a screen at the side of these were a large quantity of photo-mechanical prints, by Mr. Gutekunst, of Philadelphia, made upon Carbutt's stripping plates. These mechanical prints are as near perfection as it is possible to attain. We have nothing in England that can compare with them, either in perfection of result or cheapness of production. In this gallery was the very large exhibit of the President of the Association, Mr. Kent, of Rochester, N.Y., which was worthy of him and his position.

It would be tedious to your readers if I were to enumerate all the exhibitors separately; so I will only notice those which had some feature of general interest to photographers. One exhibit in this same gallery was remarkable, showing, as it did, that the results were due to the man and not to the plates. Mr. Dixon, of Toronto, Canada, was the exhibitor. The pictures (views) were about the finest in the Exhibition, and were all equally good. The plates used were those of two English and two American makers. Thus, with four different kinds of plates, Mr. Dixon had produced results which could not have been more uniform if they had been taken with one brand of plate. This should be an answer to those objectors who say that the introduction of dry plates would do away with all individuality in photography.

There were not many exhibits showing special rapidity in exposure. Mr. Armstrong, of Milwaukee, had some very quiet, artistic pictures, many of which must have had very rapid exposures. They were the only pictures in the Exhibition which showed any attempt at artistic composition of figures in landscapes taken at one exposure. The *Lone Rock by the Sea*—a male figure looking over the water—was most artistic; and, although the ripple on the water showed that the exposure was of the shortest, there was no sign of under-exposure in the figure. Another was *Tired of Browsing*—some cows on a hillock overlooking water, one of the cows standing on the top, outlined against the sky, while the others are below in the shadow; yet there was nothing harsh in the outline of the one nor want of detail in the others.

Close to these was a screen which deserved more than a passing notice. It is covered with examples of the platinum process of Mr. Willis. This process has found a great deal more favour in America than in England, and is almost exclusively used as a basis for finished work. The enlargements exhibited on this screen by Hoyt and Siebert, of New York, from negatives by Sarony and others, are very fine indeed. They are made in the solar camera and by electric light. The price is very low—a 20 × 16, mounted upon a stretcher covered with calico, being only nine shillings, and an 80 × 52 £5. They are nice to work upon either in crayon or pastel, as there is no gelatine or other sizing to make the working uncertain or difficult. I was surprised to find a process invented in England and little used there so well established here.

* Concluded from page 540.

From this gallery some half-dozen stairs take us into the picture and art-galleries. Facing the top of the stairs Mr. Carbutt had a number of pictures by different artists upon his special plates, for which he claims great rapidity. The claim would appear to be substantiated, for here are groups of cows taken by an amateur (Dr. Howe, of Philadelphia) with a drop shutter; and here, also, are the famous pictures of the bicyclist coming down the steps of the Capitol at Washington. In this room are the largest photographs I have ever seen. When in England I thought a great deal of manipulating 24 × 20 plates, but here are three-quarter lengths on plates which must measure fifty inches! Mr. Cramer exhibits some fine direct large pictures; but it was remarked by more than one that his negatives showed more detail than the prints from them. In the same room were exhibited Mr. Guerin's pictures, which took Mr. Cramer's first prize. I am not aware who were the judges, but there were many knowing looks and winks when it was explained that the plate-maker who gave the prize and the photographer who took it hailed from the same town. In fact, there is so much dissatisfaction expressed in this connection that I think the dry-plate makers will not offer prizes another year.

Taking the Exhibition altogether it was a most magnificent display—far surpassing anything I have ever seen in England. It was conspicuous for the great number of large direct photographs, which would have gladdened the heart of the late Mr. Crawshay. But, in talking with the producers of these large pictures, I gather that they do not pay for the outlay for the apparatus, except as advertisements; for they agree that the public would rather pay fifty dollars for an enlargement finished in crayon than thirty dollars for a direct photograph the same size.

This Exhibition has decided the question with regard to dry plates. America has been years behind England in the use of dry plates, and very few photographers have discarded the wet process altogether; but this year, as far as I could see, there are no examples of wet work exhibited at all. And, as it is universally admitted that this Exhibition was better than any before, it must prove to the most sceptical that dry plates can be made to produce results equal, if not superior, to the wet process.

While all agree that the Exhibition portion of the Convention was a decided success, it is also equally well agreed that the Convention, *as a convention*, was a total failure. Photographers who had travelled hundreds of miles to hear discussions and papers upon photography have little patience with the way the time of the members of the Convention was wasted by squabbles over the election of officers, &c. This feeling of dissatisfaction found vent in two meetings which were held at the Palace Hotel on the evenings of Wednesday and Thursday, July 30th and 31st, at which it was decided to have a meeting in the Music Hall the morning of Friday, August 1st, to discuss matters photographic *although the Convention had been formally adjourned* till next year at Buffalo. Accordingly, at eleven a.m. a bell was rung all over the building, and the meeting called to the platform under the skylight. Here it was seen that the President and one or two others were pulling about backgrounds, cameras, and accessories, and some hundreds of photographers and their wives sat and watched for *something* of interest or instruction to occur. The first thing that did turn up was a camera stand, upsetting a 24 × 20 camera with a very large lens and smashing the front of the camera. After this mishap there was more pulling about of backgrounds, screens, and cameras. A gentleman was seated before one of the backgrounds and a great deal of pulling about of all kinds of apparatus ensued, the only effect of which appeared to be that all the gentlemen on the platform got "mixed," and the sitter seemed very miserable.

At last, after nearly an hour of this, watched with great patience by the large gathering of photographers, Mr. Kent came to the front of the platform and said:—"It was intended to give a demonstration of taking a large picture this morning; but I find that there are no lenses that will suit the camera-boxes. We have no slides that will fit the cameras, and no plates that will fit the slides; so we must give it up." After this humiliating confession the audience quietly dispersed; and this was the only attempt made at the Convention to give a practical demonstration of anything photographic except those of a purely business character, such as the dark-room demonstrations of the various dry-plate makers and Mr. Seavey's illustrations of the use of his backgrounds and accessories in posing the sitter.

Mr. A. L. Henderson, of London, was a visitor at the Convention, having arrived from England to be present at the meeting of the British Association at Montreal. He must have been gratified at the reception he received, and it was most amusing to see how the dry-plate makers got round him—like "flies round a honey pot"—comparing notes and trying to get "points," as they say here. It is a proof how widespread is the circulation of THE BRITISH JOURNAL OF PHOTOGRAPHY that there did not appear to be many of the photographers present who had to ask who Mr. A. L. Henderson was. It must have been very trying to the patience of Mrs. Henderson to have to wait at almost every step, while one or other of his American admirers stopped her husband and kept him engaged in animated conversation upon topics photographic.

Of the routine business I will say nothing. You have had the details and papers in due course. I will only add that the President for the next twelve months is Mr. Landy—a photographer of well-known excellence in Cincinnati. His work exhibited at this Convention was of very high quality, and his large direct pictures were, in my opinion, the best in the whole collection. The place of meeting for 1885 is to be Buffalo, N.Y.

ON THINGS IN GENERAL.

ENGLISH photo.-aëronauts will have to look to their laurels. It is all very well to take a maplike view of any place that the wind in its caprice may blow you to, but it is quite another thing to pack up camera and plates, take your seat on the deck of the "helical" balloon, be steered where you will, take snap "shots" at whatever you like, and return in time for afternoon tea, being deposited, if you please, at your own dressing-room window. Such, in effect, is promised, or, rather, stated to have actually taken place. The Aëronautical Society of France having from their own grounds started their aërial car, its occupants took a sail of a couple of miles to windward and returned in five minutes by means of the simple expedient of turning the rudder. So far the French account. The advantages of this new plan of aërial locomotion will be considerable to photographers. When the express service is thoroughly established it will be so easy to take a balloon to any point and avoid all that careful packing which occupies such time when preparing for a long railway or road journey. But more than this: a single lens will suffice for the balloonist who "goes in" for maps of the country. He need no longer hesitate as to taking a battery of lenses, for he can get the exact range of view with one lens only by altering his altitude, free from fear of losing his view by the balloon's shifting. But, perhaps, I am getting on too fast. The balloon is stated to be able to go where it likes; but we do not hear if it can stay when it gets there—an important consideration.

Another point exercises my mind in the matter. Am I to believe it all? The French papers are full of it, and details are promised—a few weeks after the event—but on this side of the Channel a few paragraphs are all that the papers devote to the subject, and they are not of a very sanguine cast. Even our good friend, the editor of the *English Mechanic*, who always allows plenty of room to aërostation projects, gives a very guarded paragraph only, and refrains from saying more till he obtains further details. "We shall see what we shall see."

Many photographers remember the surprise caused some considerable number of years ago by the discovery of a small acarus actively enjoying itself and living heartily in nitrate of silver, the luscious crystals being evidently to its taste. One is thus prepared to receive with equanimity the account given by Mr. Sutton the other day of an inroad of black beetles upon his gelatine films, a whole batch having been ruined by the argentous proclivities of these affectionate creatures, who, not content with the near presence of their benefactors, even carry their fondness so far as to follow them in the amusements of their leisure. There is more in a black beetle than meets the eye. But even the actual presence of a cockroach in a store of plates would be preferred by most photographers to the mere inspection by "a young lady in the next room," be she ever so pretty, of the contents of the dark slides to see the "pictures that had been taken," such having been the experience of one of the members of the St. Helens Photographic Society on a recent photographic expedition in Lymm. The experience much reminds one of the latest photographic story in the *Detroit Free Press*. An amateur came to his mentor for an explanation of the faults of his plates, and, after a long series of questions and answers, the latter all tending to show that everything was right—"How did you know they were spoiled?" said the teacher. "Oh! Mrs. Butterwick was here, and she wanted so much to see how the baby took, and I opened the cases, and there was not a sign of a picture on any of the plates!"

By-the-bye, as there seems some talk about the "gradual change" of the "half-plate" size from the old $6\frac{1}{2} \times 4\frac{1}{4}$, I looked into an antique catalogue a quarter of a century old, and the only size I saw approaching the half-plate was $6\frac{1}{2} \times 4\frac{3}{4}$. I am sure that "half" of the old Daguerre size (16 × 22 centimetres), which I saw in a catalogue dated 1843, is nearer the modern half-plate than it is to $6\frac{1}{2} \times 4\frac{1}{4}$. Somebody has blundered.

The public would like to know something more about the vandalistic structure in Trafalgar-square. I have seen dog-kennels, or even the abodes of the more humble quadruped abhorred of Mahomedans, built far more in accordance with artistic propriety than this latest addition to the National Gallery. Who erected the affair? Government or a private speculator? Will the copies taken therein possess any copyright? Why, if the pictures were to be photographed, was there not public notice? I think I know several photographers who might have been glad of the opportunity to photograph if they only had been aware of the power to have a studio handy; and such a studio! I thirst for information! I do hope someone will be able to allay my thirst.

That was shabby treatment which the County Court judge was reluctantly compelled to mete out to the Liverpool photographer the other day. He had made an excellent enlargement from a poor photograph; but, through some such promise having been made when the commission was given that the picture need not be kept if not liked, the purchaser exercised his caprice and did not "like it," and so got out of payment. His Honour, however, did not fail to tell him what he thought of his conduct. I should like this judge to have a few more photographic cases to adjudicate upon. A County Court judge is supposed to see more of the seamy side of human nature than most people; but if a few leading photographers cared to bring before him some of the cases where they were victimised by persons whose dress and appearance would suggest ladies and gentlemen, he would have his eyes opened to little meannesses and deceit which even his experience could not parallel. Many sitters seem to think that a photographer's studio is like a lottery or a boot and shoe shop; the photographer to spend all his time and trouble, do his work well, and still take his chance of being paid nothing if the caprice of the sitter should lead her to say she "does not like it," and returns the photograph as though it were a pair of boots that did not fit, or, more properly, whose "cut" was not liked. Professional photographers will have to bestir themselves yet, or the public will get the whip-hand of them and command their own terms. Tht next move will be to go the rounds of the photographers, receive proofs, pick the one most liked, and decline to pay for the rest.

FREE LANCE.

WHERE TO GO WITH THE CAMERA.

[It is hoped that this series of articles will be continued at regular and frequent intervals during the vacation months, and we shall be glad to receive contributions to the series from any friends able to treat of new and interesting ground.

WINCHESTER, PORTSMOUTH, AND BOURNEMOUTH.

STARTING from Waterloo last year, about this time, for Winchester, Portsmouth, and Bournemouth, with a half-plate camera and a companion of good conversational powers, a fortnight was most pleasurably passed. Arrived at Winchester station, the omnibus quickly deposited us and baggage at the Black Swan Hotel, situated in the High-street and close to the George Hotel—a more pretentious house. A walk round the city and through the cathedral satisfied us that in two fine days we should capture all that pleased our fancy.

Before going further let me recommend all brother camera men to see Mr. Savage's studio, situated a little outside the city. A drawing of the angle of his garden wall appeared in the ALMANAC some years ago. The studio, which communicates with the house, is situated in the midst of a well-kept lawn. Upon entering the residence, and in the porch, is observed a German motto bidding you welcome. After your visit to the studio is over, you are conducted out by another door, and this time the motto wishes you good luck—or good-bye.

The exterior of the cathedral, taken as a whole, is photographically disappointing; still there are a number of interesting "bits" in and about the cathedral and college yards (they run one into another)—curious archways, old and mouldering, partly covered with vegetation.

The City Cross dates from the time of Henry VI., and contains several figures. Amongst the chief are William of Wykeham, King Alfred, &c., the Blessed Virgin, and other saints. If the cross be photographed with a wide-angle lens the modern building now occupied by Mr. Tanner, bookseller, can be avoided, and an old-fashioned gable-ended house comes in as a background.

The Guildhall—a most handsome building—would do credit to a larger and more important town. The front is well worth a plate. It is lower down the High-street than the cross. Proceeding across the river, the bridge weir next claims attention. Then passing on up the hill or cliff, if fine, a good view of the city can be obtained, taking care to get in some object close on the foreground, if only the stile and hedge. Hyde Abbey, through Jewry-street, is but a ruin, partly used as a farmyard. One of the heads on an arched gateway represents King Alfred.

St. Cross Hospital is worth a visit and one or two plates, especially if some of the brethren of St. Cross, in their black cloaks with a silver cross, and the brethren of Noble Poverty, in red cloaks and cardinals' hats worked thereon, can be secured also. This is the place mentioned by Dickens as "cakes and ale," each traveller being presented with a horn of ale and a cake with a cross upon it. Beaufort's Tower in the quadrangle, taking in the sun-dial pedestal, makes one good picture.

Winchester Castle forms another subject; but, alas! the great hall only remains of the old castle. Oliver Cromwell had been here, and, as usual, blew up the place. Here they show the "round table" of King Arthur.

Hursley churchyard contains the hallowed remains of John Keble, author of *The Christian Year*. The stained glass windows are said to have been given out of the profits of the book. Merdon Castle is close by—a small ruin.

There is one old gateway in the city still remaining. You pass under it going to Mr. Savage's studio, and I was told there is a fine early Norman gateway at the Roman Catholic church, brought from some ruins near the cathedral. Doubtless, the visitor will find or hear of other places of interest.

I may mention that at most of the hotels in the country, "boots" or the landlord will find a man who knows all over the city at one shilling the first hour and sixpence an hour afterwards, or four and sixpence the day. He will also carry anything without extra charge. It is difficult to obtain permission to photograph in the interior of the cathedral, and even with dry plates considerable time is consumed; so it is best to purchase these pictures from the local stationers, who keep an excellent collection of photographs.

To Portsmouth the railway passed by Havant and thence through the line of fortifications that surround Portsmouth. It was exceedingly wet when we were there, and photography was not attempted; but sufficient was seen to show that a batch of interesting pictures might be secured. Book to the *town* station, and if possessed of more luggage than will go on the tram, take a cab to the George Hotel, High-street. Trams pass the station every few minutes—fare twopence to any part of Portsmouth, Landport, Portsea, or Southsea; and if the tram does not go sufficiently far, or not in your direction, at Cambridge junction you can change and go on with the same twopenny ticket another mile or so. Few of the trams have any "upstairs."

In Portsmouth harbour are to be seen and visited Nelson's ship, the "Victory," also two other gallant ships—the "Wellington" and the "St. Vincent." The George Hotel is interesting, as in room No. 15 Nelson slept the night before departing for his last and final victory. Captain Marryatt has made us familiar with Portsmouth; and at the Keppel's Head—so called after Admiral Keppel—situated on the Common Hard, we find the house so well known to midshipmen, who call it "The Nut"—slang for "head." The dockyard is worth a visit; but I am afraid no photographing would be allowed.

The floating bridge is worth a plate, either to make a foreground for the harbour, with the "Victory" in the distance, or by itself. When I passed over it there were in addition about a hundred passengers, ten carriages with horses, small trucks, &c.; fare either a halfpenny or a penny.

If catching a few yachts, yawls, fishing smacks, or steamboats be desired, Southsea pier is the place *par excellence*, and for a trifling sum one may get aboard some of the larger craft and go out towards Spithead or down the Solent; or you may take the steamer to the Isle of Wight. From Southsea pier, however, can be obtained pictures all day long, forming food for the camera; also a good view of the beach, with a portion of the pier as foreground. Here can be watched the landing and departure of the steamers for Ryde, Cowes, and other places; and sometimes the Channel fleet is anchored off Spithead. A concert is given on the pier most evenings by a military band.

From a few notes, taken as a guide for future work, I find—"Take tram for Gosport and Brockhurst. At the latter place note the windmill; this, with a glimpse of the shipping in the harbour, can be seen, the tall spars standing up well against the sky. Also notice three curious trees in front of an old cottage, and some old fortifications, now overgrown with grass, but converted into dwellings—the chimneys and the streets all on one level."

There is an interesting bit of wall at the end of High-street and close to Victoria Pier; it commemorates the landing of Charles II., and forms a wind screen at the same time. The Mitre Hotel is an old-fashioned, gabled house worth a plate, and the church behind it, St. Thomas's, covered with ivy, but difficult to photograph.

I am sorry to say so little about Portsmouth, but I have indicated what a great deal of work there is to be done there. Several obelisks, in memory of fallen comrades, are scattered about the place, and these, when with a pile of cannon, make effective pictures; but do not introduce figures into these subjects.

Should the visitor run over to the island, at Ryde, the Royal Kent Hotel will be found near Mr. Jabez Hughes's royal studio.* To this day I remember a splendid salmon steak I had for breakfast at that hotel.

From Portsmouth there are two ways of going to Bournemouth—by water to Southampton, or by rail to Basingstoke, through Southampton West and the New Forest. A visit to Southampton will please; and, if this be decided upon, book to the Dock station. The Dolphin or Crown Hotels are both good. The Bar-gate is a very old gateway still spanning the principal street, and the town is divided as "Above Bar" and "Below Bar." A tram runs under it. Southampton docks are poor, and the town looks empty since the P. and O. boats have ceased to call there. I am told the harbour is considered one of the finest in the world, but it is not used to any extent. The city walls are worth notice. They are found to the left of the High-street coming from the docks, and lead to Southampton West station, whence we start for Bournemouth.

I might here mention that about a station before coming to Southampton there is a farm cottage, with an old water-wheel, and several rural "bits" might be easily picked up there.

To resume: after leaving Southampton West we soon reach the New Forest of Hampshire; but the only place that calls for notice is Lyndhurst road, with its pretty hotel—a celebrated place for newly-married couples to spend their honeymoon. Ringwood, Lymington, and Christchurch are passed on the way; and shortly afterwards the train steams into Bournemouth East station, the 'bus takes you to the Pembroke Arms Hotel—the headquarters of the Cyclist Club. When I was there a new hotel was being built at the Firs Glen, and this will be much more central. The Branscombe Hotel, a temperance house, I can also recommend; here will be found a *table d'hôte*. Bournemouth is known as the "ever green valley of the south." ARCHER CLARKE.

(To be continued.)

* Since this was written I deeply regret to hear of the decease of this estimable gentleman.

FOREIGN NOTES AND NEWS.

On the Recovery of Emulsion Residues.—Photography in Public Libraries and Museums.—Actinic Action of Light in Deep Sea Regions.

Lieutenant David and Herr Scolik have presented a report to the Photographic Society of Vienna, in which they give the result of their experiments on the recovery of silver from gelatine residues and the bath used for fixing gelatine plates, &c. This report is substantially an extract from *Photography with Gelatino-Bromide of Silver*—a work which these gentlemen have at present in the press:—

"As in the case of all other photographic silver processes, in working the gelatine emulsion process one should never lose sight of the recovery of silver from waste and residues. In the cloths used for pressing, the canvas bags, the empty cooking vessels, glass beakers and filters, there is more silver than in the paper filters and substrata that used to be so carefully collected in the wet process. The developer and washing water, on the contrary, unlike the wet collodion process, contain no silver at all, while the greater part of the silver used for the plates is to be found in the fixing bath. Indeed, according to Professor Eder's computation, they contain from seventy-four to eighty per cent. of all the silver used, only from sixteen to twenty per cent. being actually used in the formation of the image. We have found the recovery of this residue simplified and facilitated by the following procedure:—We collect all the fixing baths of both negative and positive process in a large cask. All the other residues, consisting of spoilt emulsions, filters, cloths, bottles, and also the films of dry plates that have become useless, we treat with hot water, in which the gelatine that contains the bromide of silver is easily dissolved. This solution we throw into the cask beside the old fixing baths, by which the silver compound is dissolved out, and the gelatine, being so extremely diluted, can no longer stiffen. We then place some brightly-scoured strips of zinc in the cask and leave them for a few days, at the end of which time the silver is precipitated from the solution; the clear, brownish fluid above it may be poured off and the silver precipitate left behind treated with hot water to remove any particles of gelatine that may still remain. The precipitate is then collected upon a filter paper and dried. It is as well also, before washing and drying the precipitate, to treat it with a little dilute hydrochloric acid (1 : 10) in order to remove any particles of zinc that may have got mixed up with it. A greater return will be obtained if one, undeterred by the horrible smell, add some solution of liver of sulphur or ammonia sulphide to the contents of the cask, a black precipitate of sulphide of silver being produced. This is allowed to settle, is collected, and washed as soon as the baths become ferruginous with dilute (1 : 10) hydrochloric acid; then washed with water and afterwards melted. The drawback to this process is that the sulphide of silver has to be smelted. Smaller quantities of fixing baths and residues may be heated with old ferrous oxalate developers; these reduce the silver compounds and give the silver as metallic silver at once, which may, though, of course, only after careful washing, be dissolved in nitric acid."

According to the *Moniteur* a photographic studio has been erected at the top of the National Library at Paris. When an artist or a workman wishes to have a copy of a manuscript, miniature, scroll, or map which is in the library he has to put himself in communication with a photographer, who makes an application in writing to the superintendent for permission to make the copy, and receives in return a card with a number indicating when his turn will come. When it arrives he repairs to the library with his apparatus and chemicals, and there, in presence of one of the library attendants, the copy is made. The Ministry of War and of Marine at Paris have also public studios, and the Museum of Decorative Art is having one built. The *Moniteur* would like to see similar studios erected at the Louvre, the Luxembourg, and the Ecole des Beaux Arts. The *Photographische Mittheilungen*, in commenting on the foregoing, regrets that there is no such provision made for spreading a knowledge of the treasures of the Berlin Museum, and says that though, when the Berlin Industrial Museum was founded in 1867, a studio formed part of the plan, yet there is not one in the luxurious new building. Is there any such glass house for the use of the public in connection with the British Museum and South Kensington? Or is this but one more thing that they manage better in France?

In the *Moniteur de la Photographie* M. Léon Vidal calls attention to the interest offered by the special investigation of the activity and properties of light at great depths of the ocean, and says he has constructed an apparatus for measuring the actinism at all depths, as well as a photographic apparatus intended for photographing the floor of the ocean, by which a true picture of the floor may be obtained, to take the place of the imaginative ones that have so long done duty. *Apropos* of the same subject, M. Milne-Edwards, Jun., says:—"It has usually been assumed that colour is inseparable from light, and that creatures which never see the sun are either of a dark or bleached and indistinct colour. This assumption did not, however, always prove correct, since the darkest parts of the ocean were found to be inhabited by animals in which the brightest tints of red, rose-colour, purple, violet, and blue were richly displayed. Most of the animals of the shrimp species which abound in the deep seas are a bright carmine red. The gigantic holothuria have the appearance of amethysts, and the large starfish are more beautiful than those we find upon our coasts. Their elegance of form and bright yellow reflections are truly wonderful." The question of the influence of light, it seems to M. Vidal, is only casually treated in these remarks, and that not in a very strictly scientific way, since these richly-coloured plants and animals were not examined until they were actually drawn up into daylight; and hence one does not necessarily know what their appearance may be in the depths where they live, since no one has ever penetrated to these depths. Heat, air, and certain gases are found everywhere, but at present one cannot determine how far down the visible and invisible rays of light can penetrate. It is just as unreasonable, he (M. Vidal) thinks, to consider that that decides the question of the effect of light upon colour as it is to make up one's mind that the moon certainly is uninhabited, because neither atmosphere nor aqueous vapours have been observed around it. Such an assumption contains the germ of error in so far as it assumes that it is impossible for living creatures to exist in any part of the universe except under the conditions assigned to plants and animals on this earth.

THE CONVENTION OF PHOTOGRAPHERS IN AMERICA.

The following are abstracts of the President's and Mr. J. F. Ryder's addresses, which had not come to hand when we went to press last week.

The President's Address.

After a few preliminary remarks upon the position of the Association, the progress made since the last convention, and the present status of photographers Mr. J. H. Kent proceeded to say:—

There is one matter of vital importance to every photographer which I regret the necessity of alluding to at this time—a matter that concerns the welfare of all more intimately than anything else connected with photography; I refer to the subject of prices. It is lamentable that there are those in our profession who, by necessity or greed, feel compelled to put a price on their own productions that will barely pay for material and labour employed. Unfortunately, too, the evil is not confined to those commonly denominated "Cheap Johns." If such were the case, and cheap prices always meant cheap pictures, photographers of ability could well afford to pay no attention to this troublesome matter. In some localities this is doubtless the case; but many of us have reason to know and regret that work of an excellent, if not superior, quality is made at prices which these men are pleased to say "defies competition!" This fact, that good work made by men of considerable ability is sold at such ruinous prices, is the source and sum of all the price troubles.

Cheap pictures, as such, are not by any means an unmitigated evil, if, indeed, they are not an actual benefit to the better class of photographers; and really, too, such productions are a necessity with the masses who would be deprived of these luxuries if compelled to pay extravagant prices. The necessity is that there should be a correspondence between price and quality, and the effort of this or any society should be to promote that equality rather than to stimulate strife and bitterness among those engaged in the business.

We cannot, if we would, ignore the fact that photographers, and even those who do not think exactly as we do, have rights that we are bound to recognise and respect.

It should be remembered, too, that, since they are possessed of such rights, we are, and will continue to be, powerless to coerce them into our way of thinking and acting.

It is indeed a matter for serious consideration, and I fear no satisfactory solution of the difficulty will be reached in the near future. Certainly I have no scheme or suggestion to offer other than what I have already intimated that a conciliatory course in opposition to such measures as I have latterly seen advocated by some of our photographic publications should be pursued. We may organise into societies and committees, and legislate low prices out of existence on paper; but the evil will still be as prevalent as ever, while the perpetrators of such will smile at our futile efforts to regulate their business and establish their prices.

What action, if any, this Society should take is for others who may possibly have clearer ideas than your President to suggest or advocate.

It is apparent to my mind that while there is no subject of equal importance there is none more difficult to compass. At anyrate no one likes to be driven. Men are more easily won by argument and appeal to their convictions of right and justice, or, at least, to what would appear to be their own interest, than they are to be forced into compliance with the views of others.

It is hardly necessary that anything should be said at this time relative to the subject of gelatine plates—not that the subject has lost any of its importance or interest to practical photographers, or that it is so familiar to all workers that nothing new can be said or suggested; on the contrary, it appears to me that there is no subject attracting more attention at present than that of dry plates.

While we have learned much of the advantages of this process, we are still far from having discovered all its possibilities. There are those who are still reluctant to concede its superiority over the wet process, many still contending that the crispness and vigour of the old method are not attainable with the new. It is noticeable, however, that most of those entertaining this view are the ones least familiar with the process; and it is doubtful if any who have adopted the dry plate and become familiar with it have ever given up its use and returned to the old bath and collodion.

Its advantages are so many that its abandonment would be such a long step backward that no photographer would think of taking it. In spite of all opposition it is evident the gelatine process has come to stay—at least until something possessing better advantages takes its place.

But, having promised that our proceedings should be characterised by brevity and despatch, I shall not now proceed to violate that agreement by keeping you longer than to express the hope that every member of this body will be actuated by a desire to do all in his power to promote the welfare of the national association, realising that in doing so he is working for his own interest and the interests of his fellow-workers.

On the second day of the Convention Mr. J. F. Ryder delivered an address *On the Business Management of Photography.* He said, after a few apologetic remarks :—

The first necessary requirement—the foundation stone—is a thorough knowledge of every department of the work. An intelligent understanding of one's business is solid capital. The more of that element a man carries the greater is his strength. As we have no established system of apprenticeship, no regular course of study or practice of our young art, the learner is dependent upon a haphazard chance; his aptness at catching an idea, with a natural handiness in taking to new work, and a taste for art even in a small way, prove his good friends in grasping photography.

Considering the many intricate points in chemical requirements, the judgment necessary to be exercised at every stage of the work, the many handlings and processes which depend one upon another, and all necessary to the proper production of a finished photograph, it is really a matter of surprise how successfully it is accomplished with the small chances the workman has for acquiring knowledge. I say this, believing the instances where photographers are really educated in the art-science of the profession they claim to be masters of are very few. I hope the time is near when regular schools of photography will be established and sustained in this country, where the learner may have the benefit of good teaching under competent professors, where study shall be necessary, so that he should be compelled to pass a rigid examination in chemistry, optics, physics, light, lighting, composition, and drawing, before he should be entitled to a diploma which shall be his voucher for competency.

Then we could expect intelligent skill in our *employés*, and the public could feel assured they were being served in a proper manner.

The coloured servant of a surgeon, explaining why his master charged twenty-five dollars for the performance of an operation in surgery which took but ten minutes to do, said he charged five dollars for the work and twenty dollars for the know how.

To fit ourselves in the best way for the pursuit of our art, which is becoming yearly more an art and more closely allied to science, buy books, subscribe for journals, magazines, and papers upon the subject. Make your collection of photographic literature a special library, and then make its acquaintance—the more intimate the better. In this way you become master of the requirements of your business, which is a rock-bottom foundation upon which you may build with all confidence and security.

Make a collection of studies, and encourage yourself and your operator to frequent examination of them.

I have large specimen books, the leaves of which are of tar-board 22 × 28 inches. To these tar-boards on both sides I glue mounted photographs, the best examples of work I can find. I purchase and I exchange; I have the work of friends and of strangers. It is a valuable collection for reference. They are kept where my operator has constant access to them; from them he can find almost every style of lighting and posing, as well as the peculiarities of many noted operators.

Next in value to superior quality in your productions is a safe and careful system in all the various departments—from writing an order for a sitting to delivering the finished picture into the hands of your customer. Such system should be observed; the soul of that system should be order and cleanliness.

The man who satisfies his conscience that he cannot afford to spend money in thoroughly renovating as often as once a year, and refurnishing when needful, is a poor manager and works against his own interest. Nothing commands more prompt respect than tidiness. A seeming of prosperity soon brings the reality. People like to patronise a prosperous man, and naturally avoid a poor or an unfortunate one. All that shows an air of thrift and systematic order should be practised and enforced.

Keep your show of specimen pictures fresh by frequent changes. Your customers will visit you oftener if you have new attractions. They will take pride in you, and make your establishment one of the places to be visited by strangers and their visiting friends, among whom you will find good customers.

How to treat with customers.—Here comes the place for exercise of judgment—for real generalship. To be polite, attentive, genial, and at the same time firm in adhering to safe rules for your own protection, is a difficult thing to do; yet it can be done. A correct start often saves misunderstandings, which are to be avoided by all means. It is a great mistake to have serious differences with your patrons; you must remember that great consideration is due to your sitter. Perhaps you sometimes sit yourself and find you are whimsical and exacting; you like to try again, for some reason you cannot quite explain. Perhaps when you go to your tailor you are not at once suited with the fit or hang of your coat; his telling you it is all right does not quite convince. Remember these things and be patient; you can make another sitting as quickly as you can make an argument. The sitting would perhaps convince them; your argument would not. Make your prices sufficiently high to justify the use of a number of plates and a half hour's time if necessary. You can afford this occasionally. If the exactions of your sitter be too great you are entitled to charge for extra service. State it pleasantly but firmly; sugar-coat your words where the subject is disagreeable.

In bargaining, or arranging the details for a sitting, have everything clear and distinctly understood. If additional styles beyond what is described in your order are asked for, then is the time to mention the additional price and to stand by it.

I believe it entirely fair to make for all sitters two good negatives, differing in position, so that they may have a choice. If they desire more plates used it is very proper they be required to pay extra for them, particularly should sitters be made to understand a change of dress or toilette means an extra charge for new sittings.

Do not be too obsequious to your aristocratic customers and domineering with those of modest means, who are generally sensitive. Be polite to all. Remember where you get one dollar from the capitalist you get ten from the middle class—the working people. Be prompt as possible in finishing and delivering your work; make no promises on that point except you are sure of keeping them. Impress your customers with the fact that your word is to be relied upon.

Never put off the securing of an order for another time; clinch it on the spot. It is never too late in the day to make a sitting—that is, to take a man's order for a sitting. Many a time have I written orders for sittings by gaslight, and given my client into the hands of the operator. With his money in the till he is sure to come for his proof in the morning, and be well satisfied to try again on learning last night's effort was not entirely a success. Had I told him it was too late in the day, and advised his coming again, I should probably not have seen him more. With a desire for sitting while his mind was upon it he would probably try my next-door neighbour, who, with more enterprise than I had shown, would gobble him.

The time to take money is before the sitter goes into the operating room —particularly should this apply to strangers and parties regarded doubtful. All photographers who fail in this important rule are practising an injustice upon themselves. Prices for photographs have become greatly demoralised. Many of our prominent and good men have been led or driven—I might say "clubbed"—into this great wrong. I will venture to assert that four in every five who have fallen into low prices are ashamed of it, and would be glad to get back to more respectable figures and a more respectable standing among their fellows. Low prices are in every way degrading, the work is carelessly made, the standard of excellence is lowered —in fact, is lost; ambition sinks to indifference, enthusiasm is killed. The work becomes drudgery—devoid of interest or pleasure.

Is there a remedy? Let us see. In all places where photography is practised are men and women who want the best that can be made, and will pay good prices for what they believe to be superior work. It is possible for photographers to invest their business with a tone and dignity that will be recognised by the people. There are many prominent instances to prove my assertion. This good city of Cincinnati stands at the front as an example to all other cities and to all other photographers of this country. The gentlemen who practice photography here are not devising schemes for decorating the fences with the skins of their neighbours. They are so wise as to be on the best terms with each other, both in a business and a social sense. They are quite willing that each other should live and thrive. They are prosperous; they are honoured.

The curse of our business is this curse of low prices. There is no good reason for it. There is no wisdom or advantage in it. It is a wrong to yourself, your neighbour, and the art you should be proud of, and which you should feel bound to protect.

Reform must come. I heard when a child that the city of Rotterdam, in Holland, was the cleanest city in the world, and the way it came about was from everyone scrubbing their own doorstep. I have always remembered it. My friends, the way to bring about reform in the abuse we are talking of is not to wait for your neighbour, but to commence scrubbing your own doorstone.

Put your establishment in proper train for an advance to a higher grade of work and a higher scale of prices. The public, recognising your progress, will follow you; if your neighbour will follow you also so much the better for you both. If he will not, you have, by your act, proved yourself his superior, and will hold the advanced ground you have taken. Elevate your art and it will elevate you. Make your prices high, and make your work worth all you charge for it.

This, gentlemen, is the road to success. Look about you and prove its truthfulness. The men who have been fortunate in our business have been faithful to the course I have laid down.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 11,556.—"Method of and Apparatus for Taking Photographs by Artificial Light." (Complete specification.) E. Himly, 28, Southampton-buildings, London.—*Dated August* 22, 1884.

No. 11,623.—"Photographic Albums." J. Tirebuck.—*Dated August* 26, 1884.

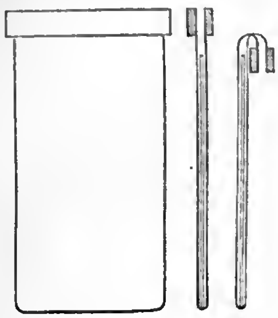
Changing Sensitised Plates in Photographic Cameras.

Patent specification. By James Sturrock, Dundee.

The first part of my invention relates to cameras of the ordinary well-known kind, in which pictures are obtained by exposure in the camera of glass plates properly sensitised. It has for its object a novel method of constructing such cameras or slides for cameras, so that the sensitised plates can be more readily changed when required. I make at the back of the camera a space to hold a sensitised plate. This space is open above, and is provided with a flange, or other similar device, to which can be readily attached by an elastic band, or other convenient means, the open mouth of a bag made of paper, cloth, india-rubber, or other suitable material impervious to light; or it may be made of tin, cardboard, or other rigid substance, with a flexible neck or mouth of rubber or cloth suitable for attachment to the camera. I fill the bag in a dark place with a sensitised plate, and then close or fold the mouth to exclude the light and secure it by a spring, clip, elastic band, gum, or other equivalents; and having fixed its mouth to the camera, as already described, I remove or undo the fastening, invert the bag, and deposit the sensitised plate in the camera. After exposure the plate is again slipped from the camera into the bag, and the fastenings again put on, and the bag with the plate removed from the camera, when another bag containing a plate can be attached. The plates can be stored away in the bags, both before and after exposure.

In the second part I make a separate holder or slide, having a space to hold one or two sensitised plates, as in the ordinary dark slides, but having a flange, or other similar device, to which the bag can be attached, and a plate or plates put in, as already described, and which can be inserted in the back of the camera in the usual way.

FIG. 1. FIG 2. FIG. 3.



In the accompanying drawings *Fig.* 1 shows front view of bag. *Fig.* 2 shows section of bag. *Fig.* 3 shows bag folded so as to exclude the light. *Fig.* 4 (which, with 5 and 6, we have not engraved) shows bag attached to slide or camera. *Fig.* 5 shows bag raised ready for plate to drop into camera or slide below. *Fig.* 6 shows section of paper bag folded.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—

First. The arrangement in cameras or slides for cameras for enabling flexible bags to be attached substantially as described.

Second. Flexible bags for conveying plates to or from the camera or slide, made so as to fold or close at the mouth, and secured by a spring, clip, elastic band, gum, or their equivalents.

Third. Bags, by means of which sensitised plates can be placed into, or taken from, the camera, or slide, without introducing the hand or other agency into the inside of the bag.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
September 2....	Sheffield	Freemasons' Hall, Surrey-street.
" 2....	Halifax	*Courier* Office, Regent-street.
" 2....	Bolton Club	The Studio, Chancery-lane.
" 2....	Glossop Dale	Glossop Coffee Palace, High-street.
" 3....	Benevolent	181, Aldersgate-street.
" 3....	North Staffordshire	Town Hall, Hanley.
" 3....	Photographic Club	Anderton's Hotel, Fleet-street.
" 4....	London and Provincial	Masons' Hall, Basinghall-street.
" 4....	Bolton	The Baths.
" 4....	Leeds	Philosophical Hall.
" 4....	Coventry	Coventry Dispensary.
" 4....	Glasgow (Annual Meeting)	177, Buchanan-street.
" 4....	Yorkshire College	College, Cookridge-street, Leeds.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

At the technical meeting of this Society, held on Tuesday last, the 26th inst., the chair was occupied by Mr. W. England.

Mr. A. Cowan showed an appliance for adaptation as a camera front to regulate the sizes of stops for lenses of different foci, so that they should work at a given speed. A description of this appliance will be found on page 508 of the present volume of The British Journal of Photography, in the report of the proceedings of the London and Provincial Photographic Association.

Mr. W. E. Debenham proposed, as a subject for investigation and discussion, the effect of different exposures, with development to suit, upon the quality of the resulting image. At a previous meeting Mr. Léon Warnerke had shown some photographs of the interior of the palace of Moscow, the work of Baron Kossuth. These photographs were remarkably fine in quality, possessing in a striking degree the characteristics which were generally spoken of as particularly belonging to wet plates. It was mentioned that the negatives, upon developing the first plate, were found to be much over-exposed—perhaps six times—and that the plates exhibited had, therefore, been immersed in a bromide solution before development to overcome this defect. They were informed that the plates had been very rapid ones, and the question arose—"Whether the result would have been as good as if the exposure had been such as to be adapted to the ordinary development." The points that he proposed for discussion would be two:—First, what is the treatment which will give the finest result upon a gelatino-bromide plate, independent of rapidity of exposure? and, second, if it should be found that treatment requiring a longer exposure gave a better result, what should be considered as the proper or normal exposure?

Mr. T. Bolas said that Mr. Debenham had put into a definite form ideas which had been hanging about for some time. With wet collodion a certain result was obtained when copying by giving a long exposure and slow development, and probably considerable advantage would accrue from a thorough investigation of the subject as applied to dry plates.

Mr. W. M. Ashman observed that the differences of make of plates would also have to be taken into account.

Mr. Cowan thought that the best result was to be obtained by a full exposure and restrained development.

The Chairman, for landscape work generally, preferred slow development and a good exposure. For a normal developer he used about a grain to each of the constituents—pyro., bromide, and ammonia—to the ounce of water. He also liked the addition of a little sulphite of soda, although it somewhat slowed development.

Mr. Ashman remarked that it was surprising what a quantity of ammonia might be added without injury—provided that but little was used at first, after the image had come up—and what an amount of density could be thus obtained.

Mr. Debenham hoped that definite and precise experiments would be made, and the subject be continued until definite results were settled.

Mr. Ashman proposed to the members to try experiments with reference to Dr. Vogel's method of obtaining true representation of coloured objects by the use of stained films. He himself had experimented in that direction, using tincture of turmeric and some obtained from the flower of the marigold.

Mr. Debenham inquired whether the results of Mr. Ashman's experiments had been to confirm Dr. Vogel's view as to optical sensitisers.

Mr. Ashman replied that they had. He found that the sensibility to blue rays was diminished, and that to yellow and brown colours increased, by staining the plate. He had not added the tincture to the emulsion, but poured it on to dried plates. He had for convenience generally exposed whilst still wet with the tincture. He found no advantage from adding ammonia to the tincture.

Mr. Cowan inquired whether the tincture was used of strength sufficient to make the plate perceptibly yellow.

Mr. Ashman replied that it was.

Mr. Debenham remarked that the somewhat greater sensitiveness to yellow rays of a plate containing iodide in addition to bromide which had been observed recently by Dr. Eder, and many years since by Herschel, might be due to the yellow colour which iodide of silver imparted.

Mr. Bolas remarked that Dr. Löbse, of Potsdam, had recommended the use of turmeric. It was easy to procure, whilst pure eosine was not.

Mr. Arnold Spiller said that it was safer to experiment with turmeric than eosine, as Dr. Vogel had stated that commercial eosine was useless.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society, held on the 21st instant, the chair wa taken by Mr. T. Waltenberg.

A letter from Mr. F. H. Davies, of the American journal *Photography*, with reference to having early reports of papers read at the Society's meetings, was read, and the Secretary was directed to reply thereto.

A question from the box was read—"Where can silver or electro-silver wire gauze, of suitable size for dividing set emulsion, be obtained?"

Mr. J. Barker had for some time been endeavouring to obtain the article for his own use in emulsion making, but without success.

Mr. W. E. Debenham had had similar experience some two or three years ago. A well-known firm of chemical apparatus manufacturers had said they would get it made, naming a certain price. After several calls they informed him that it would cost considerably more—perhaps four or five times the sum first mentioned—and finally said that they could not supply it at all.

Mr. A. Cowan said that he would advise anyone requiring it to make it or a substitute for it himself by driving in pins round the margin of a wooden tube, and then taking the wire across from these pins from the opening, first in one direction and then across. It would not matter that the wires merely crossed instead of being woven. For his own part he found the material known as mosquito netting, which could be obtained at the large drapery houses, quite satisfactory.

Mr. A. Haddon inquired whether it was necessary to silver the wire used.

Mr. W. M. Ashman said that it was not, and that copper wire would not injure the emulsion during the short time it would be in contact with it.

Mr. Cowan suggested that copper gauze should be dipped in melted tin and so coated with that metal, which was quite harmless.

Mr. W. Cobb used a netted material made of fine whipcord.

Mr. Barker thought that during the hot weather it was better to use a mechanical dividing appliance than to squeeze through any cloth fabric with the hands.

Mr. Haddon used a brass tube and plunger as a syringe, and on the end of this was fitted a brass plate which was pierced with holes as closely as they could safely be placed. Each piece of brasswork was electro-silvered.

Mr. Cowan observed that Mr. Bedford, having high pressure of water from the main, used that instead of a plunger to force the emulsion through the division.

Mr. Ashman spoke highly of the use of sulphite of soda after mercury for intensifying negatives. Common washing soda being used the mercury did not produce the desired alteration of colour, but if sulphurous acid were added, then darkening commenced at once. He (Mr. Ashman) then referred to some experiments he had made by staining gelatine plates with tincture of turmeric in order to alter their colour sensitiveness and cause them to give truer representations of coloured objects. This was a method of proceeding which could be tried by all, and was not limited to those who made emulsion themselves. He found that the sensitiveness to blue was lowered and that of the colours near the other end of the spectrum was considerably exalted. The general sensitiveness of the plate was diminished by about one-half.

MANCHESTER PHOTOGRAPHIC SOCIETY.

On Saturday last, the 23rd inst., the above Society held its tenth outdoor meeting for this season. The place chosen, though near Manchester, was quite new to those who went, and amply repaid the little extra walk, even on a hot afternoon.

Under the leadership of Messrs. Charles Pearson, Jun., and Thomas Chilton the party left the Central Station at 12.43, and quickly reaching Peel Causeway found carriages waiting to convey them to Oversley Ford, on the river Bollin—a further distance of five miles. Here the road and the carriages were left, and a delightful meadow path taken by the river side following the stream. The afternoon was almost perfection for photography, so that cameras were soon unpacked and at work on various river, meadow, and cattle scenes.

A singularly-picturesque timbered and ivy-covered cottage a little way out of the valley was the next object of attraction. The battery of cameras and lenses brought to bear upon it at one time was something startling, giving the impression to the natives that the old place was undergoing a state of siege. Various other woodland and river scenes were found on proceeding further down the valley.

The very hot afternoon made it thirsty work carrying the various heavy packages necessary, so that a visit to a large model farm, where a quantity of delicious new milk was obtainable, was very much appreciated. One of the "drier" members who had gone on in front announced that he had discovered the "milky way!"

At Castle Mills some few more plates were exposed, and the journey continued down the valley to the first footbridge, where the river was crossed, the valley left, and the road taken direct for Ashley, as there was no time for any more work.

Tea was provided at the "Greyhound," Ashley. Messrs. Smith and Chilton took groups of the members, and while the exposures—which were somewhat long—were being made, the train could be heard coming, causing some of the "sitters" to have a rather impatient and anxious appearance. A rush for the inn, a scramble for the instruments, a dash to the station, and a race along the train concluded the day's work. Manchester was reached at 7.30 p.m.

BERLIN ASSOCIATION FOR THE CULTIVATION OF PHOTOGRAPHY.

This Association met on Friday, the 4th ult.,—Professor Vogel in the chair.

Two new members having been admitted, a couple of photogravures, sent by Herr Obernetter, were examined. They were produced from negatives taken from nature (the subject of one was an Arab in a yellow turban and red jacket—the other was an animal piece), upon Obernetter emulsion, treated with azaline, by Vogel's method. The results were considered very good, and a copy of a colour scale taken by the same gentleman upon an azaline plate, without the interposition of a yellow glass, was considered perfectly successful in its representation of the value of the tints.

The Chairman called attention to the great advantage of using azaline plates for interiors.

Herr Schmid, engineer in the Imperial Navy, spoke of the views of the outlines of the coast and headlands taken by him from the deck of a gunboat [see Professor Vogel's article, page 502 *ante*], and showed a number of the pictures so obtained.

Herr Quidde inquired whether the weight which balanced the camera did not swing a great deal sometimes during the voyage, and so prevent or disturb the exposure.

Herr Schmid said that was so, and when not actually in use he had to disconnect the weight; otherwise its increasing momentum would have injured the apparatus. He also disclaimed any personal merit in the excellence of the pictures, attributing it all to Professor Vogel, who designed the apparatus, and Herr Sachs, who prepared the plates.

Herr Haberlandt reported concerning his experiments with the blue intensifier, expressing himself very favourably regarding it.

Herr Moll sent a sample of a mountant, called "alligin," said to be suitable for mounting photographs, keeping well, and being free from lumps.

Herr Schultz-Hencke, who had tried it, praised it highly, and said that, in spite of the long distance it had come (from Vienna) and the present heat, there was no trace of acid in it.

Herr Quidde read the programme of the thirteenth wandering meeting of the German Photographic Society, which is to be held at Berlin towards the end of August, and in connection with which an exhibition is to be organised. The price of tickets to the festival for members of the German Photographic Society is ten marks, and for non-members thirteen marks.

The contents of the question-box having been dealt with, the advisability of having the usual summer recess was discussed, when it was resolved by a majority to have the next meeting on Friday, 19th September, though a considerable minority would fain have had the meetings regularly continued all the year round. It was also resolved that on the first and third Fridays of each month, when if it were not for the holidays the Society would meet, any members who might feel inclined might have an informal meeting in the Leipziger Garden, No. 132, Leipzig-street.

Correspondence.

EDWARDS'S MACHINE FOR COATING PLATES.

To the Editors.

Gentlemen,—In your current number appears a sketch and description of a patented machine for coating plates with emulsion by Mr. B. J. Edwards. On reading and examining the description I find Mr. Edwards has not sufficiently informed himself of what mechanical appliances similar to the one described are, and have been for years, in use for manufacturing purposes.

The principal feature in the machine is the adoption, as the means of supply, of the coating roller and emulsion trough as described some years since in this Journal; but from the roller the emulsion is removed by a scraper, and conducted down an incline to where it meets the plates, being drawn on an endless band below to receive it. This "movable and adjustable scraper" is claimed as an essential part of the patent. Let us then see whether it has hitherto been known or used. Had Mr. Edwards made sufficient inquiries he would have found it in use as under:—

a. In the manufacture of pigments, in which rollers revolving in a trough carry the supply forward to where it is received by "movable and adjustable scrapers," and thence in some cases spread on plates for desiccation, in others collected, and repeatedly passed through.

b. In the manufacture of floor cloths, and other floor coverings, where the canvas is drawn under the scrapers identically with Mr. Edwards's description, while pigmented fluid is conducted on the moving surface by the roller and "movable and adjustable scrapers."

c. In the manufacture on a large scale of plasters for medical uses, where endless strips of muslin are drawn, precisely as Mr. Edwards does, under the stream of liquefied balsamic preparation, with the trough scrapers, &c.

d. For applying to paper various adhesive and colouring materials. Postage and other stamps are thus gummed in endless bands, waterproof material applied to brown paper for packing purposes, and tints applied to papers for decorative purposes.

It will be seen by these instances—which are but a few—that the "movable and adjustable scraper" is well known and in constant manufacturing use.

The cooling chamber must be dealt with in the same way. During the last few years few subjects have made greater progress than the study of artificial lowering of temperature to preserve organic materials or carry on chemical or mechanical processes impossible in a high temperature. This cooling, as applied to gelatine plates, is perfectly known. In America it is found in every dry-plate works—indeed, is the most important department.

The endless band is one of the best-known items in mechanical science, and is to be seen in most factories. It seems inconceivable that because it was found the friction scraped off superfluous emulsion at the back a patent should be maintained.

It will be seen from the above that all essential parts of this machine are in use for various purposes, and have long been so.—I am, yours, &c.,

Kingston-on-Thames, August 26, 1884. Samuel Fry.

INSTANTANEOUS SHUTTERS.

To the Editors.

Gentlemen,—With reference to the article on *The Use of Instantaneous Shutters*, which appeared in your issue of the 22nd instant: I purchased one of Cadett's new drop shutters with patent pneumatic ball and tube last May, and find it most efficient for ordinary work, but for instantaneous subjects it is useless. For instance: in taking cattle whose tails are in rapid movement the animals come out clearly, but their tails are fan-shaped. Again: in taking persons playing tennis, the one scoring appears double, and the arm of the one taking the score is not seen. The shutter is very light and beautifully made, and if it could be constructed to act with greater velocity it would be perfect. I agree with you that the foreground may take care of itself, for I have generally found that if I attempt to give the foreground more exposure than the sky an unnaturally-lighted picture results.

What we really require is a *drop* shutter acting with great rapidity—far more so than gravity can give—capable of some adjustment as to that rapidity, working with full aperture, and falling so smoothly as not to cause any vibration to the camera. Do you know of any shutter which fulfils these conditions?

I understand that the Phœnix does so; but, as there appears to be a double-flap action of some kind, I doubt its power of being able to take a game of tennis or any movements equally rapid.—I am, yours, &c.,

August 26, 1884. A. A. Mantell, M.D.

TOURISTS' CAMERAS.

To the Editors.

Gentlemen,—In relation to the interesting article by Mr. A. Pringle in your last, may I ask Mr. J. Traill Taylor whether his experience with removable dark shutters to slides, with a cut-off, is the same as that of Mr. Pringle, or whether the latter was using an imperfect specimen? As it is to be hoped that some manufacturer or other will soon try to do something to remove long-standing grievances in connection with the construction of tourists' cameras, he had better not be presented with conflicting evidence in this correspondence as to what is really good.

I did not say my apparatus took ten minutes to fix, but that it took ten minutes in all—(1) to take it from its case; (2) to fix it; (3) to unfix it; (4) to pack it away again. It should be ready for use inside its case, with the power of fixing the case on the stand.—I am, yours, &c.,

August 23, 1884. W. H. Harrison.

THE ETHOXO LIGHT.

To the Editors.

Gentlemen,—In reply to Mr. W. Broughton's letter, in your issue of Aug. 1st, let me say I have taken particular pains to disclaim priority in the use of ether for producing the lime light, both in the circulars which I have issued and in communications to periodicals; nor have I, as Mr. Broughton would have it inferred, obtained a patent in this country for anything which he had already published in England. What I have claimed, and what belongs to me by right of invention and prior publication, is the "saturator" *with porous filling*, which, as constructed by me, was the first to produce a reliable and perfectly-steady light with ether, and which remains today, so far as I can learn, the only form of ether apparatus which really fulfils all the requirements, and is calculated to give general satisfaction.

If Mr. Broughton did, as he now claims, first use a saturator with porous filling, he forfeited his right to any credit in connection therewith by neither publishing the fact at the time nor making a success of it. As for the rest, it is useless to deny the superiority of my apparatus so long as it it is preferred to any other where it is known, and has a good sale at a price which would cover the cost of half-a-dozen of the original Broughton ether chambers, which everyone has a right to make and use. The fact is, porous saturators have not yet become popular in England simply and solely because they have not been properly constructed, and have faults which those of my make have not.

Mr. Broughton's pumice chambers are undoubtedly useful with his apparatus, but are quite unnecessary with my own, which is absolutely safe against a dangerous explosion—has been proved conclusively to be so—and will never even "pop" in the jet if managed according to instructions with such jets as are recommended.—I am, yours, &c.,

Philadelphia, U.S.A., August 15, 1884. FRED. E. IVES.

THE PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN: ITS REPORTS AND THE PHOTOGRAPHIC PRESS.

To the EDITORS.

GENTLEMEN,—Mr. Herbert B. Berkeley, in your issue of the 22nd inst., at last admits that I have not misrepresented him: but if his present statement—that he had not accused me of misrepresentation—were correct, I should not have actually done so in complaining of a charge which he says was never made.

Mr. Berkeley now says that "the charge of misrepresentation against Mr. Debenham existed in his own imagination merely," and his statement that he "refused to withdraw the term as applied to the Editors and anonymous writers" implies that it was only intended to be applied to them. In the letter (July 11th) of which I complained, Mr. Berkeley, after devoting some space to me, says "this also in answer to Mr. Pringle," and goes on—"The gentleman just mentioned is not the only one who has misrepresented, or misread, my letter," and afterwards proceeds to discuss Mr. Pringle's letter. The "gentleman just mentioned" would, perhaps, grammatically mean Mr. Pringle, but logically it must refer to the writer whose views have been discussed, namely, myself.

Further on Mr. Berkeley said—"Like the other writers, the Editors totally misrepresent my meaning." He now says that he did not charge me with misrepresentation, because he did not say "*all* the other writers." Logically and grammatically the phrase, "the other writers," without limitation, includes "all," whether anonymous or otherwise.

In Mr. Berkeley's letter of July 25th he did not withdraw the charge of misrepresentation against me, but stated that he had not made it: at the same time his question, "If a man writes that which is not the case, does he not misrepresent?" implied that he might well have done so. Now, a denial of having made an accusation is not the same thing as suitably withdrawing it. Other writers—gentlemen whose names are honoured by your readers for their contributions to your pages—have not hesitated, when the circumstances have been much less aggravating, to offer an apology which which has been heartily accepted. Such incidents then, like the *amantium irae*, lead to the increase of good feeling. Mr. Berkeley prefers another method; but I think it is really too much for him to complain, as he does, that the matter has degenerated, by no initiation of his own, into a personal contest.—I am, yours, &c., W. E. DEBENHAM.

August 26, 1884.

[So far as the charge of misrepresentation concerns ourselves: after reading Mr. Berkeley's elaborate explanation, we see no reason to alter our reading of his original remarks. The subject has been sufficiently ventilated, and the correspondence must now close.—EDS.]

Notes and Queries.

"Is there any patent obstruction in the way of my employing the electric light for portraiture?—G. B. BROWN."——We reply: Our correspondent may employ without hindrance any artificial light he prefers.

X. Y. Z. asks—"How shall I stain the inside of a box black without having recourse to varnish?"——We reply: Let him brush it over with an infusion of nut-galls and logwood, and when dry again brush it over in the same way with a solution of sulphate of iron. If the blueness of the colour be objectionable allow the surface to become dry, and then oil it with a mixture of one part of linseed oil to two parts of turpentine.

A PROFESSIONAL PHOTOGRAPHER complains very strongly of his lens having become much slower in working than it was when he first purchased it five years ago. He is desirous of knowing the cause of such slowness.——We reply that if he make the lenses quite clean and lays them down upon a sheet of white paper he will see at a glance whether, or to what extent, they have become discoloured by the tint assumed by the paper when seen through them. If there be no perceptible darkening of the paper, then the increased slowness will exist, in all probability, in the imagination of our correspondent. But if, on the contrary, the glass of which the lens is composed be found to be of a yellow or brownish colour, then discard it at once and obtain another.

GEORGE SUTCLIFFE wishes information as to the best way by which to prepare albumen for photographic purposes, mainly those connected with dry collodion plates.——We reply that it is rather difficult to indicate this, because in each dry collodion process that has been published the directions given have usually included the beating up of the albumen. For example: in some cases it was beaten to a stiff froth, allowed to liquefy (which occupied several hours), and a small lump of camphor added to preserve it from putrefaction. In other cases ammonia was added in the proportion of ten drops to the ounce, this being followed by frothing as before. A third method, which has received much favour, consists in adding a few drops of glacial acetic acid to the albumen, stirring this up with a glass rod, and allowing it to stand without any beating up or frothing.

A YANKEE inquires if Professor Towler, the author of the *Silver Sunbeam*, is still alive, and whether he continues to take an interest in matters photographic. He (our correspondent) has been connected with photography in the United States for several years, and wishes to know why men like Professor Towler and Mr. M. Carey Lea, if they be still living, are allowed by the fraternity there to remain in the background, when such lustre might be shed upon their barren conventions by the presence of men of such eminence.——In reply: We are happy to say that both of the gentlemen named are still living. We are quite of the opinion of our correspondent as to the desirableness of securing lectures (for such we take to be his meaning) at the meetings of the conventions from men of this class: but whether they would consent to do so, if requested, is another matter.

F. J. O'B. inquires:—"Supposing (which in my case is unfortunately not a matter of supposition, but of actual fact) that a four-inch lens—four inches in diameter I mean—has sustained such a severe contusion at one side of the front lens as to have shivered the glass to the extent of a sixpence, may such a lens ever be rendered good for anything again?"——In reply: Examine the lens very critically to ascertain whether the imagined fracture of the glass may not in reality be one of the balsam by which the component parts of the front lens are cemented together. If this be the case let it be removed from the cell and re-cemented. But if the glass itself be fractured paint the shivered portion over with opaque black varnish, to prevent any of it being seen from behind, and then mount the lens so that the stopped-out portion shall be at one side rather than at the top or bottom. By adopting such an arrangement it is probable that the lens will work no worse than it did before the accident.

"I HAVE a one-eighth inch microscopic object-glass which defines very well when used upon objects that have not got very fine lines. When the light is somewhat oblique it shows the markings upon the *P. Formosum* very plainly, but will not do so upon the *P. Angulatum*. As you will have already guessed, it is of French manufacture and is not by any means pretentious. What I wish to know is whether such an objective will prove of any use in photomicrography, and, if so, what particular class of objects it will be good for.—B. H. A."——In reply: The object-glass referred to will answer for photographing such objects as can be visually examined in a satisfactory manner by its agency. From the description of what it can do it is evidently one of a very narrow angle. Is our correspondent certain that it *is* the power (one-eighth) he alleges it be? It may, more likely, be only a quarter. It is impossible to speak of its capabilities for photography unless it were tried for that purpose. It will probably be slightly over-corrected for colour, which will necessitate one or two preliminary trials when focussing.

A THIEF AT NOON.

I LOITER near the peasant's cot
(And "pot" it with unerring shot),
And at the crows that scamper by
My mute artillery let fly.
The "Lion on the old stone gate,"
Sung by Lord Alfred, meets his fate
With stoic calm; no time to carp,
My shafts are keen and cruelly "sharp."

Nor Hodge, nor haughty Vere de Vere,
The loutish peasant, or the peer—
Howe'er he fume, or curse, or gasp—
When once within my tender clasp,
Can slip his gyves. The lowing kine,
Unconscious prisoners of mine,
Might roar the welkin into rain,
And gnaw their boads—yet gnaw in vain!

I court the light and woo the shade;
With both I toy, as toys a maid
With rustic clown. I pet and coax,
And flout and scorn, and chide and hoax,
And goad them both. And all my prey
I slaughter in the glare of day.
I cloak them whilst there's light about,
And with the night I force them out.

No poacher half so deft as I,
No burglar so demurely sly;
I "bag" a tree or "grass" a roe,
And not the ghost of trouble know;
Your mediæval robbers pale
Beside the deeds that dog my trail.
I've nearly caught the sun at noon,
And t'other night secured the moon!

The burglar fears the light of stars,
The poacher's wanderings Luna mars;
Their boldness only blooms at eve—
I carry mine upon my sleeve.
"Light! give me light!" no night-bird I,
Who steals with sunbeams in his eye!
I'll drag a planet into sight,
Or take the D——l, if there's light!

I kill with speed, but always stop
To give a short and hasty drop;
And with a neat decapitation
I often couple amputation.
The twinkling of the visual orb
Will of itself more time absorb
Than I should occupy in limnin'
A hundred thousand men and women!

THOMAS BEDDING.

Exchange Column.

No charge is made for inserting these announcements; but in no case do we insert any article merely OFFERED FOR SALE, *that being done at a small cost in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a* NOM DE PLUME *be thought desirable), otherwise the notice will not appear.*

Wanted ferrotype plates and other wet plate material in exchange for a very rapid *carte* lens.—Address, AMERICAN STUDIO, Queen-street, Exeter.

I will exchange Tench's No. 6 wide-angle plano-lens for Ross's 5 × 4 medium-angle doublet, four-inch focus. — Address, T. JONES, photographer, Ludlow.

I will exchange a *carte* lens, with rack and pinion, for a drying oven, platinum crucible; or offers.—Address, HERBERT GOVER, 101, Waterloo-street, Hanley.

I will exchange a lot of gelatino-bromide pictures, both painted and black and white, for anything useful in photography.—Address, C. T., 36, Orbel-street, Battersea Park, S.W.

I will exchange a quarter-plate *Le Meritoire* complete, value thirty shillings, with extra double slide. Wanted, a half-plate folding camera with one or two slides; difference adjusted.—Address, 9, Mayo-road, Brighton.

I will exchange a good half-plate lens, combination, for views or portraits, cap and flange, Waterhouse's stops, English makers, for a whole-plate camera, dark slide, folding tripod; difference adjusted.—Address, H. Y., Edinburgh Post Office.

I will exchange my fifty-two-inch Coventry-made bicycle roadster, in fair condition, for good camera and lens. Want a 10 × 8 or 12 × 10 camera complete for studio; photo. of machine, two stamps.—Address, PHOTOGRAPHER, South-street, Romford, Essex.

I will exchange an interior background, conservatory background (new), cabinet burnisher (new), Lancaster's camera, press, head-rest, side-slip landscape, and posing-chair (the property of a photographer going abroad), for anything, except photographic materials.—Address, J. WARD, 8, St. Walburge-street, Preston.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

NOTICE.—*Each Correspondent is required to enclose his name and address, although not necessarily for publication. Communications may, when thought desirable, appear under a* NOM DE PLUME *as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.*

PHOTOGRAPHS REGISTERED.—

Joseph Stephen Brown.—*Group Photograph of Clergy and School Teachers of St. John's, Bridgwater.*

John Owen, Newtown, North Wales.—*Fire Photographs of Wynnstay, the Residence of Sir W. W. Wynn, Bart., M.P., Ruabon, Denbighshire.*

William Pankhurst Marsh, Norfolk Cottage, Bognor.—*Four Instantaneous Photographs of Sanger's Circus Procession, and One of the Elephants and Camels in the Sea at Bognor.*

WITNEY.—We are unable to give you the cost of advertising in the American photographic publications.

WM. C.—If an excess of potash has been used in the preparation of the solution lime will be thrown down, but it will do no harm.

A. B.—The only method by which we could decide the question is by making an analysis. For this, we regret to say, we have not time at present.

W. M. H.—We are unable to say with certainty, but we have an impression they are to be procured from Messrs. Perry and Co., Holborn Viaduct, E.C.

F. B.—1. The only formula published by Mr. Berkeley is four grains of the sulphite to each grain of pyrogallic acid.—2. If that be the golden rule (?) so much the worse for theory.

S. R. B.—We believe the suit is still pending, but when it will come on for hearing is a matter of uncertainty. It cannot until after the long vacation is over. The matter is not, as you surmise, dropped.

E. W.—Without knowing more of the circumstances we should be inclined to attribute the defect to damp. So far as we can judge from the appearance of the image the emulsion would appear to be all right.

A. J. McMAHON.—The emulsion is now quite useless except for the silver it contains. From long keeping during hot weather the gelatine has become decomposed. Do not waste time in trying to "vamp it up," but make fresh.

INQUIRER.—Had this correspondent conformed to our rule, by enclosing his name and address, his four or five queries would have been answered. We never reply to questions unless the correspondent forward his name and address. See heading to this column.

X. X.—1. There is no means of removing the stains; but as you only appear to require the negative for enlarging from they will not matter, as you may avoid them in the transparency.—2. You had better employ the formula supplied with the different makers' plates.

E. BOISSONNAS; F. W. VÉREL AND CO.—Messrs. J. and E. Hall, 23, St. Swithin's-lane, E.C., supply cold air machinery, such as are referred to in our issue for 1st instant. Other firms supply them also, but Messrs. Hall manufacture a smaller apparatus than the others.

W. M.—We should advise you to have some light wooden frames, covered with thin muslin, which can be fitted over the roof portion of the studio during the summer months or when the sun is very brilliant. In the winter, or when the light is dull, these can be removed and the full light utilised.

WHITE ROSE.—The simplest and least expensive instantaneous shutters are those of the "drop-shutter" form. Consult our advertisement columns. There are many different makers, but we cannot undertake to recommend any particular manufacturer. It is against our rule to do so.

A WELSHMAN.—Methylated ether, if good, will do quite well for making collodion for wet-plate work. It should have a specific gravity of ·720 or ·725. If weaker than this it should not be employed. The alcohol will answer perfectly; indeed, for the iodiser it may be slightly weaker than your sample.

CHAS. SPENCE.—The red spots on your prints appear to be caused by bubbles of air adhering to them while in the toning bath, and these have prevented the action of the gold solution. Keep the prints moving all the time they are in the solution, and see they do not get air-bells enclosed between them.

W. W.—It appears to us, from the print forwarded, that the upper portion of the building is more strongly illuminated than the lower; hence that part is over-exposed. Perhaps the building is situated in a narrow thoroughfare, and possibly the lower part is shaded by the houses opposite.

F. E.—1. We know of no cement which would be reliable. Better get a new dish.—2. We fear the mixture would not dry sufficiently hard. If it do, and the film be not allowed to touch the backing, no injury will result.—3. Most likely your surmise is correct. Try again, and see that the emulsification is complete.

A. HUNTER.—Methylated "finish" can be employed in the manufacture of varnish; but you must bear in mind that it already contains three ounces of some kind of gum to the gallon, and the retailer does not always know what gum it is. Very frequently it is of the commonest possible quality, whatever it may be. We have known common resin to be used. Better commence with methylated spirit.

A PROVINCIAL.—We think it is quite possible that the bronze or imitation gold on the flock paper with which the walls of your reception-room are covered may have something to do with the innumerable small, fading spots on the prints, particularly when you say the prints are mounted in this room immediately after it is swept and dusted. Possibly small particles of the bronze powder become detached from the walls and eventually find their way on to the damp prints; hence the source of trouble. Try the experiment of mounting in another room for a few weeks and note the effect. We shall be glad to learn the result of this experiment.

RECEIVED.—S. Highley, F.C.S.; George Smith; A. F. Genlain; W. H. Harrison; &c.

PHOTOGRAPHIC CLUB.—At the forthcoming meeting of this Club, at Anderton's Hotel, Fleet-street, on Wednesday next, September 3rd, the subject for discussion will be—*On the Effect of Different Alkalies in the Development of Gelatine Plates,* with demonstrations.—The Saturday afternoon outing will be at Hale End, leaving Liverpool-street Station at 2.2 p.m.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. STEWARD, Optician,
For three Weeks ending August 27, 1884.
THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

Aug.	Barometer.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max Shade Temp.	Min. Tem.	Remarks.
7	30·03	E	70	64	115	86	59	Hazy.
8	30·04	E	74	67	121	90	64	Hazy.
9	30·00	E	73	66	120	88	64	Hazy.
11	29·93	SE	76	66	128	94	65	Hazy.
12	29·92	W	73	68	119	84	65	Cloudy.
13	30·00	W	70	65	121	78	62	Cloudy.
14	29·99	NW	65	60	116	75	60	Bright & Clear.
15	30·07	NW	63	57	108	79	56	Cloudy.
16	30·15	W	64	60	114	80	57	Hazy.
18	29·93	W	69	62	118	83	60	Hazy.
19	29·92	SW	65	60	113	73	56	Bright & Clear.
20	30·06	N	61	56	106	73	54	Bright & Clear.
21	30·22	NE	66	60	92	77	58	Hazy.
22	30·21	SE	67	58	112	82	58	Hazy.
23	30·14	E	65	63	120	82	59	Hazy.
25	29·97	NE	68	64	85	70	64	Cloudy.
26	30·16	N	55	50	94	63	49	Bright & Clear.
27	29·95	NW	55	51	—	64	51	Overcast.

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THE DETERIORATION OF GELATINE PLATES.

The question of the deterioration of gelatine plates with age is one of constant recurrence, and one which obviously presents a considerable importance to photographers. It is true that under ordinary circumstances—even supposing, for the sake of argument, that the sensitive film must necessarily deteriorate—the trouble is not one that need cause serious inconvenience, inasmuch as, being warned of the danger, it is within the power of the photographer to employ plates whose character is beyond suspicion. But, on the other hand, it may be beyond the range of possibility that the newness of the plates can be guaranteed, or that they can be used within the period to which their good qualities extend.

For instance, the photographer who is depending for his supply of plates upon commercial sources is, to a certain extent, in the dark entirely as to their age, and can only judge of their quality by actual trial. Yet even he, by systematically noting the number which most manufacturers place upon each box to denote the batch of emulsion from which those particular plates were made, can form some sort of at least approximate judgment of their age. Thus, in a case which recently came under our notice, two batches of plates by the same maker, and purchased at the same time through a dealer, were sent to us for comparison. The results in one case were perfect, while in the other the films had undergone a certain amount of deterioration in the shape of incipient fog at the edges. Upon reference to the respective numbers of the two batches, and knowing the system adopted by the particular maker, we found that there was a difference of nearly three years between the ages of the two samples, one of which had evidently been in the dealer's stock for a very lengthy period.

Then, again, in the case of plates exported to distant parts, or carried on lengthy journeys, to be developed probably months after exposure: it is impossible to guard against the effects of deterioration if such a tendency exist; and hence the importance of studying the question thoroughly with a view to the discovery of the conditions which favour or otherwise the keeping qualities of our plates.

We may at once state, as we have done before, that in our opinion dry gelatine plates do not *necessarily* deteriorate in the slightest degree, and there is abundant evidence in support of that view. On the other hand the fact is indisputable that some films do unmistakably exhibit signs of falling off within a very short period of their preparation, the inference being that the result is caused by some variations in their mode of preparation, probably assisted by the manner of their keeping.

Colonel Stuart Wortley's experience during his trip round the world was distinctly in favour of the stability of his sensitive films. His evidence was to the effect that under extremely trying conditions his dry plates were almost the only things on board that did not suffer more or less from the effects of damp and salt water, and that most of them after a journey of nearly twelve months' duration produced perfect negatives upon development.

What is it, then, that causes the change which is noticeable in so many plates? There can be little doubt that it is mainly caused by imperfect elimination of the soluble products contained in the emulsion; for it is difficult to conceive that a film of pure silver bromide and pure gelatine preserved in a perfectly dry state can possibly contain within itself the elements of decay. But to which of these soluble products are we to look for an explanation of the evil? Possibly to each and all, for even the excess of soluble bromide, restrainer though it be, may introduce a slight element of at least uncertainty.

The chief products of the process of emulsification (other than the silver bromide) to which we have to look are the soluble nitrates formed by double decomposition. The excess of soluble bromide (for we take it that an excess of silver is never under ordinary conditions present) and a certain proportion of decomposed gelatine is produced by the application of heat or by the use of alkali. In the ammonia method of emulsification the alkali itself must be added as a highly important factor, and one or two others that will be mentioned as we go on.

We may here interpolate a few words on the subject of excess of silver, which, as we have hinted above, is seldom or never present as such. The effect upon the keeping qualities of the films of free silver present during emulsification—though subsequently removed by washing—was distinctly shown by Mr. H. B. Berkeley some years ago in a distinct, indeed very marked, discolouration of the whole film, resulting from the mutual reactions of the silver nitrate and the organic gelatine. This, however, is not the description of defect we have to guard against, and free silver in that sense may be set on one side.

But it is nearly certain that the defect is to be traced to the presence of a silver compound other than the sensitive haloid, which is capable of spontaneous decomposition and which is, moreover, readily acted upon by abnormal atmospheric influences. In other words, an organic silver compound of inferior stability to the haloid is formed in some manner during the process of emulsification, and to this the gradual deterioration is due. Let us see what are the chances of such a result.

In the first place, there is to be reckoned the mere contact of the gelatine with the silver nitrate, even though the latter be not in excess of the soluble bromide. If the emulsion be neutral or slightly alkaline the formation of an insoluble organic compound is nearly certain; but if, on the contrary, it be faintly acid the chances are greatly reduced, the compound, if formed at all, remaining soluble, and being thus removed by thorough washing. As might be expected, those films made from ammonia-ripened emulsion are more prone to deterioration than others.

Many operators prefer to mix the emulsion by first adding the silver to the gelatine and afterwards the soluble bromide—a process which would seem to favour the chance of the formation of an organic compound.

But even when the soluble bromide is in excess there exists the possibility of the formation of this inorganic compound, inasmuch as potassium and ammonium and silver bromides are solvents of the silver salt; consequently the emulsion contains a small proportion of dissolved silver bromide which is capable of combining with the gelatine. In the case of an emulsion quickly and thoroughly washed probably no ill effect would arise from this cause, but it is easy to conceive that under opposite conditions danger might lurk. Even the decomposition nitrates exercise a certain solvent action on some of the silver compounds, and their presence in the film may, therefore, contribute towards the tendency to deterioration.

Another and, very likely, the most dangerous of all the ingredients is perhaps the decomposed gelatine, especially when it is accompanied by a trace of alkali. Independent of its deliquescent character, and the consequent aid it thus lends to the work of decomposition, it is a reducer of the silver haloids. One of the best modes of reducing waste gelatine emulsion consists, in fact, in boiling, with the addition of an alkali, when the haloid is rapidly and completely reduced. If this change occur thus rapidly where circumstances favour we can easily comprehend its more gradual and less marked occurrence in the gelatine film, especially when from imperfect storage the conditions are again favourable.

But it is needless to multiply the possible reactions that may tend to produce deterioration; the instances we have given will serve to show that by perfect washing of the emulsion in the first instance nearly every chance of danger is eliminated. Such washing removes entirely all soluble matter capable of forming an easily reducible compound, and the resulting films are thus protected not only from spontaneous internal decay but also from the influence of outside conditions.

From what has been said our readers will recognise the great value of the different methods of emulsifying by precipitation. As a matter of fact we discovered a few months ago in a drawer where they had been exposed to a not over dry atmosphere for nearly five years some plates made by Captain Abney's precipitation process soon after its publication in 1879. They were in every way as perfect as when newly made, though other plates in the same drawer were strongly discoloured at the edges and had acquired a distinctly metallic appearance.

ON THE ARTISTIC MOUNTING OF PHOTOGRAPHS.

It is quite a relief to see that the art aspect of photography is again receiving some little attention, for of late the proceedings of the different photographic societies have chiefly been devoted to the discussion of purely technical matters.

At the last meeting but one of the Photographic Club the topic brought forward for discussion was the artistic mounting of photographs. This subject, though an old theme, is one that has not received that amount of attention on the part of photographers generally, but portraitists particularly, which it deserves. They, as a rule, are still content with the old, conventional style of mounting which has been in vogue ever since the earliest days of photography. We allude to the orthodox cut-out mount with a dome, oval, or cushion-shaped opening, with its neatly-bound gilt bevel and gold line. Now, the employment of these shapes, it may be mentioned, is chiefly confined to photographs, and were in the first instance, doubtless, introduced for the purpose of hiding the defective corners of the picture, caused by the plate being held by the corners during the coating and development or from accidental stains from the corners of the dark slides; and these shapes have been adhered to, more or less, for portraits ever since.

It is very seldom that works of art are seen of these shapes—except occasionally the oval—as they are generally rectangular. This is the shape which is now almost universally adopted for landscape photographs. But our remarks on the present occasion are principally directed to portraits, and these of the larger dimensions. It is true that, since the introduction of the panel and other modern sizes, several of our more artistic photographers have adopted the rectangular shape for their large portraits when they are mounted with a margin instead of being put in a cut mount.

During the discussion at the Club it was generally conceded that photographs on india-paper were far more artistic in appearance than those which are mounted on the imitation tint printed by lithography, particularly when the prints are "plate-marked." India-paper—or, rather, what is called india-paper—and that which is now used even for the finest engravings, it may be stated, is really only an imitation of the genuine article; but it answers our present purpose quite as well, if not better. This paper possesses many advantages over the printed tint beyond that just mentioned, as it may be had in various shades to suit the particular tone of the picture—a great advantage in the case of carbon or platinotype prints—whereas the lithographed tints obtainable in commerce are limited to two or three at most. Again: the india-paper can be cut to any size or shape to suit the individual photograph to be mounted, while the printed tints are only to be had in certain stock sizes, these being somewhat limited, and frequently found to be of a very unsuitable shape for certain subjects.

In all cases where a print is mounted on india-paper it is very desirable that it should be plate-marked; and this necessitates that the mounting be done on plate-paper, as cardboard, unless it be very thin, would require too much pressure to obtain the impression. Good plate-paper mounts always have a more artistic appearance than cardboard, unless, indeed, this be of a much superior quality to that usually employed for the mounting of photographs. If the size be large there will be a difficulty in getting the paper mount flat in the frame; hence the print must be treated in the same way as the better class of engravings are, namely, mounted on linen and a stretcher. This treatment does not remove the plate-mark, but only slightly subdues it, which is an advantage. Photographs of large size thus treated, when suitably framed, are exceedingly artistic as well as effective. It is somewhat surprising that the system of mounting large photographs on linen stretched on a frame instead of cardboard is not more generally adopted when the picture is required with a margin. Pictures so mounted are far more artistic and little or no more expensive, especially for the larger sizes; indeed for the largest sizes it would probably be cheaper than using mounting-boards of good quality.

Steel-plate engravings are frequently printed on a very coarse and rough paper; but, in printing, the pressure renders it perfectly smooth on those portions which come in contact with the plate, leaving the margin of the paper in its original coarseness. Some time since we had a series of photographs mounted on a similar paper and india-paper; they were then rolled with heavy pressure on a steel plate rather larger than the india-paper. By this means the margin of the paper was left coarse and rough, while the print and tint, with a small portion of the plate-paper surrounding it, was rendered smooth and even. This treatment in mounting gave the pictures a very artistic and refined appearance. Whenever india-paper is used the print should always be trimmed the same shape as it—which, for artistic effect, should in most cases be rectangular. It is clearly a mistake to trim the print to a dome or cushion shape and then mount it upon a rectangle, though this is frequently done.

There is no reason whatever why the photograph itself should not be printed with a margin an inch or so wide, provided the negative be masked up sharp and evenly. In the finished print the margin would never be really white, so that when the photograph is put upon the mount the margin will always show a more or less delicate tint, which, as a rule, harmonises with the picture admirably. We have seen some carbon pictures—copies of drawings—on rough paper, printed with a broad margin, so that they did not require a separate mounting. They were simply pasted on to a linen stretcher, and put into a plain, flat, unpolished oak frame, with a narrow gold bead inside. The general effect of the picture was very artistic and most unphotographic in appearance. The prints being of a sepia colour, and on the rough drawing-paper, were very close imitations of the original drawings.

We recently saw some large-sized portraits which had been most artistically treated in the mounting and framing. The prints themselves were in platinum and (black) carbon. They were placed behind very thick cut-out mounts with rectangular openings, and instead of the bevils being gilt, after the orthodox fashion with photographic mounts, they were left white, as is usually the custom with mounts for water-colour, or pencil drawings. They were then framed in simple black and gold frames. The pictures themselves were very artistic productions, and these qualities were still further enhanced by the *recherché* style of mounting and framing.

No apology is necessary for once more directing attention to the real importance of so apparently trivial a question as the mounting of photographs, seeing the marked effect for better or for worse the style of mounting may have on the finished picture. It is grievous to see it, but it frequently happens that a picture which has received the most artistic treatment in its production is completely spoilt by injudicious mounting and framing.

We hope to take an early opportunity of giving some practical hints on mounting on linen and stretchers, on india-paper, and also a simple method of plate-marking.

THE FADING OF COLLODION IMAGES.

If there be one doctrine or dogma in photography held more strongly than another by the fraternity it is that of the stability of a collodion image. Practice and experience have confirmed what theory had pointed out, namely, that the atoms of metallic silver, of which the collodion image consisted, should remain imbedded in the innocuous collodion filament in which they were formed without undergoing any change whatever.

We know that in pyroxyline spontaneous decomposition sometimes occurs. This is usually due to the employment of a very high temperature in its preparation, and to the acids not having been thoroughly removed. In such a case an atmosphere of red fumes will be found in the bottle in which it is kept, caused by a partial liberation of the oxide of nitrogen. It would be a subject of too protracted a character were we to here investigate the behaviour of such pyroxyline after it became converted into collodion, carrying still further investigation into its state when, after having been subjected to those operations in the course of which it became the recipient of an image, it eventually found its consummation in a horny pellicle in which were imbedded, both on its surface and throughout its substance, granulated atoms of silver.

Despite all theories to the contrary, collodion images, as they exist in everyday photographic life, are occasionally found to fade, and in some instances to fade badly. This is not necessarily dependent upon any deleterious influence or action of the atmosphere, as it occurs when the image is completely isolated from the influences of air. For example: some of the early specimens of microphotography exhibited at a meeting of the London Photographic Society on November 5, 1857, and to which we have access for examination, show serious indications of fading, one of them in particular—a portrait of the then President of the Society, the late Sir Frederick Pollock, Lord Chief Baron—although smaller than a pin's head, and protected from the atmosphere by a thin glass covering plate cemented by Canada balsam to that which contains the picture, has faded to such an extent as to show (when examined under a microscope) innumerable spots all over the background, a portion of the face and figure having disappeared altogether. And yet this tiny photograph has lain closely imbedded in resin, or hardened Canada balsam, from the day it was produced, now nearly twenty-seven years back, which demonstrates that the agent of destruction did not in this case come from without, but had been imbedded within the photograph itself.

Conversing with one of several photographers, at present on a visit to England, as to the causes of the reported collapse of the attempts lately made to get collodion transfers naturalised in the United States, he said that a *fama* exists against them there in consequence of their liability to fade—not alone in the colouring, as had already been described by one of the correspondents of the British Journal of Photography, but in the substance composing the image itself.

With regard to the fading of the transparent oil pigments with which the faces of such transfers are treated by way of being painted, especially in climates where the sun's rays are powerful: this, we imagine, is one of the inevitable accompaniments of low-priced work. A transfer painter, who lately called to show us specimens of his work, spoke of nine shillings per dozen as the remuneration given in some establishments for finishing an ordinary 12 × 10 portrait in oils. But neither the artistic merit of the painting nor the permanence of the colours concerns us at present, our inquiry having reference to the causes why the collodion transfer, *as a photograph*, should, under some circumstances, succumb to the influence of time with the great rapidity alleged by our American friend to be found sometimes in his country.

Watching carefully a workman reported to be skilful in producing transfers of a good quality, we observed several things that would go a long way in accounting for the speedy destruction of the transfers. One of these was the obtaining of a fine tone by sulphur.

The workman in question—who was a mere manipulator, and did not appear to possess any more chemical knowledge than sufficed to weigh out and mix the compounds he used—stared when we spoke of sulphur toning. When, however, we made inquiry as to his reasons for fixing his enlargements in an old hypo. bath, charged with silver not only from its solvent action upon the iodide, but from the addition made to it, with every plate immersed, of pyrogallic acid, citric acid, acetic acid, and nitrate of silver—for it was part of the routine system of operations that the image was not to be washed previous to its immersion in the fixing bath, but must be transferred direct just as it stands—he replied that such was the system universally adopted and insisted on at the establishment where he had long practised transfer making, and where the trifling remuneration given—from sixpence to a shilling a dozen for 12 × 10 size—prevented the workmen from being squeamish as to the stability of their work provided a good tone was obtained.

But this was not all we saw. The enlarged sulphur-toned transparency having been rinsed to remove the so-called hyposulphite-of-soda solution, was then placed in close contact with a sheet of transfer paper coated with gelatine and alum, and placed in water until it was flaccid, in which state it was rubbed into close contact with the wet collodion image and allowed to remain for several hours, or until both were quite dry, after which the paper, to which the image was now attached, was stripped from off the glass, pasted or glued to a card, and passed into the hands of the painter.

If a premium were offered for a process which should ensure the briefest possible tenure of existence to a photograph, we question if it could be found in the ability of any photographic chemist to devise or suggest one which would more completely fulfil the conditions than that which we have here described.

But, although in practice, and when conducted under the circumstances narrated, the collodion transfer process may be totally unreliable, it does not, by any means, follow that it may not be one of the most stable of all methods, and yield results which are practically durable. Several writers on this subject have spoken of this quality as pertaining to transfers, and seeing it can so easily be secured it is a pity that those who have to produce enlargements under climatic influences which favour fading, or by which such incipient seeds of fading as may be present in the photograph become rapidly developed, do not adopt all precautionary and preventive measures to prevent these seeds of consumption from germinating.

The most beautiful enlarged collodion photographs are not necessarily the most permanent—an assertion not likely to be gainsaid for a moment by those who still retain in their possession any of the once beautiful photo-crayon enlargements which, when introduced by the late Mr. Oliver Sarony many years ago, caused such a *furore*. But, as in these photo-crayons it was afterwards found to be possible to combine permanence with beauty, so is it in the case of the collodion-transfer process, which is but a very slight remove from that to which we have just alluded. To this subject we may hereafter return.

FRILLING AND ITS CURE.

From the earliest days of gelatine dry-plate photography frilling of the film—whether assuming the form of the true frill (that is, a swelling, sometimes to extreme dimensions, of the edge of the film, thus causing it to assume the well-known and well-described appearance) or taking the shape of blisters of various sizes—has been an evil dreaded by all. Rarely has a photographer a summer's experience without a single example of the evil, which, when it does make its appearance, proverbially spoils the best negative of the year, Innumerable nostrums have been tried and recommended in the shape of prevention; but in practice they are mainly reduced to the employment of an alum, either in the manufacture of the emulsion or as an after-treatment when the plate has been destroyed. There are well-known dangers in connection with the former method, while the latter is objected to in consequence of the increased length of time that must be devoted to a negative before it can be considered as past the finished stage.

There is no doubt that a much greater immunity from this evil characterises the plates now to be procured from the dealers; but, notwithstanding the greater knowledge obtained by practice, combined with judicious discrimination in the choice of gelatines, frilling is by no means a thing of the past. The alum bath used before fixing is, however, effective in almost every case, and we have already published the advantages of a thorough draining of the hypo. before washing the plate after fixing. The only objection to this useful method is the danger of allowing the draining to continue for too long a period, when, with some class of film, the image is slowly attacked, a plan, by-the-bye, which enables it to be of considerable use in reducing the strength of an over-dense negative if left for a very considerable length of time—say a whole day, for instance.

Sulphate of magnesia has been much spoken of; but, apart from any objections to its quality of being precipitated by the ammonia of the developer, we have found, after many inquiries, that scarcely any photographer makes use of this remedy.

When a particular batch of plates is in the uniform habit of frilling, if the owner do not cure them with a hammer he can generally avoid losing a negative by treating every plate with alum before fixing. The chief danger of losing a plate happens when a case of frilling suddenly and unexpectedly occurs. Some dozens or hundreds of a particular make have behaved to perfection in this respect, and a frilled negative is the last thing thought of; but on some special occasion—an extreme elevation of temperature, an unusually prolonged development, or from no known cause at all—the negative when taken out of the washing water is seen to be ruined, covered over with blisters of all sizes, or the film bloated and expanded at the edge—one huge excrescence, perhaps, reaching the middle of the plate. Or, what is worse, the same appearance may be presented upon the first rinse with the washing water while all the hypo. remains in the film.

We have not, however, been drawing pictures of troubles which our readers know are not imaginary without having a remedy to suggest. To Mr. Watmough Webster we are indebted for details of a method which, in the short time we have had to try it, has shown itself to be a perfect cure for a highly-developed state of frill and blister. We cannot do better than to describe the trial we gave the plan. Taking a twelve-by-ten rather under-exposed plate we developed it for a lengthened period, slightly focussing with ammonia and using water at a temperature of about 60° Fahr. After fixing, without any preliminary treatment with alum, we placed it under a rose to wash, and finally allowed it to soak in a dish of water, thus affording every chance for the formation of frill in a plate disposed that way.

After a time a blister about an inch in diameter formed in the middle of the plate, and a large frill about three by two inches at the edge—not a very terrible state of affairs, it may be said, yet sufficient to spoil any negative where, as in this case, important detail was included. Under ordinary circumstances this frill and blister would have dried down different in texture and with sundry creases.

Our next step was to place the frilled negative in a solution of alum, leave it there for an hour, and then well wash. After washing we removed the superfluous water with a dry cloth (of course, avoiding touching the raised film), and placed the plate in a dish of methylated spirit. At the end of a couple of hours we did not seem to have gained much, so covering the dish with a sheet of glass we left the negative soaking in spirit all night. The next morning not a trace of frill or blister was left, and, after drying, the closest examination fails to reveal where either blister or frill had been. There is no alteration in the density of the image, no puckering or falling into ridges, and, in fact, in every sense the negative appears perfect. If, as we have no reason to doubt, this method of Mr. Watmough Webster's should be applicable to all cases of frilling, however strongly developed, it will be of the greatest practical importance, as there cannot be a doubt that instances are numerous where fine negatives have been rendered utterly worthless from frill or fine blisters. On portrait negatives with plain backgrounds, though the negative may be put to dry at once when the blisters are discovered, the ordinary mode of treatment always leaves evidence of their presence behind; but the spirit treatment rapidly takes them away, and permits the negative to dry without leaving a trace of their presence.

It will also assist in adding to the keeping qualities of negatives; for we do not doubt that there are many valuable negatives stored by photographers already in a state of incipient disintegration through having been washed and dried long before the hypo. had been removed so as to avoid the spreading of blisters and frills, which, as is well known, are liable to spread with startling rapidity very soon after their first formation. Now, in a frilling case, the washing may be prolonged for a time sufficient to get rid of the main part of the hypo. Alum solution may follow to decompose the last trace of hypo. and to arrest further frilling; the soaking in spirit will then eradicate the evil already present.

We anticipate the method will be well tried by many of our readers, and we trust they will, for the benefit of others, send us an account of their success.

The Presidential Address at the British Association meeting having been devoted to physical science, it will be readily inferred that photography was closely allied to many of the subjects touched upon. It is not often that a striking novelty is introduced in this part of the proceedings, the President usually confining himself to a *résumé* of the progress made in the science on which he treats. It goes without saying that accuracy and lucidity characterised the address of Lord Rayleigh, than whom it would not be possible to find a more suitable exponent of science, from the double standpoint of theory and practice.

The science of optics, it is well known, is one to which his lordship has devoted special attention and it is interesting to note that the important *rôle* played in it by photography forms the opening part of the portion of his address given to optics. We have from time to time kept our readers thoroughly *au courant* with scientific discoveries relating to photography as they have been published by their authors, so that to keen readers of this Journal the topics dwelt upon by the President will not be unfamiliar. He said:—

The mystery attaching to the invisible rays lying beyond the red has been fathomed to an extent that a few years ago would have seemed almost impossible. By the use of special photographic methods Abney has mapped out the peculiarities of this region with such success that our knowledge of it begins to be comparable with that of the parts visible to the eye. Equally important work has been done by Langley, using a refined instrument of his own based upon the principle of Siemens's pyrometer. This instrument measures the actual energy of the radiation, and thus expresses the effects of various parts of the spectrum upon a common scale, independent of the properties of the eye and of sensitive photographic preparations. Interesting results have also been obtained by Becquerel, whose method is founded upon a curious action of the ultra-red rays in enfeebling the light emitted by phosphorescent substances.

Attention is called to Professor Langley's remarkable investigations upon the part played by atmospheric absorption in altering the colour of the sun as seen from the earth, which show that to an eye situated outside the atmosphere the sun would present a bluish tint. He said it would be interesting to compare the experimental numbers with the law of the scattering of light by small particles given some years ago as the result of theory. Though he does not refer to this phase of the subject there is no doubt that a special interest attaches to it at the present time on account of M. Montigny's weather prophecies, which, fulfilled as they have been, and connected with this point, naturally excite considerable attention in this direction.

Lord Rayleigh avoided all but a very slight reference to chemical subjects; hence Professors Liveing and Dewar's researches into the ultra-violet portion of the spectrum—which are closely connected with the chemical constitution of bodies, and which have been carried on almost entirely by photographic aid—are dismissed by the remark that the subject is too large both for the occasion and the individual. Lord Rayleigh, however, distinctly foreshadows a great change in the mode of viewing chemical action in the future.

It is well known that there is often uncertainty in spectrum indications as to whether certain lines are due to matter in the sun, or whether they are not rather due to absorption in the terrestrial atmosphere. Hitherto the point has only been able to be settled by observations of the sun taken at different altitudes; but, by a method founded on a combination of principles enunciated by various investigators, a plan has been devised which enables the determination to be quickly made. The President's own words may be quoted. Speaking of this "beautiful application of an idea of Doppler," he says:—

If a vibrating body have a general motion of approach or recession the waves emitted from it reach the observer with a frequency which falls short of the real frequency of the vibrations themselves; the consequence is that, if a glowing gas be in motion in the line of sight, the spectral lines are thereby displaced from the position they would occupy were the gas at rest. * * * But the sun itself is in rotation, and thus the position of a solar spectral line is slightly different according as the light comes from the advancing or the retreating limb. This displacement was, I believe, first observed by Thollon; but what I now desire to draw attention to is the application of it, by Cornu, to determine whether a line is of solar or atmospheric origin. For this purpose a small image of the sun is thrown upon the slit of the spectroscope, and caused to vibrate two or three times a second in such a manner that the light entering the instrument comes alternately from the advancing and retreating limbs. Under these circumstances a line due to absorption within the sun begins to tremble as the result of slight alternately opposite displacements. But if the seat of absorption be in the atmosphere it is a matter of indifference from what part of the sun the light originally proceeds, and the light maintains its position in spite of the oscillation of the image upon the slit of the telescope.

A brief statement of an important law regarding prisms and gratings is given:—"The optical power in gratings is proportional to the total number of lines accurately ruled without regard to the degree of closeness, and in prisms that it is proportional to the thickness of the glass traversed." * * "The magnificent gratings of Rowlands," Lord Rayleigh states, "are a new power in the hands of the spectroscopist, and as triumphs of mechanical art seem little short of perfection."

Our readers may remember that, a few months ago, we gave the results of experiments made by Messrs. Young and Forbes, which showed that light varied in the rapidity of its propagation according to its colour or wave-length. "Such a variation is opposed to all theoretical evidence," the President stated, and could only be accepted on the strongest evidence." Such a disturbing conclusion, however, has not been accepted, and Mr. Michelson had informed Lord Rayleigh that he has recently repeated his experiments with special reference to the point in question, and has arrived at the conclusion that no variation exists comparable with that asserted by Messrs. Young and Forbes. The actual velocity was found to be, as before, 299,800 kilometres per second.

This question of the lengths of light-waves has long been connected with that of the thickness of soap-bubbles. "It is remarkable," says the President, "how the playthings of our childhood give rise to questions of the deepest scientific interest. The top is, or may be, understood; but a complete comprehension of the kite and of the soap-bubble would carry us far beyond our present state of knowledge. In spite of the admirable investigations of Plateau it still remains a puzzle why soapy water stands almost alone among fluids as a material for bubbles. * * * When the thickness of a film falls below a small fraction of the length of a wave of light the colour disappears, and is replaced by an intense blackness. Professors Reinold and Rücker have recently made the remarkable observation that the whole of the black region soon after its formation is of uniform thickness— * * * between seven and fourteen millionths of a millimetre, so that the thinnest films correspond to about one-seventieth of a wave-length of light.

An interesting reference is made to the radiometer, that instrument —wonderful after all—of which such great things were expected in photography. It is well known that the investigation carried on by Mr. W. Crookes with regard to this instrument led to the construction of what was practically an entirely new instrument—the pump for obtaining extremely high vacua. With regard to the resistance of the contained air to the vanes some most interesting facts are given. "Maxwell drew the startling conclusion that the viscosity of a gas should be independent of its density—that within wide limits the resistance to the moving disc should be scarcely diminished by pumping out the gas so as to form a partial vacum. Experiment fully confirmed this theoretical anticipation—one of the most remarkable to be found in the whole history of science. * * * Subsequently the law has been examined by Crookes, who extended his observations to the highest degree of exhaustion. Perhaps the most remarkable results relate to hydrogen. From the atmospheric pressure of 760 m.m. down to about half a m.m. of mercury the viscosity is constant."

It is matter of congratulation for photographers that practically they were not involved by the electrical speculative mania which has had so much to do with the "low water" in which electric illumination now stands. Companies being wound up, and public lighting, in many places, having turned out a practical failure, form a very pointed contrast to the glowing anticipations of a few short years ago. Notwithstanding all this Lord Rayleigh is most hopeful about the future of electric lighting. Photographers take a pride in the linking of the name of Swan—eminent among photographic inventors—with the foremost men of science of the day.

We could not do better than conclude our *résumé* of the photographic points of the discourse by giving the President's remarks upon inventions and inventors, which are pregnant with suggestiveness in regard to various matters that have recently been brought into prominence in the photographic world:—

By a fiction as remarkable as any to be found in law, what has once been published, even though it be in the Russian language, is usually spoken of as "known," and it is often forgotten that the rediscovery in the library may be a more difficult and uncertain process than the first discovery in the laboratory. * * * In making oneself acquainted with what has been done in any subject it is good policy to consult first the writers of highest general reputation. Although in scientific matters we should aim at independent judgment, and not rely too much upon authority, it remains true that a good deal must always be taken upon trust. Occasionally an observation is so simple and easily repeated that it scarcely matters from whom it proceeds; but, as a rule, it can hardly carry full weight when put forward by a novice whose care and judgment there has been no opportunity of testing, and whose irresponsibility may tempt him to "take shots," as it is called. Those who have had experience in accurate work know how easy it would be to save time and trouble by omitting precautions and passing over discrepancies, and yet, even without dishonest intention, to convey the impression of conscientious attention to details.

LIME-LIGHT EXPLOSIONS AND THEIR PREVENTION.

My last article on lime-light explosions was intended to conclude the subject; but now that the lantern season is drawing near the manufacturing opticians are beginning to be interested, and I have been asked to make further experiments.

A jet with safety arrangement in the front, near to the place usually occupied by the mixing chamber, appears to be a desideratum, and my first trials in that direction were not satisfactory. Mr. W. Broughton, the inventor of the ethoxo process, tells me also that he began by filling the mixing chamber of his jet with pumice granules, but afterwards discarded that method in favour of the tubes. My own jet was made to pass the gases through the granules before they entered the mixing chamber, but the forcing action proved to be greater than when the granules were in tubes attached to the taps of the jet. I have now, therefore, altered it in such a way that I can place the mixing chamber either above or below the granules, and have thereby obtained interesting results.

No. 1. Pulverised glass, screened by two sieves of forty and fifty meshes to the inch respectively, in a tube half-an-inch wide and half-an-inch long, with a mixing chamber holding about one and a-half fluid drachms of water between it and the nipple. The exploding flame of ethoxo gas was arrested three times consecutively, but on the fourth trial it passed through the granules and destroyed the balloon.

No. 2. Same as No. 1, but commercial granulated brass, screened by sieves Nos. 24 and 30, used instead of pulverised glass. The flame passed through on the first trial, the granules being too coarse for a tube so short as half-an-inch.

No. 3. Same as No. 2, but with finer granules of brass, the sieves being thirty-six and sixty meshes respectively. Flame arrested and could not be driven through by repeated trials.

No. 4. Same as No. 3, but the front part of the jet heated by a spirit lamp until it became as hot as it would be likely to be from the heat of the lantern at the conclusion of a two-hours' lecture. The flame now passed through the granules on the first trial.

No. 5. Same as No. 4, but the mixing chamber placed *below* the granules, and only enough space left above for the free passage of the gases. Flame arrested, and could not be made to pass after many trials.

No. 6. Same as No. 5, but pulverised glass used instead of metallic granules. Flame still arrested, although the jet was hotter than the hand could bear.

No. 7. Same as No. 6, but an india-rubber suction ball attached to the O tap, the balloon being on the H tap of the jet. The result was that as soon as the suction was applied the flame disappeared from the orifice of the jet, and the whole of the explosive gas passed out of the balloon, through the mixing chamber, back into the ball, but without igniting. This experiment was intended to imitate the falling off of a weight from one of the bags in the oxyhydrogen process; only in that case the gas is not sucked back by the bag from which the weight has fallen, but is *forced* the wrong way by the bag still loaded. The experiment, however, shows that if there were any suction it would relieve itself at the expense of the other bag, and would not draw the flame through the safety tube.

No 8. A repetition of No. 7, with brass granules instead of glass. Passage of the gas in the wrong direction as before, but flame arrested and no explosion in the balloon.

No. 9. Granules of pumice used in the front part of the jet instead of glass or metal. Flame well arrested, independently of the position of the mixing chamber; but I observed a tendency to a slight flickering of the flame, which makes me think that granules of a *dusty* kind are not so suitable when they have to be placed very near to the orifice of the jet.

No. 10. Two safety tubes three-quarters of an inch long and half-an-inch wide, filled with pumice granules screened by sieves of forty and fifty meshes respectively, and placed on the nozzles of the dissolver of a large biunial lantern. The jets and tubing of the lantern were then filled with explosive ethoxo gas by the aid of a second lantern, and a free stream of the gas kept up until all the air had been effectually expelled. The gas was then fired, but the explosion stopped at the pumice and did not destroy the two balloons on the other side. On examining the pumice granules I found them *blackened* at the end nearest the lantern, and partly powdered by the violence of the explosion.

No. 11. The same in every respect as No. 10, but with fresh ethoxo gas very carefully graduated to the most explosive point. Flame still arrested on reaching the pumice.

No. 12. Same as No. 11, but with the pumice chambers removed. Flame rushed back and blew the balloon to pieces as soon as the pressure began to relax.

From the results obtained in these experiments I am satisfied that a jet can be made with which no explosion would be possible. I mean, of course, an explosion lighted up by the flame in the lantern itself. A mixture of the two gases in one bag or a rent in the india-rubber tubing must always be a source of danger when the reading lamp or any other light is at hand; but accidents of this kind are very rare compared with the other. If I can show that granules of pulverised glass, which do not stand in the first rank of flame extinguishers, arrest the flame (and these granules weakened still further by heating with a spirit lamp and applying suction), no apprehensions, I think, need be entertained that such a safety chamber will fail in the hour of danger.

I append the following directions for making a chamber of this kind beneath the orifice of the jet. It must be half-an-inch wide and half-an-inch deep interior measurement, with a disc of wire gauze, fifty meshes to the inch, resting on the top. This disc must be five-eighths of an inch across, and be kept in its place by a ring of wire. Two discs of gauze—one of fifty meshes, and the other of twenty-four meshes to the inch to strengthen it—must be pressed upwards against the bottom of the chamber by another ring fitting into a groove in the brass; whilst below there should be an empty space holding about two fluid drachms, in which the gases may mix before they enter the granule chamber. Above the granule chamber is no cavity of any kind, but the cap screws down nearly close, leaving only a space of about one-eighth of an inch extending quite across, and in the centre a tube of the same diameter leading to the orifice.

Two other points must be carefully attended to, namely to make the discs of wire gauze easily removable without disturbing the jet, and to keep a free passage for the gases. The great difficulty will be not in arresting the explosive flame, but in getting enough pressure with one hundredweight on the bags; and, therefore, no attempt must be made to contract the diameter of the granule chamber at the top in order to economise space. The upper disc of wire gauze must be as large as the lower, and all the discs must be changed if they should become rusty or choked up. Very little time need be occupied in doing this; and I find that I can take my granule chamber out of the lantern, put in fresh granules, and screw it down again upon the leather washer in two or three minutes, whilst I lose no more than twenty or at the most twenty-five per cent. of pressure. The reason that some complain so much of want of pressure I believe to be that they do not keep their apparatus *gas-tight* in every part, so that much of the pressure is lost before it reaches the orifice of the jet.

I shall not be surprised to find on further trial that the light is somewhat improved when the safety chamber is in the front part of the jet. The gases will certainly be heated by passing through the granules in that position, and this ought, theoretically, to be an advantage.

It has occurred to me, also, that the light in the blow-through process might be increased by filling a part of the oxygen tube of the jet with coarse granules of metal. The heat of the lantern would then enable you to blow a hot instead of a cold blast into the centre of the hydrogen. T. FREDERICK HARDWICH.

SODA DEVELOPMENT.

THE experience of many is the best test of the value of a process. Since Mr. A. F. Genlain so strongly advocated the use of soda instead of ammonia for the development of gelatine plates many have, no doubt, given the plan a trial; and, if their experiences were published, I feel certain that the advantages of the method would be approved by the majority. Some time since I tried soda, but the colour of the negatives was disagreeable; a yellowness all through lights and shadows alike (indicating slow printers) prejudiced me against its use. I afterwards saw some excellent negatives free from this objectionable tint, and was induced to give it another trial, the results of which were so satisfactory that I have now entirely discarded the use of ammonia and adopted soda in its place with much advantage, the printing qualities of the negatives being so vastly improved.

In every case where two negatives of the same subject taken under the same conditions were developed—one with soda and the other with ammonia—the soda-developed one has proved the best printer, although, perhaps, not so nice-looking as a negative. The appearance of a negative, however, matters little so long as its printing qualities are satisfactory.

One advantage of soda over ammonia is—much less tendency to blurring when strong light is in close proximity to shadow. It will not, however, prevent it (for the fault is, in a great measure, dependent on the character of the film), but certainly reduces the evil to much smaller proportions. There is also a greater and more equable gradation of tone from clear glass to opacity, thus giving a better *quality* of print.

One of the most objectionable faults in gelatine negatives has been want of atmosphere—a quality principally dependent upon the range of tone. It is a shortcoming very conspicuous in landscape work, where we see middle distance as strongly pronounced as the foreground, and the extreme distance dense as the sky. Most photographers know this effect, which in some systems of development and with some plates it is impossible to avoid; but unless it be the work must be considered imperfect. This is the *wet-plate* quality so often alluded to, and in the greater part of gelatine negatives so seldom seen.

Much greater control can be exercised over the development when soda is used than when the alkali is ammonia. Even a much over-exposed plate comes up slowly, giving time for the addition of a restrainer in the form of citric acid or bromide of potassium, solutions of which may be kept ready to hand. For my own part I am an advocate for full exposure, and, in consequence, sometimes overdo it. Nothing, however, actually makes up for a right exposure. Although a considerably over-exposed negative may be made to give a good print, it will be a very slow printer; whereas a properly-exposed one would produce a print equally good in a fourth of the time. This fact alone, when many prints are required, is of considerable importance.

The proportions of the chemicals used must be suited to the plates, and can only be determined by actual experiment. I have found *three* parts of a *one*-grain solution of pyro. and bromide of potassium, mixed with one part of a twenty-per-cent. solution of soda, a good standard formula for the plates I am employing. This can be varied by using a greater or less proportion of soda—the more soda the greater softness, and *vice versâ*. The negatives are improved in clearness by a bath of chrome alum and citric acid.

EDWARD DUNMORE.

TRANSATLANTIC JOTTINGS.

READERS of American photographic periodicals are familiar with the picture of a gentleman seated upon a remarkable chair, surrounded by apparatus, and about to give the *coup de grace* to a picture lying before him: the accompanying letterpress informs us that he is manipulating an "air-brush." It is a species of art by machinery, of which, nevertheless, good accounts have been given by experts. There is, however, now advertised a rival to this piece of apparatus in an automatic retouching machine patented at the end of last year, which, from the illustration appended to it, appears to work by a pulley and treadle; the former, attached to the end, is the pencil, and the retoucher works away what appears very like a sewing-machine. This invention also appears to have many admirers.

We know America to be the land of labour-saving machines; hence we should not be surprised at anything of the kind there to be bought. Perhaps the most remarkable contrivance in this direction is Major Hill-Wilson's automatic printing-machine. Strips of sensitive paper are placed within the instrument along with a negative, when, by the aid of clockwork, it turns always to the light, clamps the paper *in situ*, and then the whole is allowed to work by itself, nothing being further needed than to empty the prints at the conclusion of the day's work. The clockwork moves at a varying rate according to the sun's altitude; the nearer the time approaches midday the quicker the machinery goes. This may be useful; but when a few hundred negatives were required to be printed from in a day, we think the machine would be found in the way, not to speak of the outlay needed. The machine is not reported to equalise the light.

Among new processes is Dr. West's suggestion for a new mode of printing, the chief recommendation of which appears to be its novelty, as there would scarcely seem to be a commercial future for pictures of a beautiful crimson colour. He says:—"Paper, silk, or other fabrics floated in a solution of diazo-salicylic acid, or one of its salts, dried, printed, and washed with water, shows an image of a beautiful crimson colour." He gives detailed instructions for making the compound, but these we, perhaps, need not repeat. At the same time we quite agree with the editors of Anthony's *Bulletin*, in which the account appears, that "all fields, however unpromising they may appear, deserve exploration, and hold out great inducements, especially in the direction of a good and easy printing process."

The editor of the *Photographic Times* (New York) resuscitates the old process for restoring faded prints by means of immersion in a bath of bichloride of mercury (one grain to the ounce). He gives the very wise caution to anyone about to undertake the operation to take the preliminary step of making a negative from the print and a transparency from the negative, retouched and compared with the original, before taking any step towards the recovery of the lost beauties of the print. This, as we say, is wise, seeing that under some conditions the picture, instead of darkening and brightening, fades entirely away under the action of the bichloride.

That is a capital suggestion also (which, indeed, is more than a suggestion, since he has carried it out in practice) to carry the possibilities of a series of expensive lenses by the simple plan of using, in conjunction with one doublet lens, one or other of a series of concave lenses to lengthen the focus to any extent at will, the lenses being mounted over apertures in a long brass slip passing through a perforation made in the lens mount for the purpose.

The following rich extract appears as quoted from the columns of a newspaper, and is said to represent an experience of a photographer who was being introduced by the writer. We cannot, of course, vouch for the *bona fides* of the story, but it is too good an example of the bounce of the country to miss:—

"I tell you, pictures do a great deal to make a man popular, especially if he's good looking. Not long ago a handsome gentleman from a neighbouring city came here for photographs. Before he left I ascertained that he was a candidate for a high office. 'Let me make you enough pictures and I will elect you,' I said, for he made a very taking picture. He ordered an extra lot, but not enough. I afterwards heard that he was beaten by about sixty majority."

We find, too, a quotation from the *Deutsche Photographen Zeitung*, which is almost appalling from its cynical effrontery. It is a reply from an employer to the complaints of his *employés* that twelve hours' daily labour, not excepting Sundays and holidays, is too much to ask.

Employer.—Our young men can have no ground for complaint. Anybody embracing photography as a profession should make up his mind to renounce all desire or demand for holidays and Sundays. These are the days on which the majority of the people come to be photographed; thus the business is kept going, enabling us to engage and pay assistants. I have been an operator for ten years, during which time I have never known such a thing as a holiday, do not not know any now, do not desire to know any; in fact, would be uncomfortable were I to take one, and we do not hire help for mere pleasure. Our retouchers lead a comfortable life. They have abundance of freedom. Operators and printers must content themselves with rainy days. Should it happen they are really required to work twelve hours a day there is still time enough for them to eat, sleep, and rest.

If this be a real picture of the state of things on the continent, in even a small number of studios, we can only liken it to white slavery.

Professor Hugh, at the Chicago Photographic Association, gave an account of some experiments he had been making with a new sensitometer of his invention. It occurred to him that a good sensitometer might be constructed by making a scale of numbers and arranging it so that different parts of the scale received varying amounts of light, and he therefore constructed such a scale and placed in front of it a black revolving plate cut into the form of the "snail" used in the striking part of a clock. As this revolved, that part of the scale which was nearest the circumference of the circle of rotation (the scale being arranged radially) would receive the greatest quantity of light, the nearest the centre the least. The disc was revolved by means of clockwork (speed was not material), and while it was in motion a negative was made of the entire apparatus, when the *lowest* number visible after development gave the degree of rapidity of the plate. There seems to be the nucleus of something good in this device; but the general sense of the meeting seemed to be against it on account of the want of a standard light, the Professor himself stating his experiments, so far, to have only been comparative.

TOURISTS' CAMERAS.

MR. W. H. HARRISON was particularly unfortunate in his reference to the opinion of the late Mr. H. Baden Pritchard on the subject of tourists' cameras. It is an open secret that the latter was the author of *A Trip to the Great Sahara*, in which occurs the wail of agony about the inefficiency of his particular tourist's camera. Of course, from the peculiar point of view which he took of the requirements in a tourist's camera there was a good deal of cogency in his remarks; but I venture to say that if time had been given to him he would have regretted having taken that particular point of view, and, consequently, the inferences he drew.

I will grant at once that there are plenty of cameras in the market which are utter abominations, always failing at the time of need, except for the most ordinary, straightforward work. The reason is not far to seek. For many years the principal demand was for wide-angle lenses, and, consequently, shorter cameras. Longer-focus cameras were in the market, but such was the strange infatuation that rectilinear lenses were absolutely necessary that very few cared to go to the expense, as well as the weight, of the extra lenses necessitated by the more complete camera; and as demand must, as a general rule, precede supply, demand was found to be in the direction of short focus, the energy of makers was devoted to what became a current trade article, and also, in inevitable consequence of the demand, to making the camera as showy in external appearance as possible.

If, as I imagine, Mr. Harrison is possessed of one of these cameras he is to blame for not ascertaining for himself what his real requirements were before purchasing; and yet not to blame, for how could he gain the necessary knowledge except by experience? If he will consult the advertising columns of the photographic journals he will find that there is an earnest desire on the part of the real makers to meet the wishes of the public—particularly of amateurs. Speaking as one of them I can affirm that it is to amateurs, far more than professional photographers, that we look for real progress, and that every important hint of increased efficiency is eagerly watched for and instantly adopted.

Ordinary trade runs in very different grooves. The general tendency is only towards that amount of change which will give better outward appearance and economy of production. It is a question *entirely* of profit. If a dealer can produce an article which looks better worth the money, and on which he can secure a greater profit, he will not hesitate to aver that it is superior in every respect to another on which he obtains less profit. It is not always from pure greed that he does this. Probably he is, in reality, utterly ignorant of the practical value of the article, and speaks conscientiously from a commercial point of view, because he finds that they sell better. This is not to be wondered at; for how can the amateur know the good or the weak points of his apparatus until he has been taught by failure? He, therefore, in ninety-nine cases out of a hundred, fortified by the dealer's intentional or unintentional misinformation, chooses the showy apparatus, and then laments that brains have so little to do with the construction of tourists' cameras. If he would seek out the maker and take him into his confidence as to his requirements he would find but little difficulty in obtaining a camera to his mind.

It is absolutely impossible for a camera to be designed that will suit everybody's ideas of their requirements. I know, as a fact, that one of the very best camera-makers finds it impossible to make stock. He has, from the very nature of his business, been in daily communication with people who think they know what a camera should be and are not afraid of paying for it. Surely a man in this position ought to be in possession of such a collection of hints and notions that he could combine a camera which should be above suspicion of inefficiency, for this would enable him to make stock. Yet it is not so; his customers *will* have their special "fads" carried out. Whether they turn out to their complete satisfaction or not he probably seldom learns. I am inclined to say that the brains in insufficient supply are those of the users rather than the makers. They only think they know, and rush into print without ever really having thought the thing out from a practical point of view, which the maker must necessarily do before he can commence to put it in execution.

Now take Mr. Harrison's suggestion—that the camera should be packed inside the case ready for use. Note that the camera should be capable of racking out to three times the length of the longest plate it will take, and that both ends of the case are to be made to pull out so as to expose both lens and focussing-screen to view. Well, the case would have to be as big as a good-sized portmanteau for a $7\frac{1}{2} \times 5$ camera; and, unless made exceedingly heavy—at least twice the weight of a complete $7\frac{1}{2} \times 5$ camera, dark slides and case complete—it would collapse. Secondly, as to the plates being half the thickness of those at present in the market: this is just possible, but the cost of such glass is enormous. Glass sheet is made by blowing it into cylinders, which are then slit down one side and rapidly flattened. If the cylinder be blown out to the thinness Mr. Harrison desires, the risk of bursting is so great that the manufacture is to all intents and purposes abandoned as impracticable. Besides, unless the thin glass be plate—still further increasing the cost—the risk of breakage of the resulting negative in printing is so great as to be practically prohibitory.

As to "the glaring—the vital—fault" of tourists' cameras wasting a minimum of ten and a maximum of twenty or more minutes in setting up, Mr. Harrison must have some extraordinarily prehistoric set of apparatus; for if there be one point more than another that has been studied by the makers it is this of rapidly setting up, which is, however, by no means of the vital importance that many amateurs think. The first essential in a tourist's camera is that it shall be one that a tourist can carry. For this sake alone it is absolutely essential that it shall pack up in a compact form, and, *cæteris paribus*, the preference will be given to one that is least complicated in its manipulation.

Now, judging from the tenor of the late Mr. Pritchard's remarks, the camera that would have suited him best would have been a plain box, serving both for camera and packing-case, to contain an inner cardboard box full of dark slides. His lens might have been mounted in a sliding tube, which would have given him all the focussing he required, and all could have been ready for use in a few seconds. The stand, if of a portable type, would, of course, require (say) one minute for setting up—not a very serious delay, and not to be reduced very materially by the employment of any non-folding stand. I can assure Mr. Harrison that there are plenty of tourists' cameras in the market with all the adjustments necessary for the very highest class of work, and with all the range of focus which he so rightly desires, that can be taken out of the case and set up for any length of focus in less than half-a-minute. The stand can be set up, lens in place, and focus adjusted within two minutes comfortably, without any hurrying; and, moreover, that these cameras are of such a type that they can be carried about ready set up on their stands with the greatest ease in case one should happen to be prowling about in search of instantaneous "shots."

It is, however, very questionable whether it is fair to expect a thoroughly-efficient, long-focus, portable camera to be capable of doing really high-class instantaneous work. For this I should prefer a perfectly rigid camera of not less than one and a-half time the length of the plate, without any adjustments whatever. As a shutter I consider that none are at all comparable to Edwards's rolling blind working close to the plate. If this were made permanently attached to the camera, it could easily be made so perfectly light tight as to allow of the camera being carried about ready for exposure with the lens uncapped. For focussing, the lens should be mounted on a sliding tube, which might have ascertained register marks for various distances. Two studs on the top of the camera would make a finder, while the focussing-cloth, attached permanently to the rear end of the camera, would effectually protect the dark slide. No case would be required and no setting up; nor focussing, after one had mastered the art of judging distance.

I take it that the main object of a tourist is rather to obtain good negatives than to expose a large number of plates. A gross of plates extra per month exposed is an average of nearly six per diem—probably a far greater average per fair photographic day, and means a very considerable amount of work in developing, coating, washing, and printing. I would rather expose fewer plates and take my time over the exposure. Well, even this fancy of exposing great numbers of plates very rapidly is provided for. There are changing-boxes in the market by which half-a-dozen or a dozen plates can be exposed in about twice or three times the number of seconds—well-made articles, too, that work without a hitch.

For my own part I abominate them. I like to carry a dozen plates with me, but I am very well contented if I can expose half of them in a day. My case holds four double dark slides—sufficient for any ordinary day's outing—and for special occasions I carry some extra dark slides in a separate case. The camera has great range of focus, and can be set up in a few seconds without the lens. The focussing-screen I have loose, and put in my pocket. I first of all choose my point of view, and then, having the camera set up without lens or focussing-screen use it as a view-meter, looking through the lens aperture and racking out the camera till the back frame exactly frames the view I want, as I find that in this way I can judge far better of the manner in which my picture composes than when reversed on the ground glass, or viewed without the frame. I then see by the marks I have made on the tail-board the exact focus of lens it will require to give just that picture, and choose from my lenses the one nearest to it.

My battery of lenses is very simple. It consists, first of all, of a rapid rectilinear of a little longer focus than the length of plate, which I never use with a large stop if I can help it. One lens of the combination gives me a very long-focus single lens. A few other single lenses of intermediate foci fit the same mount and work with the same stops and cap. The length of exposure required is readily calculated from the focus of the lens. I should mention that the rapid combination is remounted, the preposterously large hood taken off and replaced by one of the same diameter as the body of the lens, so that when the front lens is taken off the same cap fits the lens body. The back lens is also removable, so that the front lens can be used alone as a single lens with the stops behind it. It is also so mounted that it and the back lens—as, indeed, are the extra single lenses, too—can be used either in front of or behind the stops and fit the same cap or shutter. I have also a shorter-focus rectilinear working with the same cap or shutter for interiors, of the same length of focus as the length of plate, and which is about the shortest focus allowable.

It is, of course, necessary in some very confined situations to use a lens which includes a wider angle; and, although the perspective given by such a lens is absolutely true, it is so apparently unreal (because it is a wider angle than the eye is in the habit of grasping) that it should only be used in desperation as a very last resource.

The shutter I have adopted is the one originally introduced by Hunter and Sands, and consists simply of a leather band passing upwards and downwards over a roller in a little framework in front of the lens. This leather band has two diamond-shaped openings, which are pulled one over the other by a string attached to one end. Theoretically it is quite wrong to put it in front of a double combination. It should there cause unequal illumination. Practically it does nothing of the kind, for the simple reason that the lens itself gives unequal illumination if used with full aperture and made to work on its full-sized plate, but very equal illumination if stopped down and used on a smaller-sized plate. I rarely use it, though it possesses the inestimable advantage—counterbalancing every conceivable advantage of any more perfect shutter—of having the duration of exposure under perfect control at the moment of exposure; because it is very rarely I attempt subjects that cannot be done by hand exposure when I can partially shade the sky.

I hail with pleasure the practical form of bayonet-joint described by Mr. A. Pringle, and suggest that it would be still better with three studs instead of two; but, for all that, I do not think there is much chance of its being generally adopted. The trade, as I have before said, are very unwilling to adopt any new method of construction, involving, as it does in this case, the change of an entire system. Another, and far more serious, practical difficulty in the way of its general adoption will arise from the fact that it is a job which requires some degree of skill and attention on the part of the workman—a combination of qualities which seems every day to become rarer.

The high degree of finish which is attained in many branches of metal-work is principally confined to objects which are in great demand, when it becomes possible to so subdivide the various parts that an ordinary workman, by force of "pegging away" at the same thing week after week, becomes expert at it. Put the same workman to another job which is at first necessarily time-work and the cost of production is increased tenfold. The plain screw thread fitting tolerably well is within the reach of an ordinary brassfitter. The standard thread, so fondly imagined and so glibly talked about as desirable, is infinitely more difficult of attainment than is generally supposed. This will, to many, appear extraordinary; but, if they have any doubt of it, let them go to a real scientific instrument maker and inquire the price of a screw a couple of inches long and (say) a-quarter of an inch in diameter fit for micrometer measurements. I expect they will find that it would cost as much as a modest photographic outfit complete; and yet it is only an accurate standard screw.

Interchangeable parts are just possible, but only where the quantities are very great and the real standards of size readily accessible. The Microscopic Society tried to establish a standard thread for all objectives; but I frequently hear complaints that they are really not interchangeable. The attempt of the Photographic Society of Great Britain to introduce standard threads will, doubtless, bear fruit in time; but the trouble of getting and keeping to the true standard is so great, compared with ordinary approximation, that it will be years before anything like certainty is obtained with threads by different makers. It will be something gained if the Whitworth standards of so many threads to the inch are even attempted to be adopted.

When the Photographic Society of Great Britain decided upon their standard I at once sent to a reputed first-class tool maker's for a stock and dies, and at once, while the taps were quite new, made myself a plate of steel—afterwards hardened—as a standard. It had not been in use long before I found fault with the fit of the screws in their sockets, particularly when there was a considerable amount of thread in the nut. A careful examination of the stock and tap revealed a very appreciable difference in the pitch of the thread. Perfect screw-cutting apparatus, if it exist, is quite inaccessible to the average manufacturer. With the tools that are within his reach, the approximate perfection attained by a good workman is, to say the least, remarkable.

Mr. Harrison suggests that some arrangement should be made for instantly fixing the camera on the stand-head, and Mr. Pringle falls into the same error. A moment's reflection would have told them that a certain amount of rotation is absolutely necessary, and by general consent the central thumb-screw has been adopted as a simple, inexpensive, and wonderfully-efficient way of securing both rotation and firmness and security. The hole in the thumb-screw, for a string to tie a weight on, is "as old as the hills," and not a very good idea either, as it entails that very fumbling at a hole to which every one objects; and, in the very few cases where a weight is required, the end is far more easily obtained by making a slip-loop of the bight of the string and passing it over the screw-head on to the shank of the screw.

Mr. Harrison complains that the dark slides are too heavy. Lighter ones with the shutters of cardboard or thin metal to draw completely out have been in the market a long time. I myself have made no others for five or six years, and, moreover, the plates do not rattle about in them, while, still further, they do not slide into the back of the camera at all, but drop into a rebate breaking the light joint all round, so that all these requirements of his have been anticipated. Mr. Pringle condemns them—I can only suppose because he has never tried them. I, who have, would never willingly use a dark slide the shutter of which did not completely pull out; and can assure him that the "gimcrack affairs," as he terms them, are in every respect as thoroughly efficient as the highly-polished, brass-bound gewgaws. No one would dream of carrying dark slides about without some external protection from dust and light. A light cardboard box is amply sufficient if enough space be not provided in the camera case; while, as for being light tight, they can be handled in full sunshine as much as can ever be needed, and with perfect confidence that no harm will come to the plate, and, moreover, I have never had a failure with them which could in any way be traced to the dark slide. I do not think he could say as much for those with the folding shutters that do not draw out.

The level is another point which both Mr. Harrison and Mr. Pringle advocate without having thought it out, and whether in the circular or double form is equally unpractical—if for no other reason than the difficulty of placing it where it can be conveniently seen. A practical man would set himself to work to judge by the eye when his camera (or swing-back) was perpendicular, and, failing in his ability to do this correctly, would take the line of the building he is photographing as a guide, or simply hang his bunch of keys to a string and use it as a plumb bob.

A description of my tourist's camera will be found in THE BRITISH JOURNAL OF PHOTOGRAPHY of 2nd November, 1883, where the Editors do me the honour of remarking:—"We are inclined to believe that in the perfect tourist camera of the future, whenever the advent of that instrument occurs, will necessarily be found some of the features here described." GEORGE SMITH.

NOTES FROM THE NORTH.

"THE King is dead! Long live the King!" It is in the nature of things that the old must give place to the new, and yet it was with saddened feelings—a sadness shared by many old photographers present—that I recently saw the apparatus and appliances of the old and well-known firm of Ross and Pringle brought to the hammer. The firm, originally Ross and Thompson, was founded, I think, in 1847, and had for some time only two competitors in Scotland. It did much good and profitable work in the daguerreotype days, and was one of the first to make practical application of the beautiful—the troublesome—albumen process. At an early period of its history the firm received substantial recognition from royalty in addition to the appointment of photographers to Her Majesty. Mr. Ross's knowledge of art and his ability as an artist, at a time when amongst photographers such knowledge and ability were the exception and not the rule, were recognised far beyond the "three Kingdoms;" and his productions were largely, and often without his sanction, appropriated by many of the illustrated periodicals.

I visited the premises recently occupied by Messrs. Ross and Pringle a few days ago, and was much struck with the alterations the new lessee, Mr. Crooke, in accordance with his ideas of the exigencies of modern trade, has made. The spacious reception-rooms have been got up in the highest style of the decorator's art. The old studio, large enough for the work of earlier days, has been removed and one measuring about forty-five feet by fourteen feet erected in its stead, and furnished with a complete system of opaque and translucent blinds, on frames so arranged as to admit of any kind of lighting that artistic taste can suggest. Winter cold will be ameliorated by a perfect system of hot-water pipes, and summer heat rendered bearable by a satisfactory system of ventilation, under complete control by the operation of a single lever.

Mr. Crooke has shown a laudable desire for the comfort of his operators in constructing a dark room of about twenty by sixteen feet, with a window nearly five by three and a-half feet. On entering this room I was particularly struck with the bright, cheerful light that illuminated every corner; and my first idea was that it was intended for the sensitising of paper or filling frames. It was noon of a bright sunny day, *the window faced the south*, and was covered with two thicknesses of "canary medium;" and on no conceivable testimony short of actual ocular demonstration would I have believed that even a moderately-sensitive gelatino-bromide plate could have been developed without fog at a distance of only the breadth of the sink from the window. But I saw it done, and that, too, on a very rapid plate, and therefore mean in future to have faith in canary medium. Of course I hardly expect all my readers to believe what I most certainly doubted myself, and therefore have pleasure in saying that anyone who may be passing through Edinburgh should call on Mr. Crooke, who will be glad to let them see what he showed me.

By-the-bye, I wonder who makes the canary medium? There is room for improvement in the kind of paper employed. All that I have seen is of an irregular, mottled, or cloudy texture; and, as its power as a non-actinic medium is only equal to its most transparent parts, a paper of even texture would give still more light with the same protection. I have a strong belief that anyone who will lay aside prejudice and give the medium a fair trial will at once adopt it, and so a demand will be created that shall warrant the manufacture of a quality even better suited for photography. I should think a well-made paper of about 20 lbs. demy would answer admirably.

The Forestry Exhibition, after having been open some time, is now in a very complete state, and contains much that is specially interesting to photographers. I had hoped to be able to invite intending visitors to bring their cameras with them; but an application to the Secretary some time before the opening revealed the fact that Mr. Moffatt, with his usual zeal in the commercial aspect of his profession, had secured the exclusive right to photograph in the grounds and buildings, and, judging from the work he has already accomplished, it will turn out a successful speculation. In addition to a considerable amount of portrait work in an admirably-equipped studio, he already shows a large collection of excellent 12 x 10 pictures of the most interesting exhibits.

It seems strange that more of our local photographers have not taken advantage of the rare opportunity for advertising themselves that is afforded both outside and inside the grounds. The only advertisement outside is that of Messrs. A. and G. Taylor, who content themselves with a modest poster; and inside Mr. Marshall Wane stands alone, although a host in himself, with an elegantly fitted-up case, containing specimens in his best style, both in silver and carbon. Mr. Magnus Jackson, of Perth, who styles himself "Photographer to the Scottish Arboricultural Society," shows, in the court in which that Society's exhibits are placed, a large and fine collection of photographs of most of the celebrated trees in the country, and nearly all of these bear unmistakable evidence that he is not only a good photographer but an able artist.

Photography, as was to be expected, plays an important part in the exhibition, most of the countries having supplemented their actual exhibits by photographs, showing, better than any printed description could do, the various methods of cutting and transporting trees, wood-working machinery, &c. British Guiana is, perhaps, the largest exhibitor in this way, followed closely by Japan; but I was sorry to notice a large number of the prints exhibited by the latter getting into the "sere and yellow" stage.

Taking it all in all, photographers have no reason to feel ashamed of their connection with the exhibition, and I have no hesitation in saying that, both in point of quantity and quality, there is in photography alone sufficient material for spending a profitable day.

The explosion of a gas-bag in Drury-lane Theatre has done good in so far as it has elicited an interesting discussion on the question of lime light generally; but why there should have been a gas-bag there at all passes my comprehension. Scotchmen, as a rule, are slow to admit that, except in the trifling matter of climate, they are in anything behind any other country, but we know that England has bigger and better theatres, and especially more elaborate and perfect arrangements for scenic display; and yet it is a poor theatre indeed on this side of the border that has not long since discarded gas-bags in favour of the more convenient, more economical, and in every sense more perfect, arrangement of gas-tanks. Some dozen years ago—the exact date I cannot find, as I have not at present access to my file of the Journal—I published a description of a set of tanks that were then fitted up in our west-end theatre. I had subsequently an opportunity of watching the nightly working of a similar pair during a long run of a pantomime that drew upon their resources to the utmost extent, during which time from twenty to fifty burners were worked without a single hitch. Those were made after the pattern of a set in an English theatre, and until the Drury-lane disaster I had fondly believed that the inconvenient, expensive, and in unskilled hands dangerous, bags had long been relegated to itinerant exhibitors. That they will, by-and-by, be altogether things of the past I have not a doubt; but it will not be till English makers discard the heavy masses of iron of which their gas-bottle at present consists, and adopt the large, light, and at the same time sufficiently-strong, cylinder so generally used in America.

John Nicol, Ph.D.

PHOTOGRAPHY IN BELGIUM.

[From Our Special Correspondent.]

Brussels, September 1, 1884.

As regards the facilities given by the Belgian government for popular education in photography, and for original experimental research by photographic experts, M. Léonce Rommelaere informs me that the use of the chemical laboratory in the Industrial Museum at Brussels is open to foreigners as well as to Belgian subjects, under precisely the same conditions to both. Supposing, however, that a foreign photographer wished to make use of the costly microscope, or the superb spectroscope with its train of six Iceland spar prisms for photographing the ultra-violet rays, or other exceptional apparatus, the authorities would necessarily only permit the use of these to foreign experimentalists with whom they had some kind of acquaintance. These instruments are not in the chemical laboratory, but in a room below. Where can an English photographer apply in London to obtain similar facilities from the government? Considering the number of skilled scientific photographers in England, there is no doubt that such facilities would do much to promote photography as a science. There is also no doubt that those who contribute the funds by which public scientific establishments are upheld have the right, in most cases, of participating directly instead of indirectly in their use; this is done in Belgium and some other free European countries.

M. Rommelaere, as stated in my last, accompanied me over the rooms of the department for the free teaching of engineering and mechanical drawing. He, however, is not the professor who gives education in these two subjects. In my last, I too hastily jumped to the conclusion that it was himself. He teaches chemistry, physics, and photography.

Last Sunday the national demonstration to request King Leopold not to sign the new school law took place. Antwerp alone ran fifteen special trains to carry processionists to Brussels; and from other towns, large and small, vast numbers of persons came. I watched the procession for half-an-hour crossing the Rue Royale, and then I went elsewhere; when I returned to the same spot two hours later the end of the procession had but just reached it. The clerical party holds a counter demonstration next Sunday; their followers live chiefly in the rural districts. One of their official circulars tells their followers that whoever does not come will be disowned by his superiors and friends; another tells them that their railway fares will be paid. One of the newspapers says that dinners will also be provided for them.

A statement has been published in England that little in the way of good landscape photography is to be seen in the shop windows of Brussels. After my prolonged stay here I do not remember to have seen a single photograph, good or bad, of a Belgian landscape. There are plenty of architectural photographs—some good, the majority of indifferent quality, and all, or nearly all, of them without natural clouds. The new Palace of Justice in Brussels is one of the finest modern buildings in the world. Many persons here believe that there is no modern building anywhere to equal it. Probably they may be right. Other modern buildings may have cost more money, but I have never seen one which impressed me more with a sense of magnificence of architectural effect. This is stated only with respect to modern secular buildings; it is not possible to draw a comparison between a building of this kind and the cathedral, for instance, of Rheims, or Chartres, or Milan. The new Palace of Justice in London is as nothing for architectural effect when compared with that of Brussels. The photographs of the latter, so far as I have seen them, fail to do it justice. Most of them spoil it by the use of wide-angle lenses. Some of the photographs of it are not sharp all over, none that I have seen give it with natural clouds above, and probably the work yet remains for some one to execute with efficiency. The tones of the architectural photographs in Brussels are not usually rich ones. There is room for general improvement in architectural photography, and at present the field of local landscape photography seems to be wholly unworked.

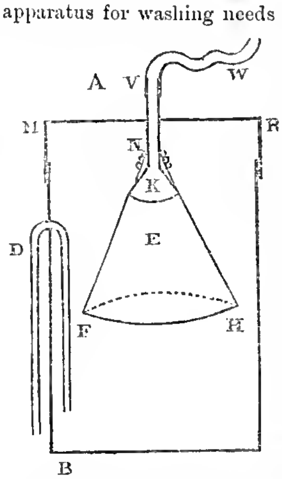
As for photographic portraiture in Brussels it is excellent. The proportion of good to bad portraits on public view in the city is, I think, larger than in most towns.

English photographic apparatus, lenses, and bromo-gelatine plates are largely used at Brussels, and well spoken of by those who employ them. It is evident that some manufacturers of these things have found a good and friendly market in Belgium.

Brussels is the nearest foreign city to London in which a strong photographic society is established, and in which various branches of photography are utilised in Government departments on the spot. The large city of Antwerp contains no photographic society, but Brussels is reached from it in one hour. If an International Congress of Photographers could be inaugurated, Antwerp, in May next year, would be the place and time for it, since the Antwerp International Exhibition will then be opened. The International Congress on Photographic Standards is to be held there in May, but this is limited in its work by its title and otherwise.

Messrs. Géruzet Brothers at Brussels, photographers to the Queen of the Belgians, have been established for thirty years. The business was founded by their father. For many years past Messrs. Géruzet have not turned out a photograph liable to fade, all their printing, even the smallest, being done by the carbon process.

Messrs. Albert and Alfred Géruzet make their own emulsion, and their apparatus for washing needs but to be attached to a tap which allows



running water to pass, and the emulsion is washed in the dark without need of further attention. The washing vessel is a cylindrical one of zinc, A B, about two feet high by sixteen inches in diameter. M R is the lid, partly let down into its place; a zinc pipe, K V, is soldered into the lid, and expands at the end K into a perforated rose-discharger for water. The bag E, containing the emulsion, is tied by its neck round this pipe at N; the bottom of the bag is distended by means of a ring of silver wire, F H, inside. The syphon, D, soldered into the side of the vessel, has its longest leg outside. The action of this is obvious. The whole apparatus is connected with the water tap by means of the caoutchouc tube W. The water washes the emulsion and is changed every time it rises above the level D, since the syphon then automatically discharges it; the vessel now fills again, is again emptied, and so on, without any attention from the operator.

The first time I entered the studio of Messrs. Géruzet a surprise awaited me. I found Mr. Albert photographing a row of human bodies with no heads. With a second glance the excitement subsided for the projecting feet of the corpses were of wood, and each had three; the ghastly sitters, or standers rather, were evidently dummies. The President of the Belgian Association of Photographers having previously told me that Géruzet Brothers were among the cleverest photographers in Brussels, it then struck me that they had hit upon the plan of photographing elegantly-dressed bodies, and afterwards putting heads of sitters upon them by double printing, so that a poor person who could not afford a rich costume, or stand steadily in unaccustomed splendour, could be furnished with a special body and dress to order at one fell stroke. This, however, was not the true explanation. A fashionable draper had sent his new costumes to be photographed, dummies and all. Two hours later I met all these headless bodies in the street with white sheets over them, as the assistants were carrying them back to the shop of their owner. The uncanny procession would have made a good photograph.

When coating very large plates with collodion Messrs. Géruzet use no holders, but rest the middle of the plate upon a kind of tall, substantial, wooden mushroom fixed in the middle of the sink. By means of this central rest the hand which holds the plate at one corner can easily tilt it in any direction. As the top of the "mushroom" is liable sometimes to get splashed, the plate is not allowed to rest directly upon it. A strip of thick, clean gutta-percha, kept for this purpose only, is placed temporarily between the rest and the plate; because of this protection, the plate is not liable to carry dirt from the rest to the silver bath.

Messrs. Géruzet are the inventors of an electrical machine for retouching, which has, I believe, already been publicly noticed in England. From external appearance it might be thought to be made on the principle of the Edison electrical pen, but examination proves it to be upon another principle altogether. A small electro-magnet sets its armature into high-speed vibration by means of the usual make-and-break contact; thus a tremor is given to the several ounces of metal forming the electro-magnet and armature. This tremor is softened by passage along a spiral wire so closely wound as to form a kind of short flexible tube, the other end of which tube carries the metallic holder of the pencil. Thus the pencil is in a state of incessant tremor, and does its own stippling. I tried the apparatus on a negative, and would much rather use it than peck or scratch away at the negative by hand. The metal work just described is, of course, heavy; but this difficulty is overcome by mounting it on a counterbalancing arrangement.

In Messrs. Géruzet's largest copying work the interior of a dark room is used as a copying camera; the negative is outside, and the light from the zenith is sent through it by a mirror at an angle of forty-five degrees. No cap is used to the lens, but a sheet of yellow glass, the light through which is sometimes useful. On the wet collodion plates of the size in use during my visit the time of exposure in enlarging was twenty minutes.

The operations of carbon printing being carried on at the top of the premises, with a developing-room abounding in steam and warm water, the floor of the developing-room is of sheet lead to protect the ceilings below. The workmen wear French wooden *sabots* to save their boots in this constantly-sloppy region—a plan which may be worth consideration upon the other side of the Channel.

In carbon printing, Messrs. Géruzet perform the development on sheets of opal glass, and on the same sheet develope pictures from negatives of slightly varying degrees of intensity. They bring the pictures all up alike in the long run. If one refuses to come up like its neighbours, even after the application of warmer water, they add some ammonia to the water, and thus produce the desired result. It is best to develope slowly at a moderate temperature, and then to deal separately with any obstinate case.

Messrs. Géruzet are just trying a new style of portrait, in which the sitters appear with real landscapes in the background, so as to get rid of the unnatural look of most of those which are artificial. They are at present engaged in perfecting their system, but they showed me a portrait of the Countess of Flanders walking through a wooded path. The effect was most natural, and left nothing to be desired. A compound negative is first made, from which any number of subsequent copies can be produced. A difficulty is, that at first the human forms appear to be floating in the air, like figures of living things stuck upon a screen; their feet have to be fixed upon the ground by skilful retouching.

Messrs. Géruzet have some large medallions in relief, upon copper; they are some sixeen inches square, and exquisite specimens of artistic work, produced by a gelatine relief and photo-galvanic process. This process is the property of a Parisian firm, and only last week Messrs. Géruzet bought the exclusive right to use it in Brussels. The copies from the negatives are made in Paris.

ON THEORISING.

There exists among some people an unfortunate proneness to unduly expatiate on infinitesimal portions of detail, to make all sorts of chemical and mechanical experiments, and then to favour the perspiring portion of humanity with a minute registration of how the unexpected did not happen or how certain inadvertencies did not produce the anticipated failures. Now, those of us who have neither time nor inclination to manipulate with the dark-room door ajar just to see what it will do, nor to keep our developers like our wine, and then "try a plate," will naturally ask what these operations have to do with art. Our concern is to stamp the imprint of genius upon the best materials the market supplies. If we are fortunate enough to discover we have no genius then there is no obvious necessity to publish the evidences of our destitution!

The painter does not discourse on the particular excellence of a special make of colours; he does not wax eloquent on the effects he produces by certain combinations of these colours; neither does he read a paper on the merits of red or brown sable. He appeals to us by his method of utilising the appliances at his command, and by the effect which his conception produces on our minds do we pronounce him a skilful man. Being neither a colour nor a brush maker he does not stoop to those mechanical details concerning the tools of his art. His part is simply to shape his means to an artistic ending. In like manner the photographer, not being a plate or paper maker, has quite enough before him in his short life if he can imprint an artistic individuality upon each one of his productions. If he cannot do this—if his skill be not sufficient to become marked in his pictures—he is simply a manipulator of chemicals—a mediocrity, or one who has mistaken his vocation.

It may be urged that the photographer is more dependent on his materials than the painter; that certain brands do not produce in his hands the inception of his brain. The remedy is obvious; and it will be sufficient for him if he discard this evil in his day and leave to the authors of his mischief the task of fighting it out amongst themselves. The excellence which should be the aim of every photographer cannot resolve itself into a modification of any existing formula. It will not depend on diaphragms being denoted by one set of numbers or another. It is not an end which can be attained by spring shutters or drop shutters. A plate may register 5 or 50 on the sensitometer, and the technical nicety may be highly appreciated; but it will certainly not in any way conduce to the production of a work of art.

Argan in the "Hypochondriac" is in tribulation, because he has forgotten how many grains of salt he should eat with an egg, and whether in taking exercise in his chamber his doctor meant him to walk the length or the breadth of the room for a certain number of times. But it is not matter for much speculation how far this minute attention to detail will affect his general health, any more than it would concern the painter to know if the hairs in his brushes were to be computed by the odd or by the even numbers. His mind soars above such atoms of knowledge; his concern is with the production of the beautiful, which cannot die.

"Of course," asks the physician of the "Hypochondriac"—"Purgon has ordered you nothing but roast?" "Indeed, no," replies the unfortunate man, "I am to have all my joints boiled." "Just so; boiled or roast, roast or boiled, it is all the same thing, and you could not be in better hands!" Follow this thought; and so that the result be a work of art, what matters (not being plate-makers) if the particular emulsion was boiled or baked. Our concern is with the picture, not with the technicalities or the theories of the tradespeople who supplied the materials used in the production of the picture. The brains of the artist seek higher contemplation than the poring over of so much humdrum detail; and as we should scarcely attempt the composition of an epic poem amid the din of a boiler shop, so we should not seek the ideal of beauty by an elaborate computation of the number of grains of chemicals used in bringing our mental conception to view.

Mahlstick.

SOME REMARKS SUPPLEMENTARY TO THE DIRECTIONS FOR THE USE OF HUSNIK'S PHOTOGRAPHIC TRANSFER PAPER.*

All the manipulations have now been described to which Husnik's photographic transfer paper should be subjected in order to be able to use it with ease and certainty; but there are some small establishments where reproductions are made which do not possess a really good satin press, so I thought it might be useful if I were to explain how the tissue might be rendered literally as smooth as a sheet of glass, without being burnished.

This operation consists merely in allowing the sensitised tissue to dry upon a sheet of plate glass rubbed with tallow, and then drawing it off when dry. The surface of the tissue then takes on the polish of the glass, and furnishes finer results than can be secured by any other method; indeed, even the asphalte process itself cannot compare with it, owing to the always imperfect contact of the zinc plate with the negative. This mode of treating tissues is certainly known already, but it has hitherto usually been used only for gelatine tissues developed by roller—a very difficult operation.

Here a sponge may also be used for developing, but it is well to commence the development by first removing the superfluous colour with a velvet pad, and not to begin to develope with the sponge until the white lights are already clean.

Detailed Description of this Operation.

Rub with beef tallow a clean sheet of plate glass a little larger than the sheet of tissue to be glazed, sprinkle the plate with stone alum, and then rub all off again with *papier Joseph*. Now pour the chrome bath into a clean dish, and lay the glass plate in the solution.

Next moisten the prepared sheet as usual, and after a minute or so lay it gelatine side downwards (in order to guard against air-bubbles), and then raise it to the perpendicular along with the sheet of plate glass. Having allowed the moisture to drain off for a minute or two, lay the glass, tissue bearing side uppermost, upon a table previously covered with blotting-paper; put a couple of sheets of blotting-paper above the tissue, and then a sheet of common paper above that again. Now press out all the moisture with a squeegee, beginning at the middle and pressing towards the edges. Then dry the back of the tissue as well as possible with blotting-paper, and set up the glass and tissue in the dark to dry.

Next day the tissue will be dry and may easily be stripped off, when it will retain the polish of the glass and the *dimensions of the tissue when wet*. This last is a very important matter when things have to be copied so as to retain a certain size. It is universally known that paper expands, when wet, only in one direction; and, as the tissue is exposed in a dry state but transferred in the wet condition, it is evident

* Concluded from page 490.

that all pictures must be larger in one direction than the negative from which they were printed. It is further evident that this distortion must always occur in the direction in which the paper expands when wet. This mirror-smooth paper having been fixed to the glass while wet, and having remained so until it became dry, has retained almost exactly the dimensions of the wet paper, and, therefore, will not expand any more when again laid in water.

After exposure the prepared paper should be blackened, by means of a velvet roller, with common transfer colour containing eight parts of wax, or with Husnik's transfer colour. The colour should be thinned with a little oil of rectified turpentine. The print having been laid upon a level plate (a zinc plate), one side being tucked under in order to afford a better hold, the upper surface is rolled very lightly with the colour, so that the drawing shines through. The colour should not be spread by means of cotton wool in this case, as, owing to the mirror-like smoothness of the upper surface, the colour would never be equally distributed.

After a lapse of ten minutes place the print in water and develope in half-an-hour—first with a pad covered with velvet, and afterwards with a sponge. The further manipulation is the same as that already described. J. Husnik.

—*Notizen.*

WHERE TO GO WITH THE CAMERA.

[It is hoped that this series of articles will be continued at regular and frequent intervals during the vacation months, and we shall be glad to receive contributions to the series from any friends able to treat of new and interesting ground.]

THE ENVIRONS OF CHELTENHAM.

With this charming town as headquarters, and where accommodation of every kind is available, I purpose acting as a *cicerone* to the photographer eager for good ground to pitch his camera on, promising him, to start with, endless *matériel* of the loveliest kind.

Cheltenham itself — with its fine transformation - scene - looking promenade, its Lansdowne and Pittville—is already so well known that nothing is left to be told but what has already been fully and ably described. Still, it may be said that a good few plates might pleasurably be used in the rendering of some of the pet parts of the town proper. Topographically speaking, westward of Cheltenham lies the Vale of Gloucester, while stretches of the Cotswold form some sort of crude crescent round the town. Now, it is precisely on and about these hills that the bulk of the views, scenes, &c., to which I am about to refer are met.

On starting eastwise—which may be as good a way as any—by the Prestbury Road, the pretty village of Prestbury is reached, and here the first halt may well be made. The church, *sui generis*, is good, and the surrounding locality excellent. One might easily contrive to occupy one's time with the camera until the carrier passes in the afternoon, and, having secured a seat, proceed to the "Rising Sun," which is some couple of miles further. Part of the way is through a delightful country under the beneficent shade of a wood formed of fine tall trees. If it be thought desirable to secure these it is needless to think of the carrier, but simply wend one's way thither, and on *via* Southam, where some good farmhouses and quaint barns are to be met.

Shortly after leaving Southam the ascent up to the "Rising Sun" begins. Once at this inn one may profitably put up, for the district immediately round is very good. Situated on what is called "Cleeve Hill," the tourist meets with rugged "bits," panoramic views, and pretty lanes going down the village of Cleeve, which lies some distance off in the valley, and where good things are likewise to be secured. This district exhausted, one may proceed three miles further, to the little town of Winchcombe, close to which is Sudeley Castle. Putting up for the night would be advisable in Winchcombe, and the next morning you would find "food" in sufficiency for the camera. It is needless to say that all information respecting Sudeley Castle will be easily obtained in the locality.

Photographic operations over in and about Winchcombe, you can return by omnibus to Cheltenham, whence, after another night's rest, a start may now be made for the Old Reservoir, *via* Battledown, and then on to Agg's Hill, with a delightful road all the way from Battledown right to the top of the hill, where very fine views are offered to the gaze. Here a vast extent of country lies before the tourist. The Vale of Gloucester, Gloucester itself in the distance, and right down to the Bristol Channel may be seen on a clear day. From this plateau (on Agg's Hill) I, about a month ago, saw Cheltenham bathed in an Italian atmosphere, looking as fine as anything I ever saw—the houses beaming in soft, golden tones in the midst of the finest conceivable aërial atmosphere. The effect was simply splendid, and I would have wished it to remain so for ever. By the way, how lovely the colouring and atmosphere have been this summer! It reminded me more of the rich bloom I saw throughout the Scotch atmosphere in the vicinity of Ben Venue and Ben Lomond than anything else. How very unfortunate it is that the perfections of atmosphere are denied to photography! How pale and insignificant—how very tame—is photographic atmospheric rendering! How very often, too, what was so charming about the distance is seen to flash out and instantly disappear under the action of the developer to the plate! But to return to Agg's Hill: though much of the beauty of the views thence must perforce be lost to the photographer, still there is much that may be done and that well deserves attention. Next to this, on the higher road parallel to Battledown proper, the camera will find a considerable amount of occupation. The evening or early morning time would be best for it, even though exposure should have to be increased. To make up for this, vast shadows will then cover the ground. Untold depth and richness, with sparkling peeps through the foliage, amply repay additional length of exposure.

There is a village close by where I have spent most pleasant hours busily limning pictures; that is, Charlton and its suburb, Spring-Bottom, the latter of which furnished Mr. Baynham Jones with one of his most felicitous pictures, *Spring-Bottom Bridge*. Mr. G. S. Penny, likewise, did excellent work in this identical village, and still left ample room for others to follow. On strolling along it is amazing the number of things pictorial one meets, and the variety offered in this one village alone. Then through Charlton passes an offshoot of the ubiquitous London road, following which one comes on the site of the New Reservoir, half-a-mile further than which, looking back towards Cheltenham, is seen one of the finest stretches, or fragments, of the Cotswold I know of. It offers magnitude, variety, and great beauty, and is especially fine as the afternoon is wearing off; but then the sun being about dead against one, reproduction by photographic means has of necessity to take place earlier in the day. This individual spot is some four miles and a-half from the town clock.

If wishful for a really-fine mill, and distance be no object (four and a-half miles further), I would advise proceeding as far as Andoversford, now accessible by rail; and, close to the mill, the waters which feed it are nice, and, with their surroundings, will keep the tourist busy for some time. The spring about here, with its grassy bank and umbrage, is delightful during an afternoon, and forms excellent ground for a picnic party.

Till this time progress has been from due east on to the south, and between these points still lies a spot usually resorted to by visitors to Cheltenham—that is, the Seven Springs. With this place, however, I was much disappointed when I went, but much liked parts of the road going there, as one passes wild scenery much to my taste. Next to the Seven Springs, southwards, comes Leckhampton. On and about this hill an entire day may well be spent; and there will be no lack of variety either, the hill-side being here wild and rugged, then covered with firs, every now and then reminding one of fragments of Switzerland. I would advise beginning early in the morning at the foot of the hill. I have seen this individual part absolutely charming under a semi-haze, the villas and cottages coming out softly against the hill, and masses of trees hurling down rich shadows, thereby giving both variety and relief to the scene. A little higher up, if one suddenly turns a semicircle so as to face the road from Cheltenham, we again get a delightful view composed of the villas and houses with their surroundings, and an excellent picture may be secured.

Next, one might plunge into the wood and, peeping out from between the trees, take the foreshortenings of the hill side, the varied vistas, the clusters of trees resting on the undulating ground. As you wander about you are sure to come upon Leckhampton, its church and village. They are enticing, and well worth spending a few plates on. If not objecting to a little climbing, you might now take the road leading to the top of the hill and, looking to the right as you ascend, watch the magnificent view of the valley, out of which, twenty miles off, the Malvern hills are seen to rise; while more immediately close to you the ground, with its varied slopes, is most attractive and replete with pictorial materials. Then to the left, as you pass, you come on seemingly a wild superstructure of stones detached from the quarried side. This natural geological freak is called "The Devil's Chimney," and is notorious to all under that cognomen, innocent as it is of any connection with the evil spirit. Just before reaching the *plateau*, look at the fine hill side to your right, and the artistically-situated house called by some "the Folly." Pause here and, while gazing on the fine view, hark to the lowing of the cattle, the bleating of the sheep, the bluster of the bantams—is it not all truly delightful? And how replete with truly artistic material of every kind! But the *plateau* or hill top is now at hand. Pack up the camera and simply feed on the invigorating air and vast horizon. The dwellings of men seem small from here; horses and cattle are but specks, and men themselves are scarcely visible. Yet it is but a poor elevation compared with the titanic heights of India. Roam about the *plateau*, following the capricious indentations of the bluff, and quietly admire the vastness and loveliness of nature in this fine panorama.

Having refreshed yourself with another night's rest at your Cheltenham headquarters, the dark slides once more replenished, and partaken of a substantial breakfast, another spot now awaits your skill and energy. This spot, being six miles off, is probably best reached with a conveyance, the coachman of which will not be sorry on finding it to be Birdlip, though it is up hill a good part of the way. The first portion of the road will be your old friend of the previous day—the ascent up Leckhampton hill. Once close to "the Folly," however, you will branch off to the right toward's Cooper's Hill, a nice view of which is got as you walk while the vehicle is making its way up the incline. By the time you have "taken stock" of Cooper's Hill, from this favourable vantage ground, the conveyance is ready awaiting your convenience to resume your seat; and now whip away right to the village of Birdlip, the approaches to which, by the road just followed, give but little indication of the scenery in store for you.

It may be that a glass of milk and a biscuit or two would here prove acceptable, unless, having made a scanty meal early in the morning, you feel more ready for a *déjeuner à la fourchette;* if so, the means to indulge such desire are at hand. Whichever you elect, the Birdlip woods next await you. As you enter these by the village entrance, some fifty yards ahead, a vast clearing is manifest. As you open out upon it, looking to the left, I think you will admit the headland is well worth depicting; but resort should be had to a long-focus lens, otherwise the lines will be so depressed as to deprive the view of its character and consequent charm. The same kind of lens is advisable for the fine wooded promontory or hill to the left, ending about the little lake, which is, I think, the reservoir that supplies the city of Gloucester with water. Practically you may now think yourself in the heart of charming sylvan scenery; but one has to pick and choose, for some of it is but poor stuff—tall, slender trees, and a great deal of inferior beeches. If, however, you are a good walker, pass right through the more immediate rubbish and you will meet with much better and more picturesque timber. The thing is to get to the very heart of the wood, and on what I have termed the "promontory." It will not take long ere you perceive that there is much to do in this locality, and that valuable studies are here to be obtained in plenty. In parts, too, will be found splendid foreground material—burdock, thistle, in fact all that the painter seeks to enrich the foreground of his pictures with. There are many spots where this foreground material comes in appropriately along with pictures otherwise complete in these woods. If provided with a good field-glass so much the better, as you will be able more fully to enjoy your trip or stay, should you elect to stop for some days in Birdlip. The only difficulty in the way at times is to find sleeping accommodation, as the place gets very full in the season.

This spot exhausted, there is Painswick, three miles further on; and here again the country is very fine—replete, in fact, with good pictorial *matériel.* When ready to return to headquarters, I would strongly advise returning by the lower road, which skirts the wood, and through Shurdington, where again the camera might be brought into requisition, and finally back to Cheltenham. This individual drive, morning or evening, is very fine; and, if in the evening, glorious effects of sunset may at times be seen, sending a rich gloss through the foliage below, and, also, when on the open covering and the distant Malvern Hills, with an exquisite mantle of purple, while the golden-fringed clouds reflect the rich lustre of the setting sun. At these times the harmony pervading sky and landscape is pleasing to a degree. The colouring is now dramatic, then soft in the extreme, perhaps horizontal strata top the horizon, or portentous masses of cumulus cast long, impressive shadows over space and ground, offering a grand contrast to the rich, metallic light of the declining orb, as this light diffuses itself through the "peerable" space, and here and there in gaps in the landscape, lending a wondrous charm and mystery to the scene. The sound of a church bell in the valley at this hour is apt to remind one of the *angelus*, still common in some countries; and almost unconsciously the mind may be led to dwell on with a feeling of respect and gratitude, while absently gazing on the sublime scene.

Half-an-hour or so later finds you again in Cheltenham, with the whole valley abaft still unexplored; with Gloucester only a-quarter of an hour's distance by either Great Western or Midland—Gloucester, with its fine cathedral and grand, massive columns and fine tower; Gloucester, with some of the quaintest and narrowest streets of any I have seen, including those of old Paris—of the Paris of forty years ago. Then, in Gloucester docks, occasionally good shipping is seen, and groups of crafts of a picturesque character, such as have happily been depicted in his leisure hours by Mr. Penny. Finally: the upper end of the valley about Cheltenham is replete with pretty roads and lanes far too numerous to be enumerated here, and villages such as Swindon, &c., &c. In fact, endless *matériel* still abound in the immediate vicinity for an earnest toiler and genuine lover of nature.

A. F. GENLAIN.

FOREIGN NOTES AND NEWS.

HERR ANDERS' PRUSSIATE OF POTASH "BLUE" INTENSIFIER.—PROFESSOR VOGEL'S METHOD OF PURIFYING GELATINE FOR EMULSIONISING.

HERR ANDERS, of Dresden, says in the *Mittheilungen* that, in consequence of the well-known disadvantage of intensification with cyanide of mercury—namely, that the negatives sooner or later become darkened to yellow, and furnish in consequence first very powerful lights and, at last, prints that no longer come up to the desired standard—he has tried another method which also produces coloured negatives; but in this case the colour is blue or violet. This method of intensification is very easily manipulated, and the process has to be carried out by subdued light, as bright daylight decomposes the fluids. Take the negative to be intensified and wash it well after fixing, or the already-dry negative, and rinse it well again; then coat it with the intensifying fluid, or lay it in a bath containing some of the same. A porcelain dish is best, as it allows the progress of the intensification to be watched. The negative is at once converted into a "blue" picture, in which the high lights remain white, while the half-tones shade gradually off into a blue, more or less decided in tint according to the length of time the plate is left in the fluid. The fluid may be made of any desired weakness by dilution with water. It is principally intended for the intensificaton of under-exposed plates, in which it brings out with great distinctness previously invisible details. If it be desired to convert a blue negative into a violet or black one, the object is attained by simply laying the blue negative in a very dilute (1 : 100) solution of ammonia of 0·910, in which the blue negative is in a few minutes converted into a bluish-black, the change of tone beginning almost instantaneously. After being removed the plate must be carefully washed. It is noticeable that we are only told how the intensifier acts, but get no specific information as to what the intensifier is actually composed of, nor its proportions, further than that it is a mixture of red prussiate of potash with a ferrous oxide. It is said that Herr Anders has applied for a patent for this intensifier, presumably in Germany. He sent a "blue" negative to the Berlin Association for the Cultivation of Photography; but it was unaccompanied by a print. If the negative look very promising, perhaps Dr. Vogel will try a print from it and report thereupon.

The latter gentleman writes to the *Mittheilungen* as follows anent a simple and reliable means of purifying gelatine for emulsionising:—

"Pains have been taken, since the use of the emulsion processes became so widespread, to furnish suitable gelatines for them; yet there are still a good many kinds in the market which do not give good results with the cooking process, and still less so by the ammonia process—that is to say, their use is accompanied on the one hand by fog, and on the other by insensitiveness. I have had to contend a great deal with this difficulty, and have had to throw many pounds of gelatine and many more of emulsion away before I found a simple, sure, and reliable method of purifying gelatine. I have now used it for more than a year, and can recommend it for use with gelatines that would otherwise furnish absolutely no usable emulsion at all. The need for such a remedy is best proved by the fact that the Berlin Photographic Society has offered a prize for a good one, which no one has as yet merited. The method is simple:—Soak the doubtful gelatine in water (running water will often do, but distilled water is best), let it stand eight minutes, and then pour off the water. Repeat this seven or eight times, after which the gelatine should be quite clean and may be confidently used for emulsionising. I usually weigh out the quantity of gelatine required for a batch of emulsion, and after subjecting it to the washing process let the water drip and then melt it. I then measure the melted mass, and use one-quarter of it to emulsionise with, and add the other three-quarters after cooking. Very bad gelatine can be worked up best immediately after washing. At anyrate it is not advisable to let it stand long after washing. My experience is that a gelatine of that sort which was used immediately gave a good emulsion, but if left to stand twenty-four hours traces of decomposition had already begun to show. The gelatine tests I published some years ago should convince anyone that the washing process is really effective:—Prepare an ammoniacal silver solution by adding a 1 : 10 silver solution to ammonia until the precipitate formed at first has become redissolved; then mix some of the gelatine to be tested, after swelling it in water and melting it, with an equal quantity of the silver solution, and heat the mixture. If the mixture become brown or even yellow, the gelatine is not to be recommended. Now in every case in which gelatine washed as above described was tested in this manner it proved pure (clean), and with every sample so treated, without exception, a good emulsion was obtained."

RECENT PATENT.

APPLICATION FOR PATENT.

No. 11,803.—"Washing Trough for Photographic Negatives." F. BISHOP.—*Dated August* 30, 1884.

A NEW OR IMPROVED PHOTOGRAPH AND PICTURE STAND.

Communicated by THEODOR MÜNCH, Vienna.

THE stand is intended for the reception of photographs, lithographs, prints, drawings, pictures, or any other flat object, and differs from other similar apparatus principally by enabling the objects to be seen at the same time from different sides.

The photographs, drawings, &c., are placed one behind the other, slantingly or vertically.

In both cases the apparatus consists of a stand and a number of picture-holders or frames. The stand is made of brass, tin, or any other convenient metal, and rests on feet of any angular or any other shape that may be desired, with crosspieces answering to the shape. The picture-holders or frames may also be made of brass, tin, or any other metal, or of hard wood; and each frame may be divided into two or more compartments, each to contain a picture. On each side of the frame knobs or screws are provided, acting as horizontal axles on which the frames hang and turn.

[Certain drawings accompany this specification which we do not reproduce, and the claim is based on the foregoing.]

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
September 9 ..	Bolton Club	The Studio, Chancery-lane.
,, 10 ..	Bury	Temperance Hall.
,, 10 ..	Photographic Club	Anderton's Hotel, Fleet-street.
,, 11 ..	London and Provincial	Masons' Hall, Basinghall-street.
,, 11 ..	Manchester	Manchester Technical School.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society, held on the 28th ult., the chair was occupied by Mr. W. M. Ashman.

A Member showed some gelatine negatives taken about three years since, which, he thought, had become dense with time. No intensifying process had been employed, but the plates were merely developed with alkaline pyro.

Mr. W. E. Debenham said that when it was necessary to look over old collodion negatives he found them very dense. The plates were not originally too intense, but had been of proper printing density at the time they were taken. His practice had been to develope with iron, and intensify with pyro. and silver after fixing.

The Chairman inquired whether the effect noticed was not due to different methods of printing.

Mr. Debenham thought not, and that the strong silver baths in use formerly would give, if anything, more powerful prints than those obtained under the conditions in vogue at the present time.

A Member, with respect to modes of intensifying, said that for many years Blanquart-Evrard, of Lille, employed the method of obtaining intensity by exposing the developed plate, after washing and before fixing, to daylight. Ten minutes sufficed to darken the image sensibly. He would put a query—"Was the change in this case due to an alteration of colour, or to a change in the agglomeration of the molecules forming the image?"

The Chairman had for many years employed the method referred to for obtaining intensity with collodion negatives. He had also, when the plate had been much under-exposed, adopted another method—that of immersion in bichloride of mercury as soon as the developer was well washed out; the plate was then printed from without being fixed.

Mr. J. B. B. Wellington showed a combined changing-box and dark slide. In this arragement each plate was contained in a carrier of tin plate. The top of this carrier had a slot in it which was taken into by a spring catch when the body of the box was drawn out, and on sliding the body back the plate was forced into a fresh position at the back of the others. By this contrivance the length of the back or changing-box was kept within moderate limits, and was not much greater than that of the plate itself.

Mr. F. W. Hart exhibited a flap shutter with pneumatic release. The shutter was furnished with a stop by which the rising of the flap could be limited to a certain height as desired, and so it would act as a sky-shade. There was also an arrangement by which the flap would work up and down instantaneously with one pressure of the pneumatic ball, or it might be kept open as long as desired, and would discend only when the pressure upon the ball was removed.

Mr. A. Haddon, referring to a question that had been put at the previous meeting, showed a piece of silver wire net and the frame upon which it was made. Anyone requiring such an article could manufacture it for himself.

A Member suggested for the purpose intended—that of dividing emulsion—the use of a piece of tinned wire gauze as sold in the shops for putting tea into when making the infusion. The piston employed would then have to be rounded at the end to match the shape of the strainer.

MANCHESTER PHOTOGRAPHIC SOCIETY.

[Our readers may have perceived that the reports of the ordinary meetings of this Society for April and May last have remained in abeyance since those periods. From a conversation we have had with the Hon. Secretary we have been assured by him that the delay in publishing has been caused by the exigencies of business and absence from home. The new session commences on Thursday next, the 11th inst., and the Hon. Secretary anticipates new life being thrown into the meetings during the forthcoming session, having received many assurances from members of interesting communications, &c., &c.—Eds.]

The usual monthly meeting of the above Society was held in the Manchester Technical School, on Thursday, April 10th. Tea was provided in the basement of the building, which was considered to be an improvement from the old tea-room. Mr. John Pollitt, the President, occupied the chair.

The proceedings of the previous meeting were read and confirmed. Mr. W. L. Heaton was elected a member of the Society.

Mr. Edwards read a very interesting paper on the importance of rising-fronts, and exhibited several negatives intended to demonstrate the advantage of rising-fronts instead of swing-backs.

The Chairman said he had given considerable attention to the subject of swing-backs and swing-fronts since the last meeting, and had made a few experiments, one of which he desired to submit to the meeting. He (the Chairman) took a double column of *The Times* newspaper and pasted the printed matter on a sheet of stout cardboard. These represented about twenty-four inches in length. On the margins of the printed matter he had marked off every inch from the top to the bottom, and that eighteen inches from the top, and therefore six inches from the bottom, he drew a thick black line across the printed matter so as to be easily distinguishable. He then fixed this against a wall with the camera and lens in front, at such a distance that the twenty-four inches of printed matter exactly filled the focussing-screen. He now elevated the columns to such a height that the eighteen-inch black line from the top was level with the axis of the lens and camera. Thus in this position it was obvious that either the front must be raised or the camera tilted to get the top of the columns on the place. Therefore, in the first place, he raised the front and exposed a plate, and afterwards brought the lens central with the plate and tilted the camera, using the swing-back to bring the plate perpendicular, at the same time keeping the camera or plate the original height from the ground. Another plate was exposed in this manner, and prints from these negatives submitted to the members. The one for which the front only had been raised was sharp and readable in every portion, whilst the one taken with the tilted camera and swing-back was with difficulty readable at the top and bottom of the columns.

Mr. Rishton, Mr. S. D. McKellen, and the Hon. Secretary expressed various opinions on the subject.

Mr. John Warburton exhibited a non-actinic portable lamp intended to be used by tourists when away from home.

The Hon. Secretary said that, for changing plates when away from home, he never used anything more than a piece of yellow paper folded in the form of a tube and secured by two pins, which he placed over an ordinary candle.

Mr. Allen Garnett said he had successfully used the yellow cover of a *Bradshaw's Railway Guide* to protect the actinic rays of an ordinary candle.

The meeting was then adjourned.

The last monthly meeting of the session was held in the Manchester Technical School, on Thursday, May 8th,—Mr. John Pollitt, President, in the chair. The minutes of the previous meeting were read and confirmed.

The Chairman said that being the last meeting of the session he felt bound to draw the attention of the members to a very important subject, and to him not a very pleasant one. The fact was there were a considerable number of subscriptions in arrear—more than one-third of the members having hitherto failed to give the matter that attention which he desired they would now speedily give.

The Hon. Secretary read out a list of outdoor meetings which had been arranged.

Mr. John Schofield exhibited his photographic apparatus, consisting of camera and dark slide, and box for carrying same. The camera was of the ordinary form. The dark slide was similar in construction to a wet slide, but deep enough to hold eighteen plates at a time, which were separated by sheets of opaque paper. The box for carrying the camera and slide also answered for a changing-box, and, being provided with an opaque calico sleeve, he (Mr. Schofield) demonstratod the ease with which he could change the plates in his dark slides. He said he had used the apparatus for some considerable time most successfully.

The Chairman opened the subject of new rooms, and the ideas entertained by the Literary and Philosophical Society, for discussion, in which Mr. Rainor, Mr. Brothers, the Hon. Secretary, and others joined.

Mr. A. Brothers exhibited some photomicrographs taken on half-plates by the aid of the electric light, which had been placed at his service at Owens College.

Outdoor Meetings.—These commenced May 31st, with a visit to Liverpool; June 14th, Gawsworth; June 21st, Miller's Dale; July 3rd, Chester; July 12th, Matlock; July 26th, Speke Hall; August 2nd, Bettws-y-Coed; August 13th, Kirkstall Abbey; August 16th, Middlewood; August 23rd, Bollin Valley.—The last outdoor meeting will take place tomorrow (Saturday), the 6th inst., to Chelford.

The next ordinary meeting will be held at the Manchester Technical School, on Thursday next, the 11th inst. Tea at 6.30. There is every prospect of an interesting meeting.

Correspondence.

"EDWARDS'S MACHINE FOR COATING PLATES."

To the Editors.

Gentlemen,—Your correspondent, Mr. S. Fry, seems somewhat troubled in his mind with regard to the novelty of my patent machine for coating plates, to which he takes exception on the ground that certain parts of the machinery are already in use for other manufacturing purposes, a long string of which he enumerates.

Mr. Fry has evidently quite misunderstood the nature and object of my invention, which is not adapted or intended for the manufacture of "floor cloths," "medical plasters," or other purposes named by Mr. Fry. The machine is simply designed to facilitate the manufacture of perfectly-coated plates in large quantities, and to obviate the well-known defects which have been found so detrimental in plates coated by any of the appliances hitherto used for the purpose.

I feel sure that a little further consideration will enable Mr. Fry to set his mind perfectly at rest as to the validity of my patent, the claims of which have been carefully considered and will be stringently maintained. I shall, however, be willing to grant licences on equitable terms to other plate-makers who may desire to benefit by my invention.

The chief point about the machine (which in its present form is the outcome of a long and costly series of experiments) is the perfect manner in which, with astonishing rapidity, it does the work for which it is designed—in this respect surpassing my most sanguine expectations—while each day furnishes fresh proof that the introduction of a more perfect method of coating than has hitherto been used will prove a boon that will be thoroughly appreciated by the users of dry plates, as well as ensure an

enormous saving in wages and waste to those manufacturers who decide to avail themselves of my improved machinery.—I am, yours, &c.,
The Grove, Hackney, September 2, 1884. B. J. EDWARDS.

To the EDITORS.

GENTLEMEN,—Referring to the letter of Mr. Samuel Fry, in your last issue, relative to Mr. B. J. Edwards's patent: as that communication contains an error in principle permit me space to point it out.

A patent may be obtained for a new application of a previously-existing piece of apparatus. This being the case, it will not only be necessary for Mr. Fry (should he be inclined to contest Mr. Edwards's patent) to show that the apparatus as it now exists *as a whole* has been previously in use, but that it has been in use for coating plates with gelatine emulsion. If he can do this the patent would certainly be of no avail.

It will not, I apprehend, suffice to say before the Vice-Chancellor that because one part of the machine has been utilised in the manufacture of pigments, another in the manufacture of floor-cloths, and a third in the application of gum to stamps, that, *therefore*, the patent is not sound when a machine is constructed, as a whole, even of parts previously well known, for a purpose different from any of those mentioned. However, law—and especially patent law—is a curious and somewhat whimsical thing.—I am, yours, &c., A PATENT AGENT.
September 1, 1884.

To the EDITORS.

GENTLEMEN,—Really inventors, or would-be inventors, should, to save themselves from chagrin, study well previous inventions. I am led to write this after perusing the specification of Mr. B. J. Edwards's plate-coating machine in your issue of August 22nd.

A machine the same in principle has been used in our works for ten years for laying an even coating of plaster of Paris cream upon wood and veneer. The same machine is constantly used by oil-cloth manufacturers, india-rubber coaters, and chemists for rolls of diachylon plasters.

Mr. Edwards does wisely in not claiming the emulsion trough or endless bands; but the scraper—which, he says, is the pith of the invention—is part of the machine used by the manufacturers I have named. His patent is no more valid, I am afraid, than his "patent-grooved plate-boxes," which patent would not stand one hour's cross-examination before the proper tribunal.—I am, yours, &c., JOHN MURPHY.
Liverpool, September 3, 1884.

INSTANTANEOUS SHUTTERS.

To the EDITORS.

GENTLEMEN,—I notice in your issue of today a letter from Dr. Mantell on the above subject, in which he complains that Cadett's so-called instantaneous shutter is not rapid enough to take moving objects. My own experience of this shutter quite corresponds with his. Dr. Mantell goes on to give the features that a drop-shutter should possess. I believe the one I now use fulfils all the conditions he enumerates.

It is a mahogany case $3\frac{1}{2} \times 2\frac{1}{2} \times \frac{3}{4}$ inches. The drop is made of silk working on a roller containing a spiral spring. The exposure can be regulated from very slow to as rapid as a flash of lightning. It causes absolutely no vibration whatever, and is so simple as to be very unlikely to get out of order. The drop is either released by touching a spring or by the pneumatic ball. The size given above is for a lens with a hood an inch and a-half in diameter. The cost, complete with pneumatic ball and tube, is about 17s. 6d. It was made by a Mr. Kershaw.

The above shutter is the only one which I have come across that fulfils the following conditions:—A drop-shutter acting either slowly or with *great* rapidity; capable of adjustment as to the rapidity; working with full aperture; and falling so smoothly as not to cause any vibration to the camera.—I am, yours, &c., R. GALLOWAY-BELLRINGER.
Patricroft, Manchester, August 29, 1884.

Notes and Queries.

"ARE there any means by which rancidity in oils can be prevented or cured?—H. J."——In reply: A few drops of nitric ether added to oil is said to prevent its becoming rancid; and, not only so, but even to destroy the disagreeable smell of oil that has already become rancid.

JASPER writes:—"I have had a valuable photograph entrusted to me for copying, and my clerk has allowed a large drop of ink to fall upon it. How can this be removed?"——We reply: Let "Jasper" try the effect of an application of hydrochloric acid by means of a brush, subsequently washing thoroughly with water.

W. E. inquires:—"Can you inform me in your *Notes and Queries* if there be any work published dealing with the history of photography—I mean giving a description of how it was found out, &c., and, if so, where I can obtain it?"——In reply: Hunt's *Manual of Photography* published by Messrs. Griffin and Co., London, contains a reliable history of photography in its early days; but, as it may be difficult to obtain a copy, we also refer our correspondent to Tissandier's *History of Photography*, published by Sampson Low and Co.

"PERMIT me the use of your *Notes and Queries'* column to reply to Mr. W. H. Harrison's query, in last number, as to whether my experience in dark slides with a cut-off and with a removable shutter is the same as that of Mr. Andrew Pringle. Although I have some dark slides with the ordinary English shutters I confess my preference for those with removable shutters, and, of course, with a cut-off. By adopting the most ordinary care in inserting the shutter after the exposure has been completed there is no chance of any light being admitted. I am here assuming good workmanship.—J. TRAILL TAYLOR."

"REPLYING from an extended experience to 'B. H. A.,' in your last issue, I think that if he be careful he can secure good results in photomicrographic work with a French eighth-of-an-inch objective. My own object-glass is one of a very narrow angle; but, as a consequence of this, it possesses great penetrative power upon such objects as are within its scope. As a rule, I can produce a good photograph of everything I see, and quite as sharply, too, as I see it. The best effect is obtained when, after obtaining visual sharpness, I give the fine adjustment one-sixth of a turn out. Although I speak in terms of praise of my French eighth-of-an-inch objective, I do not for an instant mean to imply that it is as good as one of higher pretensions, such as emanate from our best English microscope makers.—R. G. FLINT."

"I HAVE a lens three inches in diameter and sixteen inches focus which does not work to focus, being, as I have been informed, over-corrected for colour. Will you kindly inform me in what direction I should make an alteration in the curves so as to bring about a coincidence of the chemical and visual foci? I should greatly like if this could be effected without the present focus being altered—at anyrate to any appreciable extent. I may add that the re-grinding and polishing of any of the surfaces of the lens will not cause me either inconvenience or trouble if I only know in what direction to make the alteration or which surface to operate upon.—FELIX."——We reply: It will be safer for "Felix" to leave the external surfaces as they are, and operate upon the inner or contact surfaces. To make the requisite correction these curves must be flattened, so as to render the flint lens less concave than it is at present. To what extent the radius of curvature must be increased to effect this properly it is quite impossible to say. Grind the surfaces, and only partially polish them; then, having cemented them with castor oil, try experimentally what effect has been produced. If the two foci be now found to coincide, complete the polishing of the contact surfaces and cement with balsam.

J. WILLIAM FOSTER says:—"The other evening I saw in a friend's house a number of photographs that possessed a fine tone, and which I was assured had not been toned by gold at all, but by iron, the toning and fixing proceeding simultaneously. My friend cannot afford me any information with regard to the composition of the toning and fixing bath, so I look to the Editors of THE BRITISH JOURNAL OF PHOTOGRAPHY for aid."——To this we reply: The toning bath referred to must evidently be one described by Mr. Hardwich in a paper on *Positive Printing*, read before the London Photographic Society nearly thirty years ago, as we have never heard of any other toning bath containing iron. The following are the particulars:—

Solution of perchloride of iron	$1\frac{1}{2}$ ounce.
Hyposulphite of soda	8 ounces.
Water	15 ,,
Nitrate of silver	80 grains.

The hyposulphite of soda is first dissolved in thirteen ounces of the water, and the nitrate of silver in the remaining two ounces. The perchloride of iron is then poured into the hyposulphite solution by little and little, stirring well all the time. The addition of the iron salt strikes a fine purple colour, but this soon disappears. When the liquid has become again colourless—which takes place in a few minutes—add the nitrate of silver, stirring briskly. Perfect solution will take place without any formation of black sulphuret. Although this colouring and fixing bath will work well twelve hours after mixing, it is still better at the end of a few days.

WE extract the following from a letter received from Mr. BAYNHAM JONES:—"Clause 6 of the article on "the camera of the future" in the Journal of the 22nd ult. is quite unintelligible to my capacity, and as there may be many others equally stupid you would confer a great favour on them as well as myself if you would, in your next number, render the description more lucid, accompanying your remarks, if necessary, with a woodcut. In the Journal of the 22nd ult. you describe a revolving disc in a camera front at M. de Blochous's establishment at Brussels, and of which it appears that gentleman claims to be the inventor. In the year 1857 I constructed a camera with revolving disc and slide for throwing the lens out of the centre—identical *in every respect* with the woodcut given in the Journal—and which is now in my dark room. I took the idea of the revolving disc from a microscope carrying a series of object-glasses, and in lieu of the latter substituted a slide for carrying the lens. I do not imagine I ever described the invention, as THE BRITISH JOURNAL OF PHOTOGRAPHY was probably not in existence at the above date."——In reply: We presume the article first referred to is that by Mr. Andrew Pringle on *Tourist Cameras and Lenses* (page 533), and to this gentleman we refer Mr. Jones's plaint, merely premising, if it be the sixth paragraph of the article (that about the fastening of dark slides and their shutters) to which allusion is made, that while *we* quite understand every phrase, the subject yet possesses a degree of interest quite sufficient to cause us to desire to hear more about it. With regard to the revolving disc in the camera front, constructed by Mr. Jones in 1857, it is to be regretted that he did not publish it at the time, and thus entitle himself to such advantages or honours as are conferred by publication. But even had he then done so, we question if his claims would not have been subject to objection on the score of novelty: for a camera with a circular, revolving front was described, with a drawing, in our first volume (then in octavo form) in the issue for July 8, *1854*, at page 91, which settles the question of priority.

Exchange Column.

What offers in exchange for Marion's swing, good as new, cost £1 7s. 6d.?—Address, W. G. Helsby, Art Studio, Denbigh, N. Wales.

I will exchange a well-bred fox-terrier bitch, value £4, for a whole-plate instantograph apparatus.—Address, A. F. S. Kent, Corringham, Romford, Essex.

I will exchange a 10 × 8 Ross's rapid symmetrical, new, for a half-plate same make; also Lancaster's or other solar enlarging lantern.—Address, J. Jones, 34, Plantagenet-street, Cardiff.

I will exchange a good quarter-plate portrait lens for four dozen Britannia or other good makers' dry plates, quarter-plate.—Address, R. Taylor, 48, Leigh-street (off Pall Mall), Chorley, Lancashire.

I will exchange a very fine dark tent, on wheels, highly painted, also backgrounds, balustrade, pedestal, &c., for a second-hand tricycle.—Address, James Bremner, 1, St. James-road, Forfar.

I will exchange a 19 × 16 camera, swing-back and folding tailboard, extending about thirty-eight inches, in good condition. What offers?—Address, W. Hudson, 62, High-street, Bordesley, Birmingham.

I will give good exchange in watches or jewellery for a good bellows-body camera, half-plate, and good half-plate portrait lens by any good maker.—Address, B. Pearce, Doll-street, Machynleth, North Wales.

Wanted, a good posing-chair, with changeable backs if possible, also a background, interior or exterior, in exchange for a brand new single-breasted frock coat, best quality broadcloth, never worn, chest measure thirty-nine inches.—Address, Horton and Co., 26, Caroline-street, Cardiff.

We will exchange a splendid set of beaver furs, consisting of double collar, two lapells, and one large pair of cuffs, just received from America; also a Colt's revolver, forty-five calb., and hunting belt with squares for thirty-two cartridges; also scabbard for knife and pouch, all solid leather, and silver-mounted dagger and case, for a portable or rapid symmetrical lens and 10 × 12 camera with dark slides, must be in good condition and by a good maker; photograph of any of the above two stamps.—Address, Brook and Steggles, High-street Studio, Shepton Mallet, Somerset.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

Notice.—*Each Correspondent is required to enclose his name and address, although not necessarily for publication. Communications may, when thought desirable, appear under a* nom de plume *as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.*

Photographs Registered.—

Edwin Smithells, Rivington, near Chorley, Lancashire.—*Photograph of The Unfamiliar Tune; Shadows; Who's There?; Her Fortune; A Reverie; Just Let Loose from School.*

W. S. S.—See a leading article in the present number. We shall have more to say on the subject shortly.

Jas. Wilson.—Doubtless it is a mere idle rumour, with no foundation whatever in fact. Pay no attention to such nonsense.

O. O. O.—The process is worked as a secret one; but it is generally understood to be a modification of Mr. Woodbury's. So you are quite right in your surmise.

Syntax.—Do not go to the extra expense of a rack-and-pinion adjustment for the landscape lens. The rackwork of the camera is quite sufficient for accurate adjustment.

A. J. R.—At present the material is not an article of commerce in this country. It is possible, however, if a use can be found for it, that it may become so eventually.

James Lugg.—The British Journal Photographic Almanac is published at this office. The Publisher will forward you a copy on receipt of one shilling and threepence in stamps.

Hants.—The small quantity of lime in the water, as shown by the analyst's report, will do no harm to the prints. There is no necessity to give them a final washing in distilled water.

R. Michell.—Yes; you will require the permission of the authorities to take views in the streets of Paris; but such permission will be readily accorded if you apply in the proper quarter, stating the purpose for which you require the views

Wm. Biggs.—The reason the transfer paper does not adhere to the collodion film is that you have not sufficiently softened the gelatinous coating. If it do not soften in water at the temperature you have employed it is clear that you have added too much chrome alum in its preparation.

E. J. Lovejoy.—Surely sufficient has been said on the subject in our columns during the past year or two. Refer to your back numbers and you will find all you require to know. You had better remove the boiler from the dark room altogether, as it is very much out of place in such an apartment.

T. A. G.—Very much will depend upon how you place the sitter, and how you intend to use the light. You should not have much less than ten feet of glass at the top and side of the studio. It is better to have a trifle too much than too little, as, in the former case, you can stop some off if not required.

J. J. B.—There is nothing better than plumbago for rendering the gelatine moulds conductive of electricity. You must use the best quality of plumbago, such as is prepared specially for electrotyping purposes.

B. R. J.—The subjects are well chosen, but, unfortunately, all the pictures are marred by the shadows being so deep. This arises from under-exposure. Had you given double time the pictures would, doubtless, have been perfect.

S. Bailey.—If, as you say, all your albumenised paper, subsequent to sensitising, acquires a metallic lustre after hanging for an hour or two, and there is always a bad smell in the room, the sooner you have the drains of the house examined and set right the better it will be for your health, and also for convenience of working.

Aeolus.—Is it an established fact that a longer exposure is required when the wind happens to blow from the east? If it be so with collodion, it will certainly be the same with gelatine plates and also with printing. The light on the western side of large towns is, it is true, somewhat slower when the wind is easterly, because it blows the smoke and fog, if any, in that direction. But the same applies to any other direction, according to the situation.

Self Taught.—1. The sketch shows the studio to be a very useful one if you increase the quantity of glass in the side and roof. There is no advantage to be expected from the small window in the south side.—2. To photograph the church you will require a wide-angle lens of the rectilinear or symmetrical type.—3. Clearly the faults of the illumination. You do not manage your light properly. Without seeing an example of your work we cannot suggest a remedy.

W. A. K.—1. There is no objection to your drying the prints between folds of blotting-paper—that is, if the paper be sufficiently pure, so as not to contaminate the prints. You must bear in mind that some blotting-paper is made with very impure materials, and is quite unsuited for the purpose.—2. The best plan is first to remove all the scratches from the burnishing bar with a piece of snake stone, then polish with a piece of charcoal, and finally burnish with a burnisher, which may be purchased at any toolmaker's.

J. H. P.—We certainly should not advise you to make the proposed alteration in your studio. As it is at present you should be able to get all you require. If you cannot, then it is your own fault and not that of the studio. Instead of putting in a south light, paper the south side of the room with some light paper, so as to soften the shadows by reflection. If this do not answer sufficiently well, use a reflecting screen on the shadow side of the sitter. If you send us a picture or two, showing what you complain of, we shall be happy to advise you further.

Received.—H. Victor Macdona, M.A.; Andrew Pringle; &c.

Photographic Club.—At the forthcoming meeting of this Club, at Anderton's Hotel, Fleet-street, on Wednesday next, the 10th inst., the subject for discussion will be—*On the Effect of Different Alkalies in the Development of Gelatine Plates.*—The Saturday afternoon outing will be at Hale End, leaving Liverpool-street Station at 2.2 p.m.

Those Feet.—"Look here, Mr. Photographer, what in the world did you want to turn my toes in in that style for?" exclaimed an exasperated customer, exhibiting a picture which the artist had just finished for him. "Well, I thought you wanted the picture to be natural," explained the polite artist. "So I did; but I don't turn my toes in." "No, perhaps not. But you see, the picture would not be natural without your feet, and I was obliged to turn them in to get them in the picture."

LONDON GAZETTE, *Friday, August* 29, 1884.

Scotch Sequestration.

Hugh Thomson (deceased), Perth, photographic artist.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician,

For the Week ending September 3, 1884.

These Observations are Taken at 8.30 a.m.

Aug.	Barometer.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max Shade Temp.	Min. Tem.	Remarks.
28	29·66	W	61	60	118	70	54	Raining.
29	29·71	NW	59	53	111	67	53	Bright & Clear.
30	29·93	W	59	56	85	69	53	Overcast.
Sept. 1	29·64	W	61	60	94	66	59	Raining.
2	29·76	W	61	56	111	69	55	Cloudy.
3	29·75	SW	59	56	95	66	53	Cloudy.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1271. Vol. XXXI.—SEPTEMBER 12, 1884.

ANOTHER METHOD OF AVOIDING GRANULARITY IN COPYING PAPER PHOTOGRAPHS.

It will be remembered that a fortnight since we devoted a leading article to a method of producing copies of paper photographs in such a way that the granularity, always so objectionable in reproductions from photographic prints, may be avoided—well, if not actually avoided, at least reduced to such an extent that it would really require a stretch of imagination to conceive that they were actually produced from a paper picture.

At the time we wrote we had merely an opportunity of seeing the results, and of describing the method by which they were produced. Since then, however, we have put the method into practice ourselves, and find it is capable of accomplishing all that was claimed for it, and some of our friends inform us they have done the same. As a matter of course, when a picture has to be produced by double printing it not only entails double time and trouble in the manipulation, but it necessitates something more in practice, namely, the risk that the registration in the second printing may not be coincident with the first, particularly when the work has to be delegated to more or less careless assistants. When this occurs the prints are, of course, lost, which necessitates a delay in the execution of orders and also increased cost of production. Still the method, if worked with care, is one that will always be valuable.

Seeing the objection to a process of double printing in everyday practice being generally adopted, more particularly when a large number of copies are required, we have tried a few experiments to see if this difficulty could not be obviated, and similar or equally good results be obtained by simpler means, while utilising the same principle but in a different manner.

Most of our older readers will doubtless remember that many years back (and long before retouching the negative became such an important adjunct to portrait photography) the late Mr. A. Claudet introduced a method of ameliorating rugosities—always so painfully apparent in large direct portraits when taken with a well-corrected lens. The method of Mr. Claudet was to alter the focus of the instrument while the portrait was being exposed, and, as the movement of the whole of the combination would entail the risk of shaking the camera, he devised the plan of altering the focus by making the components of the lens advance towards, or recede from, each other by a clockwork or similar contrivance. So far as we are aware this ingenious method of working was confined almost, if not entirely, to the inventor himself. But Mr. Claudet's plan of destroying excessive sharpness in any one plane no doubt led to the introduction of a form of lens in which a certain degree of spherical aberration could be introduced into it at the will of the operator, so as to counteract the excessive sharpness produced by a well-corrected photographic lens.

Every observant photographer is aware that there is a considerable difference in the appearance of a picture taken with a lens possessing a considerable amount of spherical aberration—or, to speak more popularly, one that has no real focus at all—and a picture taken with a well-corrected lens purposely put somewhat out of focus. The former will be the far more satisfactory picture of the two. But perhaps, after all, the plan of Mr. Claudet would give a better result than either, inasmuch as part of the exposure can be given with the lens in perfect focus, which will secure a positive amount of sharpness, while the remainder, with the altering focus, will, as it were, soften it off or diffuse it, so that in the end a picture will be obtained somewhat of the Denier character Now this is just the plan we are about to describe for copying paper photographs so as to avoid the grain, namely, altering the focus of the lens during the exposure of the negative. We shall here describe our experiments, which anyone may repeat and thus satisfy himself as to the utility, or otherwise, of the method.

A *carte de visite* was selected purposely with the paper somewhat coarser than the average, so that the experiment should be the more crucial. This was secured in position so that it was illuminated with a strong side light—the system we have long advocated for copying photographs. A copying camera, furnished with a lens of the "rapid" type, was now arranged so that the image should be enlarged to somewhere about double its dimensions. The image was focussed as sharply as possible, a large aperture being employed; and, a negative having been taken, this negative was, of course, sharply and crisply defined. The system of lighting adopted had ameliorated the grain very considerably from what it would have been had a front light been used; but it still bore unmistakable evidence of being a copy from a paper print.

The back of the camera was now marked so that the actual focal point of the lens should be known. The focussing-screen was then replaced, the image examined, and the back of the camera racked out until it was slightly, though palpably, out of focus, it being marked at this point also. It was then adjusted to the first mark, so that it was once more in focus. A second negative was now taken, but in this manner:—When one-half the exposure was made the lens was capped and the back of the camera racked to the out-of-focus mark, and the exposure completed. This negative was a great improvement upon the previous one, so far as the granularity was concerned; but there was too much blurring or lack of sharpness in the image, and the copy had a more or less doubled appearance.

The next experiment was conducted as follows:—The back of the camera was adjusted to the focus mark, the image examined, and the back racked out until the image was again out of focus (but not nearly to the same extent as in the previous experiment), and a fresh mark made. It was now racked inwards beyond the focal point until the image was correspondingly out of focus in that direction, and another mark made at this point.

A third negative was now taken—half the exposure being made this time with the image exactly in focus, one-fourth with it within the focal point, and one-fourth with it without the focal point. This negative was eminently satisfactory; for in the prints made from it the granularity was practically *nil* and the picture sharp, although it could not be pronounced crisply so. In general appearance the copy closely resembled those we described a fortnight since, which had been produced by double printing. The first exposure appeared to secure sharpness, and the subsequent ones a certain degree of diffusion which destroyed the granularity, similarly as did the first and second printing as detailed in the previous article. The copies certainly had no appearance of being taken from paper photographs, and, after they were trimmed and mounted, few would suspect that they had been.

It need scarcely be mentioned that, in adopting this system of copying, it is essential that the alteration of the focus be made with the back of the camera and not by a movement of the lens; otherwise its conjugate focus will be altered.

DISSOLVING PHOTOGRAPHIC VIEWS.

By the term "dissolving" we do not here mean the chemical act associated with the action of solvents upon the substance forming the view, but that optical phenomenon of one picture, while under examination, being gradually and imperceptibly superseded by or "dissolved" into another. Hence the origin of the term. It has hitherto been effected by the agency of a pair of optical lanterns, their respective images being projected upon a screen, the light from one being gradually subdued in proportion as it is increased in the other, producing the effect of both images at one stage of the progress being equally blended, followed by one of them acquiring strength and the other disappearing.

When a succession of views are shown by a single lantern the act of supplanting one by another produces an exceedingly awkward effect upon the screen, the whole act of the transition being witnessed by the spectators, who watch the withdrawal of the exhibited picture at one side and the approach at the other of that by which it is to be superseded, and which the inevitable "small boy" of the audience usually hopes to see displayed upside down—a hope in which he is too often gratified. This changing of the pictures is the *bête noir* of displays by the single lantern. A better effect is obtained when, as soon as the new picture is ready for insertion, the lens is capped and the screen allowed to remain dark until the change has been effected. But this, also, apart from its clumsiness, is attended with unpleasantness.

In previous issues we have described means by which, through the prompt pulling of a string, one photograph succeeds the other with an incredible degree of rapidity; but still the motion from side to side, quick though it be, takes place under the cognisance of the spectators. How to get rid of this formed a problem for solution. We have now the pleasure of giving full details of a method by which the presenting on the screen of a succession of pictures can be effected without any drawback whatever, every one of these having been eliminated.

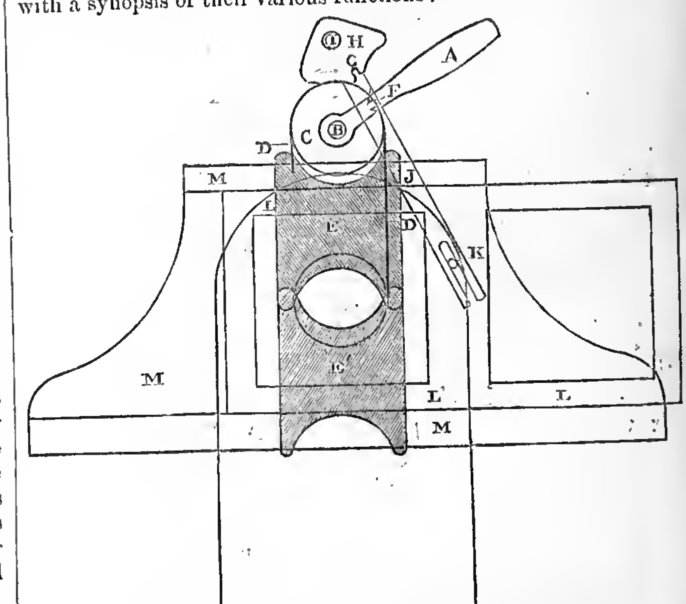
Those acquainted with the phenomena connected with the persistence of vision know that when the eye has been examining any bright object the cessation of the impression of that object upon the lenses is not concurrent with its withdrawal from actual inspection, but that for a brief though measurable period the impression still remains upon the retina. The zigzag path of the lightning and the circle of light formed by the ignited and whirling stick are familiar examples. If a picture or any printed matter be laid on the table, and, while being looked at, the open hand be passed across the line of sight, the senses are scarcely aware of any break or cessation in continuous, uninterrupted vision having been made. In like manner, if the light passing from a lantern to the screen were interrupted for an exceedingly brief period, such as that occupied in making a deliberate blink of the eye, such cessation would scarcely be appreciable. Now, by the new system of dissolving, the lantern is first of all made to blink or, more correctly, to wink its eye by the quick motion of a shutter attached to the lens; and during the moment that the "wink" is being made, and while yet the shutter stands in front of the lens, one picture has been removed from the optical axis of the lantern and another made to take its place. The consequence of this is that when the disc is once more illuminated by the continuous action of the shutter, which has been moving all the time, it is seen that it is now no more the same but quite a different picture which meets our vision. No motion of either of the pictures—the outgoing or incoming—is apparent, for every change was automatically effected before the shutter was allowed to uncap the lens.

As we have described it, the change of one view to another has been supposed to have been effected during a species of "wink," but this may be prolonged to any desired extent by the exhibitor. If preferred, a quarter or a half minute may be occupied in effecting the change. In this case the phenomenon presents the appearance of a gradually-diminishing illumination of the picture on the screen until it passes into total darkness, from which state it gradually increases up to full intensity of illumination, but with a different picture from that which disappeared with the cessation of light. How is this done? We now proceed to answer this question.

We first of all describe the means by which the light is managed and cut off at the proper moment. Erected on the hood of the lens, or by any other convenient means, is a light frame provided with grooves in such a manner as to allow two slipping-slides to pass up and down in front of the lens close to, yet not touching, each other. The ends of these shutters are formed with a hollow or semicircular curve, so that if one be drawn up and the other pulled down there is a stage of progress arrived at by which a circular opening will be formed, and this is obtainable by either end of these sliding shutters. They are operated by strings which pass over a pulley, one at each side, so that by the partial rotation of the axis on which the pulley is fixed one string is wound while the other is being unwound, resulting in one shutter being raised and the other lowered by the same operation. By the sweep of a handle or projecting lever fastened to the axis of the pulley the sliding shutters can be so actuated that when the lever is at either side the lens is open, but when centrally situated between the course it has to travel the lens is closed.

We have next to explain by what means the pictures are changed. A double lantern slide-carrier is made to travel with facility from side to side of the optical axis in a frame by which such movement is facilitated, and which has previously been described in this Journal. In *that*, however, the movement was effected by pulling a string; in this it is effected by a metallic lever, which is forked at the end and actuates a short stud fixed on the division bar of the carrier, the axis of the lever being a rod or axle, one end of which works in a frame just over the condenser or nearly so, the other being carried forward to the objective, where it carries a segment of a wheel containing only one notch. Into this notch works a single tooth, either projecting from the pulley before mentioned or forming part of a separate disc, working on the same axis. When, by moving the lever handle, the pulley is revolved, the single tooth of which we have spoken falls into the notch of the segment on the axis above, by which the lever, acting upon the stud in the carrier, causes this latter to move swiftly to one side.

We here append a diagram showing the various parts mentioned, with a synopsis of their various functions:—



A is the handle or lever which, being fixed on the axis B, causes the drum or pulley C to revolve. On the pulley C, suspended by cords, are two opaque metal plates or diaphragms E E', the ends of which are semicircular, corresponding to the aperture of the lens.

In the diagram the handle A is supposed to be rotating from right to left. As it rotates the plate E falls while the plate E' rises, the two semicircular plates gradually overlapping each other, and so gradually closing the lens. By the time the tooth F (which is attached to a disc or wheel also fixed on the axis B) reaches G the lens will be completely closed, and will remain closed in consequence of the plates E E' overlapping each other, until the segment H, which rotates on the axis I, is moved to an equal distance on the other side of the centre. The lever J is also fixed to the axis I, and, by means of the pin K fastened to the central partition of the double slide-carrier L, pushes the slide-carrier, which runs in grooves in the framework M, to the other side, and thus changes the slide during the interval of darkness.

The diagram is represented attached to a sciopticon. The supports for the axes B I, as also the framework and grooves in which the plates E E' work, all omitted so as not to complicate the diagram.

Mr. B. J. Edwards is the inventor of this ingenious lantern appliance, and by arrangement with Mr. George Smith it is expected to be manufactured at an early date.

MODERN DEVELOPMENT.

The present workers with dry plates do not only include among their number those who have been gradually or, mayhap, suddenly weaned from wet collodion; for amongst them must be numbered a large army of amateurs who, utterly ignorant of wet-plate work, have only taken to the art within the last two or three years. Many of either class are indebted to books or to journals like our own for all their communicated knowledge, and not to hints from friends or conveyed tradition. The fact thus exists that a tendency to an imperfect routine governs the mode of operating adopted by a considerable number, and uncontradicted or unmodified recommendations are still followed to the detriment of real excellence and to some slight hindrance to progress in the various operations involved.

It is our purpose here to touch lightly upon some points connected with development, in order to give the less experienced some idea of the progress made, and to indicate considerations which may be lost sight of even by the earnest student of photographic literature.

We may take for example the oft-quoted maxim that in development a guide to the correctness of the exposure, or to the extent to which development has progressed, may be ascertained by observing the "image showing through" at the back of the negative. This has been said over and over again, and we cannot at the moment of writing recal an instance where the recommendation has been withdrawn. Now, as a matter of fact, it is a most misleading instruction. Time was when it was universally true, as anyone may prove for himself if he happen to possess a few plates of a very old brand. Nowadays, however, thanks to the introduction of iodide and the thicker coating of plates, many kinds are made which scarcely, if at all, allow the image to be seen at the back of the plate, although the fullest exposure has been given and the most thorough development carried out.

Of the vast number of photographers now existing the proportion who make their own dry plates is almost infinitesimal. At one time it was the fashion for everyone to dabble in collodion-making, and the same tendency existed as to gelatine plates; but just as photographers then found that practically they could buy cheaper than they could make collodion, so now it is discovered that time and expense are saved by purchasing ready-made dry plates. But, less like collodion experiences, it may be very plainly stated that, apart from questions of excellence or the reverse, the characteristics of the plates in the market vary to a most considerable degree. For this reason it is that the old rule for development may have to be discarded and others learnt. Not only, however, has this fact to be learnt, but other old beliefs have to be modified.

When a photographer purchases plates from a maker who supplies an article of a character entirely different from what he has been accustomed to use he is too apt to employ his old formula without discretion, and to condemn the fresh plates without giving them a really fair trial; for there is notably a great difference between the class of gelatine which one maker employs and that used by another. One is soft and porous, another is hard and repellent; and, further, one may employ chrome alum, and a rival none. In such a case, while one plate will allow the first trace of an image to start very soon after applying the developer, the other may only begin to appear by the time the first has almost arrived at full density. A knowledge of this fact and the acting upon it may save much trouble.

Again: the older forms recommended a very large proportion of ammonia to the pyro., and a small proportion of bromide to the ammonia. At present we may call attention to the fact that the proportion of ammonia to pyro. recommended by plate-makers and employed by photographers is gradually diminishing. While formerly one, two, or even three minims of ammonia were recommended to every grain of pyro., we now rarely find more than one minim advised, and frequently only half-a-minim. Similarly, the proportion of bromide is increasing. Thus, a well-known maker has from time to time recommended all proportions from a-quarter to three-quarters of a grain to every minim of ammonia; and it was only the other day that a recognised authority stated that he preferred equal quantities of ammonia and of bromide—a proportion that would be absolutely startling to some operators. Yet we do not think it at all unlikely that the plate of the future will have recommended a maximum quantity of half-a-minim of ammonia to every grain of pyro., and a far larger proportion of bromide than is now usual.

Intimately connected with this question is the old "latitude-of-exposure" idea; but when a plate is, as a matter of routine, worked with the very utmost quantity of ammonia it will stand without fogging, it is really absurd to talk about latitude when the result of adding the smallest extra quantity of ammonia—the only way of obtaining "latitude" when an under-exposure has been given—will be to produce fog.

The only way to obtain such latitude is to work with a uniformly smaller quantity of ammonia than the plate is able to stand; then a deviation in either way can be made without any very considerable amount of difficulty.

The true function of a bromide is so far very imperfectly understood. If the usual mode of developing is to employ (say) half-a-grain of bromide to a minim of ammonia, it will be found, that if double that quantity of bromide be added, the image will be far slower in making its appearance, and the conclusion in consequence is usually arrived at that some of the effects of exposure have been destroyed by the bromide. If, however, anyone will take the trouble to carefully compare two printed negatives which have been given identical exposures, and developed with the varying proportions of bromide we name, he will find that there is very little to choose between them. We do not mean to say that the effect of over-exposure cannot be counteracted by the use, in time, of a large proportion of bromide; but we do say that there is a very great tendency to confuse the retarding with restraining action. Anyone who has tried to obtain a good negative from a plate which has shown signs of over-posure by the copious addition of bromide knows how woefully disappointed he usually is. A citrate is infinitely better for this purpose, as the literature of our American brethren very plainly shows them to believe; yet in this country very few photographers have even heard of it, and still fewer make use of it.

We have carried our remarks to the fullest length our space will permit, yet we could have added much more to the same effect. We think, however, that we have said quite sufficient to show that the familiar "cut-and-dried" routine of development is still in a transition stage, and capable of producing results in the future far exceeding the average of the present time, though that is undoubtedly of high excellence.

It is rather a serious charge to make against the management of an important body like the Photographers' Association of America that the officers subordinate public weal to private interest; but it has been made pretty openly in an American journal. Accounting for the non-acceptance of Mr. A. L. Henderson's offer to give a demonstration of emulsion-making before the members assembled, the *Photographic Times*' report states that "there was a whisper in circulation to the effect that a prominent officer of the P. A. of A. was too much interested in a certain dry-plate factory to permit any matters relative to dry-plate making to be discussed." This, if true, is encouraging news for American photographers!

The demonstration was, however, given before the Chicago Photographic Association, and led to an exposition of how thoroughly one of the oldest backers of the wet process has changed his mind. In answer to a question regarding the comparative sensitiveness of wet and dry plates, Mr. Henderson is reported to have replied as follows:—"I am certainly well within the mark in saying sixty times. If challenged I should have no hesitation in guaranteeing to make an emulsion one hundred times faster than your ideal wet plate." It is *not* a quarter of a century since the speaker was willing to back himself with a wet plate to beat any gelatine plates extant. The latter have not since grown more rapid.

But is Mr. Henderson correct in his assumption that "by prolonging emulsification at a high temperature iodide of silver cannot exist in presence of free bromide?" There are certainly some anomalies in recorded opinions on the relative affinities of the halogens for silver, and it would not be a bad subject for a special committee, if such were appointed in the interests of photographers.

Before parting with American topics we may here refer to another cruel thing said by one of her own sons—reflecting certainly not on the country nor even on a class. The chairman of the meeting referred to above stated that "he would remark that the Cincinnati meeting was the first photographic convention he had attended *where not one word was spoken about photography.*" What should *we* think if we had to attend a church where no word was spoken about religion? or be compelled to send our children to a school where no attempt was made at education? It is probable we should like it no better than the American photographers are reported to have enjoyed their lot in connection with the recent convention.

The "Sunbeam" balloon will very likely take part in the centenary celebration on Monday next, but whether the ascent will be a photographic one or not will depend upon the weather and light.

Every photographer who has occasion to use loose gas burners for heating or lighting (and who is there who has not?) is aware of the trouble and the nuisance involved in the use of the tubing required to attach them to the supply pipe. Ordinary vulcanised tubing frequently smells persistently and continuously, while the braided or cloth-covered tube, which is fairly effective, entails so much trouble from the need of brass connections both to tubes and burners that it is placed out of court for ordinary purposes. At last, however, the long-felt want of a tube impervious to gas, elastic and convenient, has been satisfactorily met by Mr. Fletcher, the well-known manufacturer of gas burners and furnaces. The new tube is made of two layers of india-rubber, with pure, soft tinfoil vulcanised between, and it is said by the maker to be perfectly effective, he having had it in practical use for some time, and tested it under strong and continuous pressures of gas for some months. Owing to the difficulty of manufacture it cannot be made in great lengths, six feet being the maximum length that at present Mr. Fletcher has been able to make. This fact, however, need occasion no difficulty; a piece of glass tube to join each length of tubing will enable any quantity to be utilised.

A new filter has been proposed—a porous vessel of unglazed porcelain, through which water is to be forced under pressure. One such vessel ·2 metre long and ·025 diameter gave about twenty litres of water daily which was absolutely free from microbia. The fact of pressure being required is likely to prevent the employment of such a means of filtration by photographers, though there is no doubt that the power to obtain water perfectly free from germs must be of value in some kinds of investigation.

In a communication to the Paris Academy of Sciences MM. Paul and Prosper Henry describe results they have obtained in stellar photography. They employed an objective of ·16 metre diameter and 2·1 metres focal length—quite a small instrument—but they have been so encouraged by the results obtained that they are now engaged in making a much larger instrument, ·34 metre diameter, expressly for astronomical photography. The results so far obtained represent upon a square decimetre a section of the Milky Way of 3° of right ascension and 2° declination, showing fifteen hundred stars from the sixth to the twelfth magnitude.

From a foreign source we learn of an ingenious method of testing a substance for small quantities of silver. It is a combination of the ordinary and the blowpipe methods, the weight of the ultimate globule being estimated, with the aid of a lens, by measurement on a scale, and not by a balance. It is calculated that the requirements of correctness to the one-hundred-thousandth per cent. are easily satisfied by this method.

A new use for iodine has been recommended, and one that amateur manufacturers of cameras, &c., may find useful. It is said that tincture of iodine thinned with methylated spirit forms an excellent brown stain for wood, but requires "fixing" by the subsequent use of French polish. The need for the polish can be obviated by adding shellac to the iodine stain.

We do not often find an early publication of scientific novelties in the columns of some of our foreign contemporaries, but it is seldom that so old an illusion is published as that found in *La Nature* a short time since. The curiously droll and puzzling effect of a set of excessively elongated letters, which was first brought out by the Stereoscopic Company very little less than a score of years ago, was brought forward in that usually most readable journal as an entertaining novelty in the number for the 30th ultimo!

Our readers will, no doubt, remember the ingenious fraud of an alleged discovery of a genuine copy of the "Book of Deuteronomy," which was partially unmasked by the aid of photography. A million of money was the price asked from the British Museum for the treasure; but, it is needless to say, it was not obtained. The same ingenious forger was successful in selling another of his efforts—a "Book of Numbers"—to a Philadelphia *savant.* When the "Deuteronomy" fraud was exposed this gentleman began to get uneasy. He had been furnished with a letter, showing the authenticity of the manuscript, by Professor Tischendorf, and this letter was photographed and a copy sent to Germany. The friends of Professor Tischendorf pronounced it a genuine letter, but Professor Delitzsch furnished ample proof that it referred to a different manuscript altogether! This is another instance of many in which the forger has a very opposite feeling to that of thankfulness for the aid of photography.

Apropos of our recent remarks upon the prospect of iridium coatings for burnishers, it may be worth while to draw attention to the singular properties of the so-called "Hadfield steel," made by imparting a considerable quantity of manganese to decarbonised iron or molten steel, in varying proportions according to the object to be attained. The result is a metal combining, in a remarkable manner, properties hitherto considered quite antagonistic—extreme hardness and great toughness.

MORE ABOUT TOURISTS' CAMERAS.

As the remarks made by Mr. W. H. Harrison and myself on cameras appear to have been acceptable to our readers, and as they have elicited an editorial article in the Journal of August 29th, I venture to offer a few remarks supplementary to my former ones on a subject which really is of great importance to tourists. There are so many workers who have special ideas and devices of their own, and so many camera makers anxious to outstrip their rivals in the production of perfect cameras, that I wonder how it is that Mr. Harrison's remarks did not draw forth a swarm of suggestions for remedies to the imperfections he pointed out.

I confess to having misread Mr. Harrison's calculation as to the time he takes to prepare, use, and repack his camera; but even yet I must say that my operations with my largest camera are very much more speedy than his. As I described the operations with the 10 × 8 camera I shall not repeat them, but I shall describe briefly the *modus operandi* with my smaller one ($7\frac{1}{4} \times 5\frac{1}{4}$). The camera has a folding tailboard, the fold not being secured by a screw but by a catch spring. With my finger I release this spring in the very act of lifting the camera from its case; the base-board falls and is instantly secured to the side fold by a sliding catch. There are no screws, it will be seen. The closing is equally rapid. I cannot allow over one second for each operation, when I try to do it quickly. The camera is thus ready in an instant to fix to the stand.

I have already touched upon the operation of fixing to the stand, but I wish to revert for a moment to my packing-case. This is a brown canvas knapsack, with a leather hand-piece so as to permit of its being carried in the hand as well as on the shoulders. Here I may say that I can carry no weight in my hand, and highly dislike a weight on *one* shoulder; but in a knapsack I could carry a man, if he were a "little London porter," as the old joke has it. When I am going to put in my camera the knapsack lies on the side that goes next my back. It has one leather division, on the left of which goes the camera, face up, covered by a canvas flap, on top of which goes my changing-box slide. On the right goes the changing-box; two side flaps strap over, and then a large flap folds over and straps at the bottom. The dark cloth goes below the large flap and prevents accident to the articles inside. One of the shoulder straps has a buckle and the other a hook-and-eye, so that I can swing the whole on to my shoulders and fasten without wriggling my arms into the straps and unduly "shooting my linen." When I say that my camera has gone round the world in no other garment but this—that it has travelled by ship, rail, coach, on horseback, and on man-back, and has met with no injury—I guess that comment is superfluous. Further—or, rather, not so far—when I want to carry my camera down stairs only, I carry it in the same receptacle; it is so easy to open and so compact.

I fully appreciate the convenience of carrying the camera with tailboard distended as per the editorial article; but how about the ground glass getting broken? Admitted that it is not likely—asserted that it is possible: my ground glass being protected by tailboard and fold it cannot come to grief, and, as I have shown, how swiftly the camera finds itself in the same state as that of the writer of the article! And how about the slides now lying loose in the camera case? Possibly they were in a partition; but, if so, there must bave been a long, narrow partition into which the tailboard would require to be carefully slipped on repacking. The front of the case falling down is a first-rate idea, and I admit would greatly simplify or do away with my last objection. I never tried a thin millboard case lined outside and inside with bookbinders' cloth, so that I cannot speak of its qualities; but I should be afraid of rain and heat affecting such a box. My canvas case laughs at both, and it has been well tested.

The arrangement mentioned in the same article for carrying the lens with its hood facing inwards and the whole lens inside the camera is a good one, but is suited only to lenses of limited length and to a camera that does not shut so close as I like. I doubt if any camera of mine would so carry the lens which I generally use in the camera. This leads me to another desideratum in cameras: they should close into as small a space as possible. My $7\frac{1}{4} \times 5\frac{1}{4}$ camera closes so that from ground glass to lens back combination is under three inches; yet I have full play of both swing-backs. With this camera and a division I have taken views with a lens of three and a-half inches focus—another very weighty statement. I got a second-hand quarter-plate camera lately, and cannot use the same lens in it for want of shortness of focussing arrangement. Makers are very apt to waste wood, increase weight, and spoil cameras by clumsy swing-back adjustments, and the camera of the future will have ample swing-back without waste or weight of timber. My camera of the past (several years) has all this. Until Mr. Gifford came to my aid with his practicality and pencil, and until I had seen my lens arrangement of August 22nd, I intended to have a front made to carry my lens inside the camera, but now I have changed my mind *entirely*. I have had my camera and lens out in the field, and I am at a loss to find a word to express my satisfaction, unless it be that grand word "galoptious." I hope that the studded adapter will not be lost sight of simply because it entails a little trouble and expense. If those who wish to save time in preparations to take views do not adopt the adapter they have only themselves to blame.

A good camera must have two focussing actions—one "rough," which must be performed rapidly; the other "fine," which must be performed accurately. The best cameras of today are so arranged that "rough" focus is attained by drawing out the back part of the camera, the swing-back arrangements and the focussing-glass coming back together. It is important that this drawing back should be smooth, and that all parts should come and remain square to the camera front. So far as I remember, every camera I have seen is open to the two slight objections—that this extension motion is not quite "sweet; that one side of the back of the camera comes occasionally more easily than the other, and that a careless worker may unconsciously be using a side-swing. I think that some little improvement might be made in this matter by manufacturers, and that the two pinch-screws usually found at the top of the extension might be replaced by something better, such as appears to be hinted at by the writer on page 549. The brass band on which my extending motion is worked has ruled lines, by which the back of the camera when extended can be kept parallel to the front. In practice I have never had any trouble in this matter, but I think it right to mention it as a possible improvement. I should prefer all loose screws to be banished, and these screws on my camera *might* certainly get lost, though I have never seen one off yet.

It now remains to discuss one point where Mr. Harrison and I seem to be at variance, and that is the slides, or, more particularly, the shutter of the slides. We agree that the slides should not slide into position in the camera but push, only he is of opinion that the shutter in front of the plate should come right away out of the slide. Well, the first thing after pulling out the shutter is—you have it in your hand—what do you mean to do with it? It is a loose part to begin with, and we ought to have no loose parts. But it is a light thing; the wind will blow it away, or it will get broken perhaps, so you cannot lay it down. You want one hand for your watch or for your cloth if the wind be blowing, and the other for your lens cap or shutter. If you put it into your pocket, fumbling—if the pocket be not large and the shutter is—no place remains but your mouth! That is hardly good enough, for where can you put your pipe then? Joking apart, let us have no loose, light articles in our hands or lying about either on the ground or on the camera. I still stick to what I said about the fog-danger of these separate shutters. If the "cut-off" be a slip of wood or metal it stands to reason that if the shutter be put back or taken out the least bit off the square, light must get in. If the "cut-off" be rubber or any similar material the same thing *may* occur, and soft, flexible materials wear with friction.

In reply to Mr. Harrison on this point, I may say that my practical experience with this kind of shutter is confined to one slide of a thoroughly-good American maker; but I have examined shutters of this kind by several English makers, and distrusted them all. But, even if safe, I would reject them as highly inconvenient for reasons given above.

It will be seen from my writings on this subject that I think that the "camera of the future" will not be so very different from a first-class camera of today, because the cameras I now possess have done me thoroughly-good service under all conditions in the past; but if anyone will suggest improvements on what I have described in this and my last article I shall be only too eager to embody them all in a camera of the Paulo-post-future, and go forth to the wondering nations with a perfect camera, an ideal implement—a *κάλον κἀγαθον!*

Since writing the above remarks I have seen The British Journal of Photography of the 5th instant, and I think Mr. George Smith's remarks, where they touch upon what I have already written, call for some reply from me. In most respects Mr. Smith and I are perfectly at one, and both of us seem to think that Mr. Harrison's camera must be rather out of date.

Where Mr. Smith and I seem to be furthest apart is in the matter of the pulling-right-out shutter. Mr. Smith says I condemn this system, because, as he can only suppose, I never tried it. Whatever may be my demerits as a contributor to this Journal, good faith with its readers is not one; and it would be a want of candour and truth on my part to condemn anything without trying it. As will be seen above, I have tried such a shutter.

Mr. J. T. Taylor, in response to Mr. Harrison, says that he prefers the removable shutter, "the most ordinary care being taken." That is the very point I would be at. Mr. Harrison wanted a camera to rig up in the minimum of time and, as I suppose, with the minimum of care; and for such a purpose the removable shutter is not adapted so well as the ordinary one, because a little care is required to prevent access of light to the plate. I see Mr. Smith puts his focussing-glass in his pocket; if he do that, of course, he may put his shutter there also. My coat would require to be *all pocket* to hold my focussing-glass and shutter sometimes.

I have not now by me my former article on cameras, so that I do not know exactly how I expressed myself as to the fixing of the camera to the stand; but I certainly did not mean that the camera was to be instantly fixed immovably to the tripod head. All I meant was that there should be no fumbling in trying to get the point of a screw into the hole in the camera. There might be guides for the camera to be slipped into, and the pinch may be effected with half a turn of a screw when the camera was properly directed.

Mr. Smith's experience or opinions differ widely from mine in the matter of cameras for instantaneous work. He thinks they ought to be "without any adjustments whatever." If there be a time when side-swings and back-swings are required it is when instantaneous work is on hand; the lens requires to be but slightly stopped, and by a swing-back the focus of different parts of the picture can alone be effected. Mr. Smith abominates changing-boxes. I do not worship them, but I should be very sorry to be without one for each of my cameras when I go touring.

Beginning at 6.30 this morning I have exposed twenty-two plates—four of them duplicates, and all carefully selected and focussed. I have been at it all day, and I do not expect to lose a plate. I have used ten plates $7\frac{1}{4} \times 5\frac{1}{4}$ and twelve quarter-plates. When one is on a tour and views lie close together it is easy to get through two dozen plates, especially when working for a certain set of subjects, and not merely making pictures. I very much prefer picture-making, but at times one must "shove along." Today I should either have "stuck" or required to change plates away from a house. I think it is a pity not to have at least a dozen plates ready for use without going into a dark room or using a dark box. Mr. F. York told me lately he "did" forty-two plates one day this summer, and I have heard of forty being done before breakfast. I do not recommend nor often practise such feats, but it is well to have the power to do them when wanted.

As to the level on the camera: I admit that generally I can level the camera without it, though I have been deceived. I like my camera very nearly dead level for landscapes as well as buildings.

I have never examined Mr. Smith's camera, which, from my knowledge of Mr. Smith's ingenuity, I can easily believe to be a very perfect article. I have no doubt that his camera contains some of the features of "the camera of the future;" but if I buy a camera from Mr. Smith with the removable shutter I shall also have to buy a coat with special pockets from Mr. Poole.

Not having here (at Ayr) my former articles, I cannot tell to what clause Mr. Baynham Jones refers. On finding this out I shall be glad to endeavour to make myself intelligible.

Andrew Pringle

PROPORTIONS OF AMMONIA, PYRO., AND BROMIDE PER FLUID OUNCE OF VARIOUS DEVELOPERS.

The annexed table is one I have worked out for my own use in order to reduce different makers' developing formulæ to common terms, and thus avoid the necessity of preparing different sets of solutions for each make of plate:—

Name of Maker.	Ammonia	Pyro.	Bromide.		Glycerine, Sugar, &c.	Sulph. of Soda	Remarks.
			Amm.	Pot.			
	Minims.	Grains.	Grains.	Grains.	Minims.	Grains.	
Wratten's—							
"Drop Shutter"	3·00	3·00	·75	..	..	..	
"Ins'taneous"	1·66 to 2·50	3·00	..	·21 to ·31	..	..	
Ordinary	1·66 to 2·50	1·50	..	·21 to ·31	..	..	
Swan's	2·96	1·00	2·22	..	..	..	
Edwards's	1·87	2·10	·23	..	4·20 gly.	..	
Nelson's	12·00 to 12·30	1·00 to 1·84	3·00	..	3·40 grs. sugar.	..	
Thomas's	6·00	1·00	2·50	..	..	..	
Rouch's	3·00	1·26	1·26	..	..	5·04	
Mawdsley's	2·96	1·50	..	1·00	..	..	
Autotype	0·86	2·30	0·30	..	..	..	
Bennett's	5·00	1·50	..	0·60	..	..	
York's	3·00	2·00	..	0·25	¼-gr. citric acid.	..	
Pumphrey's Films	1·88	3·75	..	1·00	1·00 gr. ditto.	15·00	
Captain Abney	2·66	0·90	..	1·35	..	..	*Photography with Emulsions*, page 192.
,, Coll. Emul.	3·00	2·40	..	8·00	..	..	Ditto, page 91.
Canon Beechey's Coll. Emul.	21·82	8·73	..	2·18	..	..	Carbonate of ammonia.

To facilitate matters I use concentrated solutions and dropping-measures. The ammonia I make up to a 50-per-cent. solution with glycerine and water; the bromide to a 25-per-cent., also with glycerine and water; and the pyro. to a 25-per-cent. with alcohol. The proportion of glycerine used is that recommended in Edwards's developer, which I find suits any kind of plate and enables me to use less bromide than would otherwise be necessary.

For convenience sake I write down on a card the quantity per ounce of water of each solution required—in accordance with the above table—for any particular plate, and when proceeding to develope I hang this card in front of me where it can be seen easily. It saves hurried calculations at the last moment; for even when using the simplest concentrated solutions some little thought is necessary to arrive at the right number of minims to be employed, and thus prevent mistakes.

To simplify as much as possible everything connected with the mechanical operations of photography, leaving the mind the better able to devote its energies to the higher branches of the art, should, in my opinion, be the aim of every photographer. The adoption of standard developing solutions, concentrated so as to admit of the use in all cases of minim dropping-measures, would be an important step in the right direction; and, if these were decided upon by a photographic committee, I do not think that any difficulty would be found in persuading manufacturers of gelatine dry plates to employ them in their formulæ and directions for development.

The present want of system is most perplexing and troublesome to any but rule-of-thumb photographers. W. Fredk. Mayes,
Assoc. M. Inst.C.E.

PREPARING WOOD ENGRAVINGS FOR REPRODUCTION BY PHOTOGRAPHY.

Given a magnificent impression from an attractive wood engraving—one in which the effects are produced by bold lines rather wide apart—how can this be photographed so as to present the verisimilitude and character in detail of the original without reproducing these lines? This problem is one which possesses special interest for those who desire to reproduce a series of views of objects of current interest, or of portraits, for the lantern from any of our weekly illustrated newspapers, the magnified lines in which would seriously mar the effect.

If the engraving be one representing the higher order of mechanical excellence — such as those now well known to be characteristic of two of the New York monthly magazines, *The Century* and *Harper's*—a nearly wholly obliteration of the lines may then be produced by the simple expedient of covering the engraving with a sheet of ground glass, the rough surface being placed in contact with the print. Two factors here govern the character of the resulting photograph—first, the degree of coarseness of the ground surface; and, secondly, the local moistening of certain portions by oil or water to which a little glycerine has been added. This provides the means of giving great vigour to certain portions of the picture, leaving the remainder like a soft chalk drawing or pencil sketch.

We have recently had occasion to produce photographs for the lantern from rather coarse-lined wood engravings; and, as the result has been successful, we imagine that the *modus operandi*, if described, will be gladly welcomed by some who may have occasion to convert lines into tints.

Let us suppose that the subject to be operated upon is a landscape. The first thing to do is to get rid of the sky altogether; for, however effective a series of beautifully-printed and graduated lines are in an engraving, they do not look well when thrown upon a screen in a disc of fifteen or twenty feet. With a brush charged with *Chinese white* go over the sky, obliterating all the lines. When this has become dry it will be seen that the opacity of the pigment which has been applied is not so great but that the outline of the clouds, should such have been present, can still be perceived, although only faintly; and by the skilful use of an ordinary blacklead pencil they can be restored with any desired amount of delicacy. This applies also to every portion of the composition in which pronounced lines or cross-hatchings prevail.

The foliage of trees, as a rule, does not require any retouching of this kind; but in many of the trunks of trees the effect of rotundity and, indeed, their whole character are often conveyed by a few strongly-marked lines, which would mar the effect of a picture if reproduced on a large scale. Hence the necessity for stopping them out with the Chinese white and replacing them by the delicate tints of the pencil or crayon.

In portraiture we have seen a coarsely cross-hatched face made quite delicate, and this to such an extent as to render it impossible to detect the nature of its origin. We know of some photographic cabinet portraits of statesmen possessing beautiful gradations of tone the originals of which were rather coarsely-executed wood engravings.

We anticipate an objection that may be made to the working upon engravings with Chinese white and pencil in the manner advocated, namely, their permanent destruction *as* engravings. But while owing to the "white" in question being a water-colour it may be washed off, and the engraving restored to its pristine condition, or nearly so, by being sponged with water, it will be a very easy matter for a photographer to make a *facsimile* of the engraving and effect his stopping-out operations upon *it*, leaving the original quite intact.

PHOTOGRAPHY IN BELGIUM.

[From Our Special Correspondent.]

The Production of Belgian Ordnance Maps by Photographic Aids.

L'Institut Cartographique Militaire, or the Military Map Institution of Belgium, is situated a little outside the City of Brussels, near the *Bois de la Cambre*—an ornamental, richly-wooded park on the outskirts of the Forest of Soignes, which forest stretches for about twelve miles from Brussels to Waterloo. The Map Institution is a section of *L'Ecole Militaire*; it forms the fifth department under the control of the Minister of War of Belgium, and is under the direct supervision of Major d'Etat-major Hennequin. The department was created with several others in the year 1830. The principal work of the department is to produce for the army the best military maps; the public also have the benefit of the results. Before 1860 the Military Map Institution, then known as the *Depôt de la Guerre*, was occupied in preparing the necessary documents and plans for producing an accurate map of Belgium on a large scale. The officers attached to the establishment at that time made astronomical and other observations to secure the commencement of the work upon a sound basis. Between 1870 and 1872 the principal work of the department was the completion of the large-scale maps ($\frac{1}{20000}$). This necessitated the presence of more officials; consequently at this period the department was in its highest state of activity.

From 1872 to about 1880 most of the staff was employed in reproducing the large-scale maps by photolithography; these consisted of 400 sheets to make up the whole map of Belgium. In the course of the same period the engraving of the map of Belgium reduced to the scale of $\frac{1}{40000}$ had been taken in hand and completed, and since the year 1880 the department has been occupied in the revision of its chief work. A brigade of officials is constantly at work surveying; it takes note of any changes, sends the information to the department, and the alterations are made in new editions of the maps.

In the early days of the establishment the Belgian artists became remarkably expert in engraving upon stone—"so much so," says Major Hannot in his official report, that "their specimen maps could so well sustain comparison with the best copperplate engravings, that when one of the specimens was deposited at Somerset House, in London, the English Commissioners, thinking it to be an attempt to mystify them, declared, after consulting all the lithographers of London, that the specimen map could not possibly have been produced by any work upon stone."

When it was resolved to reduce the scale of the Belgian maps from $\frac{1}{20000}$ to $\frac{1}{40000}$ as being more convenient, photography attracted attention as likely to be a useful agent in the work. In 1856 Major James wrote from the Southampton Ordnance Survey Office to the Brussels Academy of Sciences:—"I have sent four of my men to Paris with maps which are to be placed on view at the Universal Exhibition. I have utilised their stay in this town by initiating them into the art of photography. I have furnished them with the best apparatus I was able to obtain, and to-day I am in possession of plans of $\frac{1}{10560}$ reduced to the scale of $\frac{1}{63360}$ with perfect exactitude. I attach great importance to this, because I have obtained the means of making perfect copies, on a reduced scale, of maps such as are reproduced by hand labour, with the advantage that I have a confidence in these reductions which I have not in those done by hand." I have translated this letter from the French, so the wording may not be exactly the same as in the English original.

About the same time General Nerenburger wrote to the Brussels Academy of Sciences that in Paris Messrs. Bisson Brothers were trying experiments for him of the same nature. He had just received a proof 25 × 20 centimetres in size, reduced by photography from a part of a large map. It was very sharp, and all the details visible in the map of $\frac{1}{20000}$ were visible also in the reduction. The paper, however, instead of being white, had a bad colour, and the effects of the spherical aberration of the lens were visible at the margins of the proof. "I am not the less convinced," said General Nerenburger, "of the possibility of applying photography advantageously to the reproduction of maps. For this reason I have asked and obtained of the Minister of War authority to construct an *atelier* to enable me to study the matter seriously, and to make experiments, which professional photographers will not undertake. Captain Libois, who has worked assiduously for one year at this subject, will then be able to continue the experiments he has begun, and I do not doubt that he will finally attain the object we both have in view." Not long afterwards photography was employed to reduce the entire map of Belgium from the scale of $\frac{1}{20000}$ to that of $\frac{1}{40000}$.

The use of photography did not stop here. Photozincography was employed to print off maps of the $\frac{1}{20000}$ scale. This necessitated the intermediate production by photography of negatives to the scale of $\frac{1}{10000}$, and the department is in possession of a map of the entire country on this large scale. The maps to the $\frac{1}{40000}$ scale are printed from engraved plates. Some of the maps of the Belgian Government are turned out in colours by chromolithography.

The head of the photographic department at the Military School at Brussels is Lieut. L. Massaux, of the twelfth regiment of the line. He is an accomplished photographer with great artistic taste, to judge by his paintings in oil colours. He informs me that of the three methods of producing maps on the premises—that is to say, by impressions from copper, zinc, and stone—the best results are obtained by printing from copper. The majority of the maps are, however, for reasons of a practical nature, printed from stone.

In the copperplate process the work begins by the use of the original map as turned out from the hands of the draughtsmen. This map is, of course, drawn with great care from the original surveys, and is usually five or six months before it is finished. It is then enlarged by means of the collodion process to the scale of $\frac{1}{10000}$. Each map is divided into four parts in the enlarging process, and the four negatives measure 40 × 50 centimetres each. This is done in a photographic studio by means of one of Dallmeyer's rectilinear lenses, which has an equivalent focus of thirty centimetres, and gives no distortion in the performance of the work. The camera is mounted upon a heavy four-legged table, which runs upon wheels.

The method of taking the negatives does not differ from that in ordinary use, but the images have necessarily to be strongly intensified to give dead whites and blacks. A trace of chlorine is added to the collodion, and the negative is fixed before any of the fine lines are veiled. The best method of intensifying among all those tried at the Military School is the following:—A ten-per-cent. solution of bromide of potassium in water is made, and this is poured into an equal quantity of a saturated solution of sulphate of copper, bromide of copper being then produced by double decomposition. The presence of sulphate of potassium in the resulting liquid is harmless. The negative is treated with this solution until it becomes white all over. It is then washed, and plunged into an eight- or ten-per-cent. solution of nitrate of silver, which produces such a very black image that it is easier to obtain one fit for the engravers than to obtain one of a feeble nature by this method. The same plan of intensification is used not uncommonly in Brussels by professional photographers when they require deep blacks and strong contrasts in negatives. The operation may be repeated several times with the same negative if desired.

Four positives are copied on paper from these negatives by the ferro-prussiate process. To sensitise the paper two solutions are made as follows:—

Solution A.

Ammonia-citrate of iron............	10 to 12 grammes.
Water.............................	100 cubic centimetres.

Solution B.

Ferridcyanide of potassium	10 to 12 grammes.
Water.............................	100 cubic centimetres.

These two solutions, slightly warmed, are mixed in the developing room, and the resulting bath is protected from the action of light. The mixture is filtered into a developing dish, and the paper sensitised by being floated upon its surface. After flotation for one minute it is raised from the bath and hung up to dry in the dark. The usual time of its exposure to daylight under a negative is about five minutes. It is fixed simply by washing in water. Major Hannot says that this fixing produces two opposite effects, namely, that in the same proportion as the water removes the colour from the whites does it deposit it upon the other portions of the design.

Major A. Hannot has sometimes used another process for making the proofs upon plain paper. He says that for maps it is one of the best, and is not generally known. The paper is first salted in the following bath:—

Chloride of ammonium	2 grammes.
Citrate of soda	2 ,,
Water	100 cubic centimetres.

When the paper is dry it is sensitised upon a five-per-cent. solution of nitrate of silver, to which a few drops of citric acid have been added. The paper is exposed to light under a negative for but a few seconds, for to get good results by development no visible image should be brought out by light. The development is effected by plunging the proofs in the following solution:—

Gallic acid	1 gramme.
Acetate of lead	½ ,,
Rain water, acidulated with three or four drops of glacial acetic acid	4 litres.

When the image is sufficiently developed it is fixed at once in a thirty-per-cent. solution of thiosulphate of soda. The print loses no intensity in fixing. When these operations are properly performed the prints, he says, are of good tone and need no intensification, all the more so because they are required only for the purpose of making tracings.

The white back of the paper proof is then brushed over with blacklead. The leaded side, freed from any loose black dust, is then laid upon a sheet of white paper, and a draughtsman following the lines with a hard point makes a tracing upon the paper below, the under part of the positive being blackleaded. This large tracing having been perfected has to be reduced by photography to the exact size of the design intended for the copper plates. This is done by the wet collodion process, and the exposure is made through the glass instead of with the sensitive film on the side of the glass nearest the lens; otherwise the finished printed map would be reversed.

The reduction is effected by means of apparatus placed on elevated ground, and beneath two wooden huts opposite to each other, the camera being placed in one hut and the map to be reduced under the front of the other, so that the light falls strongly upon it. As the map has to be reduced to the true scale all the apparatus is firmly fixed upon stands of iron, resting on stone foundations, and varieties of substantial rackwork are provided to bring the portions of the apparatus and map into any desired relative positions. The lens used is one by Dallmeyer, of the rectilinear type, thirteen centimetres in diameter and ninety centimetres in focus. Although I am far from being a blind admirer of expensive lenses I am bound to say that Lieutenant Massaux told me that this lens had been tested on the premises against one of French make, and the inferiority of the latter was visible even by simply looking at the image it threw upon the ground glass. The English lens gives an image sharp up to the angles of the plates, and in all respects furnishes a negative true to scale. For some of the work at the Brussels Military School a doublet by Ross is used; it is of thirty centimetres focus, and three inches in diameter. After exposure the plates are carried in their slides down to the main building of the series for development.

As this communication is already long enough I shall postpone the continuation of the description until my next.

THE SUN'S SURFACE.

On the evening of Monday preceding the opening of the meeting of the British Association, the Rev. S. J. Perry, S.J., F.R.S., F.R.A.S., F.R.M.S., director of the Observatory at Stonyhurst, delivered a lecture in the hall of the Church of the Gesu, Bleury-street, Montreal, on *Our Present Knowledge of the Sun's Surface.* The chair was occupied by his lordship Mgr. Fabre, and the lecturer was appropriately introduced by the Rev. Father Turgeon, rector of St. Mary's College.

The Rev. Father Perry, who was received with cordial applause by the large audience present, began by giving some general information of the sun, the spots on the sun, and the magnitude of those spots from the distance, including the rotation of the sun, the gradual changes that take place connected with the development of faculæ, the supposed lagging of faculæ behind sun spots, the coloured vales on sun spots, the moving bodies observed upon the solar surface, the connection between ordinary spots and the fainter markings on the solar surface, &c. Speaking of the determinations of the distance of the sun, he said there were three methods of determining the distance—first, the geometrical method, of which the transit of Venus has been the most permanent of late years, and coupled with the observation of Mars in opposition; secondly, the gravitational method, which will probably later on give the very best results; and, thirdly, the physical method by measuring the velocity of light; but they nearly all give the same result, and place the distance of the sun at about 92,500,000 miles—others giving more weight to the observations of Mars would make it rather greater. He (Father Perry) then gave a brief sketch of his method for obtaining photographs of the sun, and went on to speak of the question of the spot area, in which he treated of the times of the maximums and the maximum which we are just passing through, which was illustrated by a number of drawings of the sun taken during the last four years, and gave his reasons why we should suppose that the maximum had taken place in 1882 or 1883, and also what constitutes a maximum. Some of the spots increased in magnitude up to November of 1882, and have gradually decreased ever since. The spot area, however, was greater in 1883. In 1882 there were two decided maximums—the maximum of April and the maximum of November; but in the following year (1883) there was a great acquisition of large spots, which consequently made the area more extensive than in the previous year. It certainly showed that enormous forces were at work to produce such a spot on the sun. The rev. gentleman also detailed his method of measuring the spot area, and the various phenomena to be found in the solar surface, including the movement of spots, proper motion of spots, repulsion, rapid changes, the connection of spots and faculæ, and gave a probable explanation of the blurred surface of the sun, illustrating his remarks by means of diagrams displayed by means of transparencies. The rev. lecturer concluded by appropriate remarks on the joint cause of true religion and true science, as bringing the world nearer to a proper understanding of the truths and works of the Great Creator.

BOTTLES *VERSUS* GAS BAGS.

My thoughts for some years past having been diverted from things photographic, not till my attention was directed to the subject by a lantern-working friend was I aware of the discussion that has been going on in the pages of The British Journal of Photography on the question of gas explosions, and the relative advantages of gas bags *versus* bottles for the storage of oxygen and hydrogen, and the greater or less chances of explosive mixtures being formed under the respective systems. As soon, however, as I found war declared I buckled on my armour, put my steel pen in rest, and made ready to enter the field with the partisan cry—"A bottle! a bottle! a rescue to the bottle!" A cynical "*bag*-man" insinuated that most men of "the old school" might be depended on as "champions of the bottle;" but, fiercely refuting the imputation, I requested him to remember the question was gas—not spirit—and that the gas-bottle pertained to men of the modern school.

Having been the first person in this country to introduce the gas-bottle system for sale to the lanternists, as far back as 1866, whilst carrying on business at Green-street, Leicester-square, as a philosophical instrument maker—and in connection with the long series of critical articles contributed to Cassell's *Technical Educator* and *Popular Recreator* on *Sources of Light* and *Magic Lantern Construction,* so favourably referred to by Mr. S. Simpson Tomkins, at page 471 in this Journal on July 25th—I may fairly claim to speak with some authority on the subject in dispute, especially as every arrangement described in those articles had been tested by me experimentally, at some considerable cost for construction, my object having been an exhaustive examination of all reasonable suggestions for making the magic lantern a perfect philosophical instrument for educational purposes in place of a toy. The most practical arrangements resulting from that investigation were exhibited at a lecture I gave before the Society of Arts, January 20th, 1869, including the condensed gas-bottle system.

But here, to forestal any protest against my attempting to claim too much, I will give the history of the introduction of the condensed-gas bottle. A Frenchman—one Professor Thorillier—invented an arrangement for the solidification of carbonic acid gas for its exhibition, not only in a snowlike form of falling flakes, but as a solid cake like ice. The late Professor Adams—well known as a science lecturer at the old Birkbeck Institution and at provincial institutions, and as a popular Eastertide lecturer on astronomy at the Adelphi Theatre, illustrated by mechanical lantern diagrams (the originals of those sold by opticians at the present day)—was in the habit of showing the condensation of carbonic acid gas, not only at his own lectures, but at those of other professors of chemistry both in London and the provinces, for the reason that the special apparatus required was not only costly but required considerable experience in its manipulation to render it free from danger. That carbonic acid gas apparatus led Professor Adams to employ it for the condensation of the oxygen and hydrogen he required for his lantern illustrations in his provincial lectures. When advancing age induced Professor Adams to sell off, at Stevens's auction rooms, his splendid collection of apparatus—all exquisitely packed in cases, methodically arranged for travelling—I saw a collection of iron bottles, large and small, for the storage of oxygen and hydrogen in compressed condition, but *minus* the necessary condensing apparatus. On inquiry I found that this essential part was in the possession of Mr. Orchard, who had managed Professor Adams's bottles for some years.

During that sale I arranged with young Mr. Orchard for the supply of condensed oxygen and hydrogen in iron bottles with properly-constructed valves, of the respective capacities of seven and a-half and fifteen cubic feet. Immediately after I issued a prospectus to lecturers and lanternists advocating the employment of the condensed gas system, on the grounds of great portability, non-deterioration of the gases, and *entire freedom from danger in any form,* my authority for such statement being founded on Professor Adams's long personal experience with this form of apparatus during a professional life constantly occupied with lecture demonstrations. All credit for the application of the condensed gas system to the oxyhydrogen apparatus is, therefore, due to the late Professor Adams.

From 1844, when I formed a Students' Practical Chemistry Society (which included several members who have since made a name in the world of science), I have had practical experience with the generation of oxygen and hydrogen and the lime-light apparatus; but from 1856, when I adopted the lantern as the regular method of illustrating my lectures and demonstrations on the microscope and natural history, given in connection with St. George's School of Medicine, I have made the improvement of the oxyhydrogen apparatus a special study; and, having employed water-pressure gas-holders, weighted gasometers, Dr. Woodward's mixed gas apparatus, gas-bags with all forms of pressure-boards, I unhesitatingly say that, after considerable experience with condensed gas-bottles from 1865, I never again would employ any other form of apparatus but as a matter of necessity. My reasons for coming to this conclusion cover the whole field of constructive and manipulative details connected with lime-light apparatus. These may be brought into a kind of debtor and creditor account, well worth the trouble of "totting up" on which side a balance stands in favour. The items we have to consider are—

1. The apparatus required for making oxygen—its cost and dangers.
2. " " " " hydrogen " "
3. " " " storing the gases " "
4. " " " producing the light " "
5. Carriage of apparatus .... " "
6. Erecting, removing, and guarding—its time and danger.

Each of these items shall receive careful and unbiassed consideration in future articles. SAMUEL HIGHLEY, F.C.S., &c.

ON THE TREATMENT OF HUSNIK'S PHOTOLITHOGRAPHIC TRANSFER PAPER.*

THE second bottle, which is intended to contain the solution in use, should only hold about two or two and a-half litres. It is made three-quarters full from the store-bottle, and the other quarter is filled up with plain alcohol. If, through long use, there should be but little of the bath remaining in the bottle, then take three volumes from the store bottle, add one volume of alcohol, and fill up the small bottle again with that.

In using them never pour more than about two-thirds of the fluid contained in the small bottle into the metal bath; in that way one will be saved a good deal of trouble in the shape of filtration, as the dust and other impurities which are taken up in the course of time from the vessel itself, or from the paper floated in it, will, when the solution is poured back into the bottle, settle at the bottom of it, and may be kept back by careful pouring.

After the bath has been poured into the metal dish lay a sheet of photolithographic paper, back downwards, upon the fluid, and with the thumbs press down two corners of one side of the sheet to the bottom of the dish; with the fingers raise alternately the one side and the other of the dish so that the fluid may run over the upper surface of the paper. By frequently moving the dish up and down the whole of the paper is covered by the solution without its being necessary to fix it except at the corners. Now, this is of importance, as any contact with the hand or with any solid object injures the upper surface (which is soluble in water) of the prepared paper, so that at the subsequent development the parts of the picture that had been touched would remain black. When the paper has been in the bath for about half-a-minute take it by the two corners, lift it out quickly, let it drip, and then hang it up by pins to a cord or rod to dry in a dark place.

If one has to sensitise a double sheet, and the metal bath is not so large as the paper, first treat half of the paper as described above; then get some one to hold up the half already sensitised while you sensitise the second half. Should one, however, not have an assistant at hand to hold the paper then proceed as usual to sensitise the first half of the double sheet; but, instead of taking it out at the end of half-a-minute, let it lie a couple of minutes, so that it may not afterwards be able to absorb any more solution. Then raise the paper quickly forward in a sloping direction, so that the part which is still dry may be drawn through the solution and completely wetted. Hold the paper perpendicularly, so that the fluid may run down from the upper perfectly-saturated portions of the paper, and keep the lower longer moist, as it is only in this way that it is possible to moisten the under part equally. In this manner, also, one is saved having to handle large dishes, which also require much more solution.

THE DRYING OF THE SENSITISED PAPER.

So far everything may be done in the light, because light has very little effect upon the wet salts of chromium, and because the bath is quite neutralised by ammonia. But the paper must be dried in the dark, and when dry it must be perfectly protected from light. The drying itself should not take place at a higher temperature than 22° R. Even a temperature of 25° R. may melt the upper and under gelatine films of the paper together, and make the whole useless. In order to learn whether the transfer paper has become spoilt—either by lying too long in a damp place, by the action of hurtful vapours, or by light reaching the sensitised sheet—all that has to be done is to take a tiny strip of the suspected paper, blacken it with the colour usually employed, and in a few minutes lay it in cold water. If at the end of half-an-hour the colour can without difficulty be removed with a sponge then the paper is still fit for use. As in summer sensitive paper will only keep about a couple of days, it is very handy to be able to apply this test to see whether it is still in working condition. It is advisable to keep the well-dried paper in a tin case in a cool place, when it may be kept even for three or four days; and its keeping qualities may be still further increased by putting some carbonate of ammonia into the tin case.

THE EXPOSURE, OR THE PRINTING.

If one have a good negative, in which all the lines and dots are transparent and all the whites opaque, he may feel sure of getting good results. But it must be kept in mind that there should not be too great a difference between the temperature of the drying-room and of the printing place, whether the latter be in the open air or under cover. If it be cold and damp outside, then the paper or other backing of the printing-frame will also be damp; and when the well-dried sensitised paper is placed in the frame it will communicate its dampness to the latter, which will, consequently, become crumpled. It must be borne in mind that the slightest creasing of the paper will cause some lines to run into each other, thus effecting a loss of sharpness. The paper should, therefore, be kept for at least an hour in the place where the printing is done before it is put into the frame. The paper, which has become somewhat damp, is then burnished, in order that its upper surface may become perfectly flat and smooth, after which it is placed under the negative, and a much greater pressure may be put upon it than is done in printing photographs in the usual way.

The burnishing of the paper before printing must be done with the greatest precision, as the flatter the surface is the sharper the image, the finer the lines, and the opener the shadows will be; yet the burnishing should not be continued after the paper begins to become transparent, because then the chromate will be decomposed by the pressure alone just as if light had reached it, and will give rise to spots on the picture. Also, even if it did not prevent the picture from developing properly, a paper over-burnished until it began to become transparent would be useless, because it would not transfer properly, as it would not adhere to the zinc. The length of the exposure depends, of course, principally upon the state of the light, but also partly upon the clearness of the lines in the negative. In the strongest summer sunlight with a good negative an exposure of a minute or even less may do; in weaker sunshine three to six minutes; and in winter sunshine about ten minutes. In the shade in the best light one will require from a-quarter of an hour to an hour, and in winter two hours, or in bad light longer. In printing it is of great importance to have a Vogel's thermometer, furnished with a strip of the same paper as you have under the negative. One usually prints until No. 8 becomes slightly visible. Fogged negatives require longer to print—sometimes twice as long. The printing-frame should not be opened to see how the printing is progressing, as the paper will be more or less expanded by the moisture contained in the atmosphere, and will never be laid down again to a hair on exactly the same line and dot; and this displacement causes want of sharpness, broadens the lines, and makes the dense shadows run together. On this account a photometer is absolutely indispensable;—indeed, one should have at least three to five photometers, as they often require adjustment, and the more work there is to do the more negatives there will have to be exposed to the light that do not print alike.

In preparing the negative plate glass only should be used, as the slightest inequality in the glass gives rise to an inequality in the pressure of the paper upon the negative, and may cause the lines under it to appear either broadened out or contracted. The same effect is produced by the slightest grain of sand or of dust blown between the negative and the paper. On a fully-exposed print all (even the finest dots) must be visible, though in the latter case they need be but slightly so. A print should never be left undeveloped until day on account of the continuating action of the light going on in the dark and widening the lines. Each print must, therefore, be blackened at once with the transfer colour and laid in water, where it may be left for a whole day, if so desired, without the development suffering.

—*Notizen.* *(To be concluded.)* J. HUSNIK.

* Continued from page 90.

WHERE TO GO WITH THE CAMERA.

[It is hoped that this series of articles will be continued at regular and frequent intervals during the vacation months, and we shall be glad to receive contributions to the series from any friends able to treat of new and interesting ground.]

LANGHOLM AND ITS VICINITY.

As this is the time of the year when the amateur photographer is as keen as any August sportsman on the moors to make a good bag, I take the opportunity of giving a few hurried notes of a recent visit I paid to the seat of Mr. Andrew Pringle, at Craigcleugh, Langholm, N.B.

This very beautiful residence is embosomed in a wild cincture of hills, from the summit of which the most enchanting views may be obtained, the purple heather and undulating soil suggesting to the mind of the artist splendid visions of academy honours and distinction. Here I found my host "at home," and ready to accompany me on the following day to "fresh fields of (camera) glory and pastures new."

Punctually at 10.30 a.m. we started, with our slides charged for a few exposures on the banks of the River Esk. The morning was phenomenally clear and brilliant; not a cloud to be seen anywhere, and the light of that tone which always sends a thrill of joy through an artist's soul. It was simply perfect.

We soon found ourselves on the banks of a very fine reach of water, arched in the centre by a most picturesque bridge. Here we exposed our first plate under the most favourable conditions. The rocks in the foreground, water in the middle distance, and well-lighted foliage in the extreme distance gave a very fine effect of light and shade to the view. We exposed a few more plates from the other side of the bridge, which was, if possible, more picturesque than the side we first selected. Had our supply of plates been equal to the demand of the beautiful "bits" of landscape and riverscape on all sides of us we might easily have taken home with us a large "bag;" as it was, we had to content ourselves with only four whole-plate views.

We were amply rewarded for our exertions (as the sun was oppressively hot) when under the fascinating labours of the developing-chamber—*not* dark room. I wish this to be carefully noticed, for Mr. Pringle has no *dark* room. It is a model of lightness and brightness—every article of chemical plant being quite visible—and *soothing* to the eye. Here a pane of green glass, there yellow, elsewhere orange, and last, not least in the enthusiastic laird of Craigcleugh's mind, *ruby*. Anybody once inside that *sanctum sanctorum* would have solved at once and for ever the vexed question as to how most successfully to solve the problem of obtaining "the minimum of actinity with the maximum of luminosity." Our plates, by-the-bye, were not up to our ideal of either exposure or development. *Verbum sat sapienti.*

Next day we early filled our slides and started for another excursion. We had to wipe off our photographic war paint and attend a wedding ceremony—a *Scotch* wedding. Well, I will not venture to describe this function, as it is exactly the reverse of all Anglican prejudices on the subject, the ceremony taking place in the afternoon, and the guests being regaled with tea and cake. Two quick "shots" were taken of the bridal party, which pictures will *not* get the medal.

I forgot to mention that *en route* to the hamlet where the wedding ceremony took place we exposed a few plates on some very beautiful peeps of the river Esk—views which, I am told, received the highest eulogy from the pen of Mr. Ruskin. He is reported to have said that there was no scenery more striking and picturesque in the whole of Scotland.

We returned home late—I mean *early*—after a ball given at the bride's residence, and made early next morning further preparations for a third and last effort to win the Parent Society's medal for landscape work. We went over the same ground until we got nearly as far as the Parish Church of Canobie, and diverged thence to the left until we came to a bridge which spanned an insignificant-looking rivulet near the high road. This was a gem, and no mistake about it. I have never seen anything more truly artistic and beautiful. Long trailings of ivy hung down in graceful festoons along the arches of the bridge; ferns of a delicate species clung to its sides in wanton proportion; and all kinds of wild plants clung to its buttresses in matchless confusion. The lichen was there in all its grey splendour, and the foliage of the overhanging trees gave shelter and balance to the whole picture, the little pebbles in the foreground giving the finishing stroke to as charming and fascinating a bit of scenery as ever delighted the human eye. We exposed two plates with long exposures, and hastened to the end of our drive—Pentone. Here we were to have a picnic and were the *avant-coureur* of our party. It was a Scotch picnic—tea and cakes again.

Before the arrival of the guests to partake of this very innocent refreshment we set up our cameras and exposed a few plates on the surrounding wild rock scenery. This place it is hard to describe. It is the rendezvous for all enthusiastic sight-seers. Travellers flock, I was told, from all parts of England to gaze on these rocks. Many of them are of the most weird and startling proportions—a kind of miniature Giants' Causeway in a rustic glen. No words of mine could possibly describe the beauty of the environment of this place; it must be seen to be realised.

This ended our day's work, and my jottings are now at an end. Moral: Let the reader go and make his headquarters at Langholm, N.B., and if he be not satisfied with the scenery on all sides of him I think he must be indeed hard to please. If it should be his good fortune to find the laird of Craigcleugh at home, and have the honour of the *entrée* under his hospitable roof, the photographic tourist will be a fortunate traveller. It is a liberal education to see all his works of photographic art hanging on his walls, and one day in his company will do more to enlighten the tourist in the mysteries of the "black"—I mean the brilliant—art of photography than all the primers recently published put together. H. VICTOR MACDONA, M.A.

FOREIGN NOTES AND NEWS.

PHOTOGRAPH OF A FLYING BULLET.—SOME DISTINGUISHED AMATEURS.—HOW TO FREE GELATINE FROM GREASE.—PHOTOGRAPH OF A FLASH OF LIGHTNING.—HYPOSULPHITE OF SODA AS AN ANTISEPTIC.—A PERMANENT INDUSTRIAL EXHIBITION.—M. PHILIPPE'S ANILINE PHOTOGRAPHIC PRINTING PROCESS.—ON THE SUMMER TREATMENT OF LICHTDRUCK PRINTS.—GELATINE AND GELATINE DRY-PLATE MANUFACTORIES.—DR. ELSNER'S PHOTOMICROGRAPHIC ATLAS.

ACCORDING to the *Mittheilungen*, Professor Mach, of Prague, has photographed a whizzing bullet which was shot off in a dark room in front of a camera containing a sensitive gelatine plate. The very firing off of the bullet itself caused the discharge of a Leyden jar, which was connected with it, and which furnished the necessary light.

The *Potsdam Zeitung* says that Prince Henry of Prussia is an accomplished landscape photographer, and carries out the necessary processes in a studio attached to the Villa Liegnitz, at Potsdam. Prince William and the heir apparent of Saxe-Meiningen are also said to be amateurs of the modern "black art." The members of the house of Hohenzollern are all obliged to learn some trade or profession, and perhaps some of these three princes have selected photography as the optional branch of industry.

In the *Bulletin de la Société Française de Photographie* M. Scola makes some remarks on the grease contained in many kinds of gelatine, which prevent it from adhering to the glass, and causes specks and flaws in the picture, owing to inequality of development from the inequality of the composition of the gelatine. To remedy this state of matters he recommends the employment of those substances which dissolve grease but not gelatine, such as ether, sulphuretted carbon, and, above all, benzole. The sheet of gelatine to be dealt with is simply laid for a couple of minutes in good benzole, the adherent solution is then shaken off it, and it is rinsed in alcohol. Good benzine may also be substituted for the benzole.

Dr. Kayser, the Vice-President of the Association for the Cultivation of Photography, has sent to the *Mittheilungen* a photograph of a flash of lightning taken on the 16th July. In the print it appeared to be about two m.m. in width, and was distinctly divided into two by a black band, while in the negative the flash appeared to be divided into four parts. The broadest consisted of very narrow, clear, and dark scaly-like marks placed at right angles to the direction of the flash. From the principal ray of the flash smaller rays of lightning branched off on all sides and became lost in the air.

The *Archiv* says hyposulphite of soda is said to be both an extremely powerful antiseptic and a remedy for diphtheria.

The Upper Austrian Industrial Association has opened a permanent industrial museum at Linz, to which photographs and photographic apparatus are admissible.

M. Philippe's aniline printing process consists of floating albumenised or gelatinised paper upon a bath of bichromate of copper and ammonia (ten to fifteen per cent.), drying it, and exposing it under a negative. When a powerful picture has been produced it is laid in a one-per-cent. solution of cyanide of potassium until the whites are quite clear. It is then allowed to drip, after which it is placed in a very acid aniline bath, consisting of—

Water	100 parts.
Oxalic acid	10 ,,
Aniline	1 part.

In a very short time the dye becomes fixed upon the parts which the light had reached, and the picture becomes powerful and assumes a tone very similar to that of silver prints.

The *Archiv* repeats the following hints for the treatment of lichtpaus pictures upon cyanotype paper (dark lines on a white ground) during warm weather:—Keep the prussiate of potassium bath very weak, and keep adding water very frequently to make up for the loss by evaporation. The acid bath should not be too strong, otherwise it dissolves the size in the paper, and it must also be diluted with water from time to time. By exposing the paper much longer the development may be undertaken with a solution of two grammes of gallic acid in one litre of water, instead of with prussiate of potash, but the salt must be completely reduced by the exposure.

The Photographic Society of Frankfort-on-Maine intends to have a general photographic exhibition in the course of this month.

One North American gelatine plate manufactory has offered four prizes, amounting in all to 600 dollars, for the best character portraits taken on its plates; and another manufactory offers four prizes, amounting to 500 dollars, under similar conditions—so that, on the whole, dry-plate manufactories seem to be in a very thriving state in America. The manufacturer of the raw material does not, however, seem to be so fortunate in Germany; for, according to the *Archiv*, a man who set up a gelatine factory at Gera was literally driven out of the place. He then bought an old factory at Weida and resumed business there; but there also police and community joined to interdict the manufacture, and a third start made at Greiz met with no better success.

Dr. F. Elsner has just published the first number of a microscopic atlas intended for the use of health officers, apothecaries, druggists, and persons who are interested in the prevention of the adulteration of food stuffs. The illustrations are reproductions in lichtdruck of microscopic preparations which are photographed direct. The whole thing being done by photogrophic processes, no allowance has to be made for the working of the imagination of the engraver, which so often beautifies but at the same time falsifies and renders untrustworthy the usual reproductions of microscopic slides. As at present projected the undertaking will consist of three series—first, food stuffs; second, textile fabrics; and, third, fresh water animalculæ, to which a fourth, bacteria, may be added if the work meets with sufficient acceptance. The first number contains fifteen figures of microscopic preparations relating to coffee and twelve to tea; No. 2 thirteen figures of cacao and its adulterations; and sixteen of cinnamon and its adulterations. There is an accompanying explanatory text. The microphotographs are from the establishment of Otto Wigand, of Zeitz.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
September 16 ..	Bolton Club	The Studio, Chancery-lane.
,, 17 ..	Photographic Club	Anderton's Hotel, Fleet-street.
,, 18 ..	London and Provincial	Masons' Hall, Basinghall-street.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society, held on the 4th instant, the chair was occupied by Mr. W. K. Burton.

Mr. A. Cowan said that a good deal had been spoken lately of a modification of the alkaline developer introduced by Mr. Monro, of the United States, which variation consisted in the use of the mixed alkalies (potash and soda, instead of ammonia) with pyro. and sulphite of soda, but no restraining bromide. He (Mr. Cowan), in order to make comparative experiments for testing its characteristics, had used six developers as follows:—

No. 1.

Pyro	1 grain.
Liquor ammonia	$2\frac{1}{2}$ minims.
Bromide of potassium	$1\frac{1}{2}$ grain.
Water	1 ounce.

This might be considered as the normal developer with which the others were compared.

No. 2.

Pyro	2 grains.
Carbonate of potash	$12\frac{1}{2}$,,
Carbonate of soda	$12\frac{1}{2}$,,
Sulphite of soda	$12\frac{1}{2}$,,
Water	1 ounce.

No. 3.

Like No. 2, but with the addition of half-a-grain of bromide to the ounce of developer.

No. 4.

Pyro	2 grains.
Carbonate of potash	25 ,,
Sulphite of soda	$12\frac{1}{2}$,,
Water	1 ounce.

No. 5.

Pyro	2 grains.
Carbonate of potash	$12\frac{1}{2}$,,
Carbonate of ammonia	$12\frac{1}{2}$,,
Sulphite of soda	$12\frac{1}{2}$,,
Water	1 ounce.

No. 6.

Like No. 5, but with the addition of one-quarter of a grain of bromide of potassium.

The same subject had been exposed on several plates for a like time, and then treated with the above developers. These plates were handed round, and Mr. Cowan summed up the results as follows:—There was in no case more detail than with the normal pyro. and ammonia developer. In one case—that with the mixed carbonates of potash and ammonia—there was, however, a more vigorous image; but the use of potash and soda with him caused a disagreeable yellow colour. This result was different from that obtained by Mr. Ashman; possibly the make of the plate had something to do with it. Those he employed were made by the boiling process, and contained but very little iodide. A point to remark was that the carbonate of potash and soda developer not only did not require the addition of a restraining bromide, but would not stand it unless the exposure were enormously prolonged. No. 3 solution had refused to act, and when the amount of bromide solution was reduced to one-tenth of a grain the action was very slow, and the picture appeared under-exposed. When No. 6 was employed, which contained only one-quarter of a grain of bromide to the ounce, there was no image after an immersion of ten minutes. He thought that the developer, with the addition of the small quantity of bromide, would be useful for negatives that had been over-exposed.

The Chairman had experimented with carbonate of soda and carbonate of potash, and like Mr. Cowan had found the yellow colour that ensued unavoidable. He had also found that a moderate addition of bromide when using these alkalies instead of ammonia prevented the image from developing.

Mr. A. Haddon said that the yellow colour resulting from the use of soda could be temporarily removed by hydrochloric acid, but that it returned as soon as the acid was well washed out.

Mr. W. E. Debenham inquired whether in the use of the soda or potash developer with bromide, as recommended by Mr. Cowan, the latent image was affected; or whether if a plate upon treatment with it were found to be insufficiently exposed for that mixture it could be washed off and the development continued with a less-restrained or with the ordinary developer. If the latter were the case the development not only of a plate known to be over-exposed, but of one which was thought to be so and was in reality not so, could be successfully carried on.

Mr. Cowan replied that the latent image did not appear to be affected, but that the development could be carried on in the manner mentioned.

Mr. Debenham, referring to the comparison between the normally-developed plate and that which appeared more vigorous, said that the normally-developed one looked to be over-exposed, and if it had had a somewhat shorter exposure than the other the image might have come out with equal vigour.

Mr. J. Barker, adverting to the use of sulphite of soda in the developer (the usual ammonia and pyro. developer he meant), said that he looked upon it as a useless incumbrance and of no advantage, but the contrary. In his hands it gave a grey veil, and the negatives were not so clear as when developed without it.

Mr. Cowan had used sulphite of soda with the potash and soda developer, as it had been included in Mr. Monro's formula; but he had not used it in the No. 1 or normal developer, for in his own practice he preferred to do without it.

The Chairman said that as to the use of sulphite of soda his opinion was much the same as that of the preceding speakers.

Mr. W. Cobb was quite of Mr. Barker's opinion as to the use of sulphite of soda. There was a question he would like to ask—Whether any of the members had had experience of the use of bichloride of mercury as an intensifier when not carried to the usual extent of bleaching and subsequent treatment by ammonia, but in cases where only a little intensity was required by the pouring on of a dilute solution for a time sufficient only to somewhat darken the image and before there was any bleaching action? He had used this method but some months only, and would like to know what were the probabilities of permanence in the results.

Mr. Debenham had at many times employed this method occasionally for thin collodion negatives when they happened to be a little under-exposed. He thought that the results had been permanent.

Mr. W. M. Ashman had also used it in collodion and found that the negatives were permanent; but it did not follow that they would be so with gelatine films.

Mr. Barker said that there had been some controversy lately as to the production of warm colours on bromide plates, one gentleman claiming it as his introduction. He had produced plates with this characteristic as long ago as 1873.

The Chairman had seen a set of collodion emulsion plates produced ten or more years since showing a great variety of colours. This variety was induced by the employment of restrainers.

Mr. Derham, of Boston, U.S.A., showed a double camera for use when taking instantaneous pictures. The camera was fitted with a pair of Voigtländer's Euryscope lenses (which were now most highly esteemed in America for instantaneous views) of about twelve-inches focus. The camera was applied to the shoulder, and whilst the subject was focussed with one lens the other was exposed by pressure upon a pneumatic ball releasing a spring shutter that worked between the lenses. The shutter itself was taken from one described by Mr. Noton in The British Journal of Photography in the year 1879.

Mr. W. Turner was elected a member of the Association.

MANCHESTER PHOTOGRAPHIC SOCIETY.

On Saturday, the 30th ultimo, a considerable number of members and their friends, including ladies, from the above Society assembled at London-road Station, for the purpose of making an excursion for photographic work to the charming and romantic scenery in and around Dovedale. The occasion was not one of the regular trips which have taken place after short intervals during the summer months, and of which a printed programme is placed in the hands of each member at the beginning of the season; but was the outcome of a mutual wish on the part of the Derby and Manchester Photographic Societies, which met a little while ago at Matlock, that a special meeting of the two societies should be arranged to take place at a subsequent date, for the purpose of passing a few hours in friendly rivalry and social intercourse.

The train by which the party travelled left Manchester at 9.20 a.m. and arrived at Ashbourne, "up to time," at 11.50. Waggonettes having been procured, the drive to Dovedale, some four or five miles distant, commenced under somewhat gloomy forebodings as to weather. Happily, however, the threatened rain did not come, and with the exception of a slight shower later in the afternoon the day continued fairly bright. The hotel at which refreshments had been ordered was reached about one o'clock, and a pleasant walk across the fields brought the stepping-stone at the entrance to Dovedale in full view. Here the landscape is charmingly pastoral, but on this occasion it was somewhat desecrated by the presence of sundry sweets' stalls and ginger-beer vendors, as well as an imposing array of "Jerusalem ponies." Accessories such as these, however, were not appreciated.

The members made their way up the valley, and on the arrival at the curious and romantic group of rocks, called the "Twelve Apostles," cameras were quickly opened out and work commenced in earnest. From this point to the termination of the dale at Dove Holes, about one and a-half mile further up the stream, the scenery is of the most varied and delightful description, and the number of views to be obtained may be said to be almost endless. A mass of rocks on the Staffordshire side of the river, called Dovedale Church, Tissington Spires, and Reynard's Cave on the Derbyshire side, each absorbed a considerable number of plates, while quiet pools and picturesque groups of trees presented themselves *ad infinitum*.

The Straits of Dovedale, the Watch Box, Piccary Tor, and a multitude of other choice "bits" in the upper part of the valley, finishing with the Dove Holes, were generally voted too much for one short afternoon, as the latest return train to Manchester left Ashbourne at 6.35 and tea had been ordered for five o'clock. Consequently, when Reynard's Cave was reached the bulk of the party began to wend its way back again, and several other plates were exposed on the return route, the distance from the entrance gate to the "Peveril of the Peak" being covered by the members in straggling file, Mr. Atherton bringing up the rear as the patriarch of the party on the back of a mule. Two or three of the more enthusiastic spirits, under the intoxicating influence of the Dovedale scenery and not to be deterred by such commonplace matters as the flight of time and its consequences, prosecuted their rambles as far as Dove Holes and had to hurry back in hot haste, arriving at the hotel only just in time to make a scant and, it is feared, a very fragmentary meal before the departure of the waggonette for Ashbourne.

The excursion was a most enjoyable one, the only regrettable circumstance being the very large portion of the day taken up by railway travelling, and the consequent shortness of time available for photographic work; but the experiences of the day seemed to whet the appetite for a future raid on the lovely scenery of the locality, and several of the members expressed themselves strongly in favour of another excursion to the place next season, which, if possible, should be arranged to leave Manchester by an earlier train.

For some reason or other the Derby Photographic Society was only represented by two gentlemen, whom the Manchester members met in the Dale, and who joined the party at the hotel in taking tea.

The President, Mr. Atherton, Mr. Coote, Mr. McKellen, and Mr. Scott remained at the hotel to be in readiness for a field day on the Monday following, when some further work was done in Dovedale as well as at Ilam and Thorpe. The time, however, even of those who remained over Monday, was much too limited for the amount of work to be done. Dovedale itself for a distance of two miles is, of course, the gem of the Peak, but for many miles further up the valley the scenery is charming. In Narrowdale and Beresford Dale—redolent with associations of quaint old Izaak Walton and "his son," Charles Cotton—are to be found innumerable "peeps;" but nothing short of a three or four weeks' residence in the locality, and the most favourable weather, would suffice to accomplish all that can be done.

THE last of the season's outdoor meetings in connection with the above Society took place on Saturday, the 6th inst. About a dozen members and friends were present; but, unfortunately, a steady downpour of rain all the afternoon somewhat marred the enjoyment, and prevented a lavish use of the camera. Had it not been for the liveliness of some of the ladies the afternoon would have passed off very dull indeed. In a waggonette and under an awning of umbrellas the party left Alderly Edge *en route* for Capesthorne Hall. At Nether Alderley a halt was called, but neither the picturesque old mill or the many "bits" of black and white scattered about, nor even the ancient church, could tempt anyone to unlimber, so the order was given to "drive on."

At Capesthorne Hall—a fine brick and stone mansion of the Elizabethan period—the party took shelter in the spacious conservatory, where several plates were exposed, and many of the trees in the park and the extensive lakes excited the admiration of the members. These, however, like many other of Nature's pictures, had to be left without carrying away a duplicate. Astle Park, Chelford, was also on the programme; but this, likewise, had "to be continued in our next."

The prettiest picture, and one which found favour in the sight of all, was that of a tea-table laid out in the most *recherché* style at the "Trafford Arms," Alderley, and more plates were exposed and used on that picture than on any other during the afternoon.

Had it not been for the excessive and unrelenting rain this trip would, probably, have been one of the most pleasant and successful of the summer series. By the leader's characteristic judgment and foresight, everything had been so well planned and prearranged, and the route chosen was so continuously lined with picturesque beauty, that it is to be hoped Mr. Wade will repeat the excursion next season.

CHICAGO PHOTOGRAPHIC ASSOCIATION.

A REGULAR meeting was held at the Association Room, 229, State-street, on the evening of the 6th ult.,—Dr. H. D. Garrison, President, in the chair.

Mr. A. L. Henderson was proposed and elected for honorary membership.

The CHAIRMAN, in introducing Mr. Henderson to the Association, observed that he had no doubt the great majority of those present were more or less acquainted with him through his contributions to the English journals. There were few men who had done more to advance dry-plate photography, and the results of his researches and experiments had always been given freely to the world. Some of those present, who had attended the late convention for the revision of the constitution and by-laws, in Cincinnati, might perhaps be aware that Mr. Henderson had offered to demonstrate his method of emulsion-making before that Convention; but, through influences not exactly understood by the speaker, he was not allowed to say a word. There was a whisper in circulation to the effect that a prominent officer of the P. A. of A. was too much interested in a certain dry-plate factory to permit any matters relative to dry-plate making to be discussed, but as to that the speaker could not vouch. In dismissing the subject, he would remark that the Cincinnati meeting was the first photographic convention he had ever attended where *not one word was spoken about photography*. However, Cincinnati's loss was their gain, and, without taking up any more time, he would now introduce Mr. Henderson, of London, who would make an emulsion before them and answer any questions.

Mr. Henderson's remarks were as follow, much being in the form of questions and answers freely and courteously given.

Mr. A. L. HENDERSON:—Your Chairman is perfectly right in his statements about the Cincinnati Convention. I *did* suggest to Mr. Kent that if there was a gap to be filled up I should be most happy to occupy it with a practical illustration of emulsion-making; but let that pass. I have had the pleasure from time to time of publishing many little things in the English and continental journals, which have been appreciated, especially in France and Germany. The process which I shall demonstrate before you tonight is what is known as the cold emulsification process. It allows you to obtain readily almost any degree of sensitiveness that may be desired. It should be remarked here (although I suppose it is pretty generally understood) that the more sensitive the emulsion the less light you can use in preparing and developing your plates. Some time ago I myself offered a small money prize for a safe light for this purpose, but there were no competitors. They all said—"If you cannot devise such a light yourself, Mr. Henderson, it is useless to expect any one else to do it." I do not think that these gentlemen quite did themselves justice in taking this view of the case; but, at anyrate, I did not get my "safe light." About the best thing I have met with so far is a peculiar variety of paper called "canary medium." I have a piece of it here, which may be cut in little bits for distribution. I may say that it is astonishingly safe. A window three feet square covered with it, and lighted by a small gas jet behind, gives ample illumination for all purposes at a distance of four feet from the window. It is impossible to tell the colour of the paper by gaslight. It is a peculiar greenish-yellow, and is, I believe, a chromate of lead colour. You use it without oiling or other treatment.

Mr. BURNHAM: Can this medium be safely used when daylight is the illuminant?

Mr. HENDERSON: Daylight is such an uncertain quantity that it is difficult to answer that question directly. However, I should advise you to use the paper double in that case. I may observe that I do not use either daylight or gaslight myself, but a small kerosene lamp, giving a flame much smaller than a candle. The rapidity of an emulsion depends, amongst other things, on the quantity of gelatine used in the process of emulsification. A very small quantity is sufficient. I will take five grains in four ounces of water. By using ten grains a much finer deposit would be obtained, but the emulsion would also be much slower. The rapidity of the emulsion can also be regulated by varying the quantity of salts in proportion to the water. I am using here gelatine pure and simple, but in my own practice I use meta-gelatine prepared in this way:—Take 300 grains of gelatine, nine ounces of water, and one ounce of ammonia ('880); boil until the solution entirely loses its power of setting. This is then kept as a stock solution; for with the addition of a few drops of ammonia it will keep almost indefinitely. I dilute it for use as required. There are great advantages in thus having the liquid gelatine all ready for making your emulsion, instead of having to dissolve your gelatine as required. You thereby avoid the necessity for using heat at all during the formation of the sensitive bromide of silver. I keep this meta-gelatine for sale, put up in bottles under the name of "glueine." Well, I am now dissolving five grains of gelatine in four ounces of water by the aid of heat (Nelson's No. 1 gelatine). This done, I add three drachms of potassium bromide and two grains of potassium iodide. Let it dissolve. Next, I take four drachms of silver nitrate, divide it in two equal quantities and dissolve each separately in two ounces of water, or dissolve the whole in four ounces of water and divide the solution in two equal parts. A good deal depends on the form in which the silver bromide is formed to start with.

Professor HOUGH: How much more rapid than a wet collodion plate can you make an emulsion by this process?

Mr. HENDERSON: If you will define the rapidity of your wet plate I should be better able to answer that question.

Professor HOUGH: Well, take a neutral collodion and bath, and everything in the best possible condition for rapidity?

Mr. HENDERSON: I am certainly well within the mark in saying sixty times. If challenged I should have no hesitation in guaranteeing to make an emulsion one hundred times faster than your ideal wet plate. In England, however, we have dropped this kind of comparison as too indefinite, and all tests are referred to Warnerke's sensitometer.—Next, I take one drachm of carbonate of ammonia, and add it to one-half of the silver solution (that is, to two drachms of nitrate of silver dissolved in two ounces of water). This, of course, converts a part of the nitrate into carbonate of silver. I may mention here that the sensitiveness of the emulsion will depend, *inter alia*, on the proportion of the total quantity of silver nitrate thus converted. If I want a slow emulsion I only convert about one-quarter of it; if a *very* rapid one the whole. My reason for dividing the silver in two parts is to ensure that a definite quantity shall be converted. I would caution you to be careful that your carbonate of ammonia is pure, especially that it contains no chloride. Now I add liquid ammonia until the precipitate redissolves. This ammonia must be weaker than I have been accustomed to use, for it takes a great deal of it.

Mr. AIKEN: Why do you use carbonate instead of aqua ammonia?

Mr. HENDERSON: I think that question will be answered in the course of the demonstration, but I can answer it now. You would then get oxide instead of carbonate of silver, which would cause your emulsion to work foggy if the oxide was formed in the light.—Next, I mix the carbonate solution with the remaining half of the nitrate solution, and by means of this dropping bottle stir it in to the bromised gelatine. A light, flocculent deposit is the result. It is, perhaps, unnecessary to observe that this last operation must be performed in the dark room, while up to that point everything may be done in broad daylight. This done, we will add four drachms of gelatine, and place the jar containing the emulsion in this pot of hot water to dissolve it, stirring it all the time. You will see how, as the gelatine dissolves, it will break up the flocculent deposit. The temperature of the water in the pot should not be allowed to exceed 120° Fahr. It is important to use a vessel of a certain size and a definite quantity of water at a fixed temperature if you want uniform results. For this quantity of emulsion I should take three quarts of water, and heat it to 120° before putting in the emulsion; then, the gelatine being dissolved (with constant stirring, remember), the cover is put on and the whole business allowed to cool down. If the emulsion has not set at the end of three or four hours it would perhaps, in your climate, be advisable to use ice or other artificial means to make it do so.

Mr. AIKEN: Has the rapidity of cooling any effect on the sensitiveness of the resulting emulsion?

Mr. HENDERSON: I think not. You can make one thousand batches of plates by this process, and have them all exactly alike in sensitiveness. I asked Professor Haddon some time ago to make some experiments on the behaviour of silver bromide under ammonia treatment. He tested the matter under the microscope, and arrived at the conclusion that the smaller particles were dissolved, and the larger ones agglomerated into hexagonal masses. His conclusion was that the hexagonal form is the most sensitive condition of silver bromide. This gelatine (Heinrich's) is too hard to suit me, but, perhaps, for your climate it may be all right. It has been my experience that the softer the gelatine the finer the quality of the resulting negative. I will pass around some of this emulsion on pieces of glass, in order that you may judge the colour and structure of it. Now, gentlemen, I have shown you the principle and method of working of the cold emulsification process. If there are any points not exactly clear I shall be pleased to answer any questions.

Mr. Hesler: Does the speed of drying affect the sensitiveness and clearness of the plates?

Mr. Henderson: Our English climate is very variable, and at first I found that a change of temperature or of the hygroscopic condition of the air during drying would cause circular marks on the plates. This I have overcome by adding a little thymol dissolved in alcohol, just before filtering the emulsion for use. Its action is simply to prevent decomposition. My plates have always been dried in an open room—not by artificial means.

Prof. Hough: Did I understand you to say that you can make a dozen successive emulsions exactly alike?

Mr. Henderson: Yes, by always adhering closely to the same quantities and temperatures.

Prof. Hough: About what difference in rapidity would result from using ten grains of gelatine instead of five?

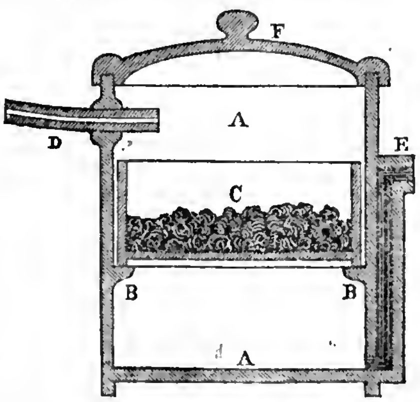
Mr. Henderson: You would reduce the speed more than one-half. In a general way, I consider it unwise to use a large quantity of gelatine as a retarder, and then accelerate by means of heat. Moreover, the less gelatine the silver comes in contact with the better; for the combination of the silver nitrate and bromide is not instantaneous, so that even if you have an excess of the latter the silver has some chance to combine with the gelatine. For this, among other things, I prefer to emulsify with meta-gelatine, because I believe this is all removed in the washing, and the gelatine subsequently added does not come in contact with free nitrate at all.

Prof. Hough: Suppose you used half the total quantity of gelatine to emulsify with?

Mr. Henderson: The ratio of speed would not be the same in this case; it is a diminishing ratio as the quantity of gelatine increases. Probably, taking the five-grain emulsion as twenty Warnerke, the 120-grain one would read about ten. It may be necessary to explain here that the numbers on Warnerke's sensitometer do not represent the ratio of speed, but every three figures about double the speed; thus, thirteen would be twice as rapid as ten; sixteen, four times; nineteen, eight times; twenty-one, sixteen times, &c. Warnerke's sensitometer consists of a plate of glass, on which are superposed, step fashion, twenty-five layers of carbon tissue, of equal thickness. The plate to be tested is placed behind it, and the source of light is a tablet coated with phosphorescent sulphide of calcium, excited by burning a piece of magnesium ribbon. It has been proved by experience that a certain length of ribbon is sufficient to raise the tablet to its greatest luminosity. After excitation the tablet is allowed one minute's rest before being used to test plates, it having been discovered that a very rapid falling off in luminosity occurs during the first few seconds, but that after a minute the decrease is so slow that it may be disregarded.

A Member: Please give us a little information about washing.

Mr. Henderson: As to the time required for washing: much will depend on the temperature of the washing water; but it is a good plan always to keep on the safe side. After my emulsion is set I put it in a vulcanite cylinder with both ends open. Over one end is fastened a sieve of copper wire—I believe about No. 16 mesh; while through the other an ebonite plunger is introduced, expelling the emulsion in shreds. The emulsion thus broken up is placed in a washing apparatus, constructed as follows:—A is a vessel of wood or stoneware (mine is of the latter material, by Doulton, of Lambeth) with a ledge, B, round its interior at about one-third its height from the bottom. On this ledge rests a fine hair sieve, C, in which the broken-up emulsion is placed. Above the top of this sieve a water supply pipe, D, enters; while at the bottom it is provided with a bent outlet, E, of such height that the water level is preserved above the top of the emulsion in the sieve. F is a light-tight cover. You must be careful to keep the whole of the emulsion under water during the operation of washing. I have traced some of my own failures to allowing some portion of it to adhere to the side of the sieve where the water did not reach it.



When washed and redissolved your emulsion should measure about fifteen ounces; if less, make it up to this quantity. Asked by a member as to the quantity of thymol necessary, Mr. Henderson replied that for this quantity of emulsion seven or eight grains dissolved in half-an-ounce of alcohol would be ample. He had found no injurious action on the emulsion from the copper wire; but the wire itself was rapidly corroded by the ammonio-nitrate salts, and he would recommend that it be silver-plated.

Dr. Garrison: Have you tried the addition of bichromate of potash to the emulsion before washing?

Mr. Henderson: I do not see any advantage in it. It will remove green fog, to be sure, but it changes it into grey fog, which is worse.

Mr. Aiken: What substratum do you recommend?

Mr. Henderson: I never use any. Mr. A. Cowan, of London, tried some experiments on the addition of various quantities of chrome alum to the emulsion and found no difference in speed. If there were any difference in brilliancy it was in favour of the emulsion containing the largest percentage of chrome alum. I have not used formic acid, but it is used by some makers to prevent frilling. Frilling, by the way, is generally owing to decomposition of the gelatine, and if proper care be taken not to make the emulsion too hot, and not to remelt it too often, there should be no trouble on this point.

Mr. Hesler: You promised to say something about iodide in emulsions.

Mr. Henderson: If you use much more than I have here—two grains of iodide to three drachms of bromide—you will slow your emulsion considerably. However, the more gelatine your emulsion contains in proportion to silver the more iodide you can use without perceptibly slowing your plate. The reason is this: iodide makes a yellow film more difficult for the light to penetrate; but the larger the proportion of gelatine the more transparent is the film, so that the yellow tinge is not so obstructive. In landscape work a pretty thick (opaque) film is an advantage as a safeguard against halation, and it allows more latitude in exposure.

Mr. Aiken: Do you find any advantage from the use of a chloride?

Mr. Henderson: None whatever. There is a question whether chloride can exist for any length of time in presence of free bromide. I will relate a strange experience. Mr. Cadett gave me a boiling formula. By boiling fifteen minutes he found that he got a certain speed. Boiling forty-five minutes gave him a much greater rapidity, but beyond that he could get no benefit from prolonging the cooking. I tried his formula, and could only get the speed he attained in fifteen minutes by continuing the boiling two hours. Mr. Cadett's plates, by his formula, fixed quicker than those made by mine, although they contained about ten times the amount of iodide. Mr. Cadett was under the impression that the iodide was precipitated and filtered out; but from experiments I made I found that this was not so, and I have come to the conclusion that, by prolonging emulsification at a high temperature, iodide of silver cannot exist in presence of free bromide. The cold emulsifisation gives much more sensitiveness than boiling. A boiling emulsion may give as high a sensitometer number as an ammonia one, but in the former several figures will dissolve out in fixing; that is to say, they will not develope to printing strength.

Dr. Garrison: What developer do you recommend for these plates?

Mr. Henderson: They can be worked with any developer, but mine is generally prepared as follows:—Take one ounce of pyro., half-an-ounce of potassium bromide, fifteen ounces of water, and ten minims of nitric acid for stock solution. For use, dilute this down with water to two grains of pyro. per ounce, and add to each ounce two minims of liq. ammonia (·880). I find no advantage in sulphite of soda.

Mr. Aiken: Do I understand that your stock solution of meta-gelatine is thirty grains to an ounce?

Mr. Henderson: Yes; gelatine is boiled until it decomposes. The ammonia is added to accelerate the action. Prolonged boiling without ammonia would answer the same purpose. I prefer Nelson's No. 1 for emulsifying.

Mr. Edgeworth: I believe you claim to make an emulsion with less silver than others.

Mr. Henderson: I have used as little as one grain per ounce and obtained fairly rapid plates with good density. For opals or gelatino-bromide paper I think this is just what is wanted. A heavy emulsion is fatal to brilliancy in this case. I have made thirty-seven ounces of emulsion with thirty grains of silver, but I do not recommend such extreme economy. I can, however, make a very good emulsion with the same quantities of salts I have used here, increasing gelatine and water to bring it up to thirty ounces.

Mr. Burnham asked some questions as to the use of canary medium in daylight.

Mr. Henderson replied that it was always advisable to use as little light as possible. Nearly all the trouble with fogging, so often complained of with rapid plates, resulted from using too much light in handling them. He did not believe in chemical fog at all.

Mr. Greene: How much emulsion would you allow for an 8×10 plate?

Mr. Henderson: I am more familiar with some other sizes. For instance: fifteen ounces of emulsion prepared according to the formula I have used tonight should coat thirty-six $8\frac{1}{2} \times 6\frac{1}{2}$ plates, or a gross of quarters. The more rapid the emulsion, however, the thicker your plates must be coated, as a protection against halation, for the reason that a blue film is so much more readily penetrated by actinic rays than an orange one

Professor Hough: Do you consider a very rapid plate as good as a slow one for general use?

Mr. Henderson: Yes; but it requires much more skill to develope it. Colonel Stuart Wortley stated the case concisely when he said that he could teach anyone to make an emulsion, but that to develope a plate was a science only to be acquired by long practice. If I were making plates for the trade and wished to make money I do not think I would put on the market anything more rapid than a sixteen Warnerke—about the average sensitiveness of a Britannia or Wratten and Wainwright plate. Such plates as these anyone can develope. Of course, if parties wanted more rapid plates, and I knew them to be capable of handling them, I would supply them, but should not consider it policy to put them on the market indiscriminately. He (Mr. Hendeeson) now passed round for examination some gelatino-chloride prints on opal glass, which were much admired for their brilliancy and warm reddish tone. He explained that the process was neither patented nor secret, but consisted simply in coating the plates with a chloride, instead of a bromide, emulsion, and printing by contact similarly to the old collodio-bromide process—no development. Prints can be toned to any colour desired. The following is the formula:—

Hard gelatine (dissolved in one and a-half ounce of water)	80 grains.
Silver nitrate (in half-an-ounce of water)	75 ,,
Dry sodium chloride	21 ,,
Potassium citrate	21 ,,
Water	½ ounce.

Warm and dissolve.

Warm the solution of silver and gently pour into gelatine; then add the sodium and citrate, also warm, stirring all the time. Pour into a dish to set. Work in a yellow light. Wash in the ordinary way, but keep everything very cool, as this emulsion is very thin. Then melt up and add two drachms of alcohol containing three grains of salicylic acid and one grain of chrome alum in a little warm water: filter, and coat. You will find the emulsion almost as thin as water. If great contrast is wanted work it thicker and the reverse for softness. The emulsion will not keep, so make small batches as required, and use the plates as soon as you conveniently can, for they are prone to turn yellow. Tone in a borax bath after a thorough washing, fix in hypo. (twenty per cent.) for at least ten or fifteen minutes, wash well, and give a bath of alum. These plates may be printed in the ordinary frames without difficulty. Push both negative and opal against one side and end of the frame—that is, into one corner. You may examine as often as you please.

Mr. Edgeworth: As the question of substratum has been raised it may, perhaps, interest some of those present to state that nearly all the large dry-plate factories in this country have abandoned the use of any substratum, and now simply polish their glass on a cotton buffing wheel running at a very high speed. Mr. Eastman uses a species of whiting on the buffing wheel, but I think the others use nothing whatever.

Mr. Henderson: One plate-maker in London, who has unusually clean water to work with, cleans his glass with soda and water, then with clean water and a rubber sponge, finishing with a rinse under the tap, and dries his glass in a cabinet over a Bunsen burner. I have a glass-dryer at home, completed just before I left; but I have not thoroughly tested it yet. If I used any substratum at all it would be silicate of potash. In making plates solely for my own use I have never found such a thing necessary. Possibly, if making for the trade, I might use a substratum.

Mr. Douglass, in moving a vote of thanks to Mr. Henderson, said he understood that that gentleman had remained at some little personal inconvenience in order to be present at this meeting, and he was sure everyone present felt under a great obligation to him.

The motion was carried unanimously, after which the meeting was adjourned.—*Phot. Times.*

Correspondence.

A SODA DEVELOPER.

To the Editors.

Gentlemen,—If Mr. E. Dunmore has not tried the following excellent modification of the soda developer I think he will find it works most satisfactorily. It was given to me by a friend—Dr. Carter Browne—who tells me he "spotted it" in a late number of the *English Mechanic*. I find it most useful in all cases where the necessary exposure can be pretty accurately determined, as, for instance, in interiors and copying; at the same time it will admit of considerable modification in cases of under- or over-exposure.

The colour of the negative is not the usual "bottle green," as it has been not inaptly termed, but a purple black, similar to that obtained with ferrous oxalate. The shadows are perfectly clear, without any veil whatever, and the range of tone everything that could be desired. As a standard developer it possesses the great advantage of *stability*, whereas each time the ammonia bottle is uncorked there is an undoubted loss of strength, and consequent weakening of the developer.

I give the formula as I received it from Dr. Brown, and trust that others will be as pleased with it as I have been:—

No. 1.

Sodic sulphite	4 ounces.
Hot water	10 ,,

When dissolved and cool, add four ounces of sulphurous acid; then add one ounce of dry pyro.

No. 2.

Washing soda	3½ ounces.
Sodic sulphite	¾ ounce.
Water	64 ounces.

To develope: use one drachm of No. 1 to each ounce of No. 2.—I am, yours, &c., L. Macdona.

Cheadle Rectory, Cheshire, September 10, 1884.

N.B.—Place the negative in the alum bath after development. If this be omitted the purple-black colour will not be obtained.

[Is there no bromide included in the above formula?—Eds.]

To the Editors.

Gentlemen,—Bachelors' wives and old maids' children are well known to be the most perfect specimens of humanity. It seems from correspondence that it is the same with photographers' developers. I have one which I love so much that any gelatine plate that would not behave in a most becoming manner towards it I would at once condemn and discard.

The way I proceed to develope with this developer is as follows:—I make saturated solutions of carbonate of potash, sulphite of soda, and washing soda. These I name 1, 2, 3, which means—take

1 part of carbonate of potash.
2 parts of sulphite of soda.
3 parts of washing soda.

To these add forty-eight grains of bromide of potassium dissolved in eighteen parts of water, and label this "soda solution." Now dissolve a-quarter of an ounce of citric acid in thirty ounces of water; add this to one ounce of pyrogallic acid, and label this "pyro. solution."

To develope a half-plate take—

Pyro. solution	2 drachms.
Soda solution	*quant. suff.*

I never soak the plate with water previous to developing, as it is one cause of frilling.

Anyone who tries this developer I feel sure will value it as I do. It has every virtue, and none of the faults of the soda or potash used alone.—I am, yours, &c., Henry Law.

30, *Waterloo-street, Leicester, September* 6, 1884.

[Our correspondent will, upon reperusal, discover that the above formula is quite indefinite, owing to "parts" being alternated with definite quantities, such as "grains." To prove of real benefit the quantities should be definitely expressed. We shall be glad to receive the amended formula.—Eds.]

"EDWARDS'S MACHINE FOR COATING PLATES."

To the Editors.

Gentlemen,—I have read and contributed to your Journal since its commencement, but I believe such a letter as that of Mr. B. J. Edwards has never previously appeared. It commences with a misstatement.

Mr. Edwards says I object to his patent on the ground that "certain parts" have been previously used. This is incorrect. I object on the ground that the *entire machine* has been in manufacturing use for years, and my statement has received complete corroboration in your columns. I say Mr. Edwards is not the inventor at all, and has no right to take out a patent and thus exclude the photographic community from using it if they wish.

A correspondent reminds your readers that this is not the first time Mr. Edwards has done this, and cites the "patent grooved plate box" as an instance. The use of these boxes has been much hindered from the belief that Mr. Edwards held a patent, whereas they can be ordered in the trade just the same as any other box.

Not content with taking out a patent for an already-existing machine, he seeks to cast discredit on methods of coating plates by machinery, as at present known, as being remarkable for "well-known defects." Well, gentlemen, I can say from my personal knowledge that some of the largest manufacturers of dry plates have been employing for years past machine-coating with complete success. The late Dr. Monckhoven devised an exceedingly-successful machine which has been in use for years at the great Belgian manufactory, and the simplicity of which would astonish Mr. B. J. Edwards. Again: my own firm have used since August, 1879, machine-coating with perfect success, some of the machines having run eight hours a day for nearly five years with scarcely any intermission. This system of coating is also adopted by the Compagnie Anglaise, who work our method at Rouen.

By what right, then, does Mr. Edwards make these disparaging statements, of the truth of which he has no kind of evidence? It is simply to bolster up his intention to grant licences for his so-called "patent." He has no right whatever, either in equity or any other way, to attempt to obtain any such payment, the machinery being open to the whole world. He threatens to "stringently maintain" his rights. No doubt lawyers can readily be found to threaten and serve processes; they know their costs will be paid. But no one need have any fear of these threats.

I sum up the whole matter by saying that if I had not seen the subject in print it would have seemed incredible that anyone could attempt such a thing as Mr. Edwards has.—I am, yours, &c., Samuel Fry.

Kingston-on-Thames, September 8, 1884.

To the Editors.

Gentlemen,—Surely your correspondent who signs himself "A Patent Agent" allows his zeal in advocating the validity of Mr. B. J. Edwards's plate-coating patent to carry him a little too far. He says that in order to contest the patent "it will not only be necessary to show that the apparatus as it now exists *as a whole* has been previously in use, but that it has been in use for coating plates with gelatine emulsion."

According to this doctrine a man desirous of patenting a wheel may take the spokes invented by one man, the tire of a second, and the hub of a third, and patent the use of them in conjunction; and, not only so, but if the wheel as a whole had already been in use for an omnibus, he could patent its application to a cab. If such be really the state of the law the sooner it is altered the better.—I am, yours, &c., Looker-on.

September 9, 1884.

THE ETHOXO LIGHT AND GAS EXPLOSIONS.

To the Editors.

Gentlemen,—In reply to Mr. H. Ives's letter, in your issue of August 29th, I may say I admit his *prior publication* of a porous filling for ether chambers, but certainly dispute his prior invention. I have never attempted to eulogise my own invention, preferring to let others do that. But if I am to believe what a countryman of his tells me "Ives's generator" is not the success the inventor would have us to believe, and from reading a catalogue from America, which I recently saw, I shall certainly come to the same conclusion, for there were instructions how to act in case the generator took fire.

As to its being made and sold at a price, that is no criterion of merit. The *original* chamber anyone may make, as *I gave the world* the benefit of my discovery in the pages of THE BRITISH JOURNAL OF PHOTOGRAPHY in the year 1881, but not of the present form.

Explosions do not occur where everything is properly managed; it is where there is *mismanagement* that we have to deplore accidents; and from these there is no protection, as far as I can gather, in Mr. Ives's generator. In my own lanterns I do not use pumice chambers, and never have any "popping" in them.—I am, yours, &c., W. BROUGHTON.

Eccles, Manchester, September 4, 1884.

Notes and Queries.

B. FLETCHER is informed that the best and most convenient cloth for cleaning a lens is (if he will excuse the Hibernicism) a soft wash leather. This is better than the silk handkerchief to which he alludes.

"CAN you supply me with the late Mr. H. Negretti's formula for printing stereoscopic transparencies by the albumen process?—GEO. B. ROBERTSON."——In reply: The formula recommended by Mr. Negretti consisted of a hundred parts of albumen, diluted with twenty parts of water in which one part of iodide of ammonium had been dissolved. The sensitising bath was a ten-per-cent. one, containing a proportion of glacial acetic acid equal to the silver. A saturated solution of gallic acid, used warm, and having a few drops of the sensitising bath added, formed the developer. From this it will be seen that several changes and improvements have been made since this formula was published.

PH. D. says that he requires a very thick bi-convex lens of about four or five inches diameter, and he cannot obtain glass of the requisite thickness without incurring more expense than the work can afford. He asks if we can afford him any hint by which to avoid this difficulty.——To this we reply that the best way to proceed is to obtain two discs of glass of the greatest thickness procurable, grind them as plano-convex lenses, and then cement the flat sides together. If "Ph. D." be not compelled to adopt any definite radius of curvature we would advise him to obtain from an optician who makes a specialty of lantern appliances a pair of unmounted plano-convex condensers and combine these with cement.

"I HAVE some very thin and transparent gelatine plates of my own preparation, made for a special purpose (photomicroscopy) and I occasionally find a luminous margin or halo round light portions which adjoin dark parts. Is there any remedy for this?—ALPHA."——In reply: Our correspondent will prevent this halation by sponging over the backs of his plates with either the following or a mixture of a similar character:—

Burnt sienna	100 grains.
Dextrine	30 ,,
Glycerine	2 minims.
Water	Enough to form a pasty mass.

After exposure remove this backing by a wet sponge, and when the image is developed there will not be the slightest appearance of halation.

F. writes:—"Referring to your remarks about photo-crayon, and a method by which the enlargements can be prevented from fading, I shall feel greatly indebted if you will let me know by what means this can be done. I have carefully and closely followed Sarony's instructions, and as my pictures changed tone after a time I concluded that the fault must have lain with myself rather than with the process. I may say that I eventually discontinued making them on account of their fading."——We reply: The whole secret consists in a total abandonment of mercury as the toning agent and substituting for it gold, platinum, or some other reliable agent. Uranium produces tones less cold than the platinum or gold, and equally durable, so far as our experience has gone. It is not difficult to produce a rich purple tone by development alone without having recourse to any toning at all.

"WOULD you kindly oblige me, if possible, with a formula for photograpic crystal varnish? My various books of receipts give a formula for a crystal varnish, namely, equal parts of Canada balsam and turpentine; but I doubt much if this is the proper photographic article. I require some for immediate use, and cannot get any in the town, and, what is more strange still, I have never come across any formula for crystal varnish in the Journal. Although I have perused many volumes, not a single formula can I find in the ALMANACS. Twenty years ago I used crystal varnish (I think) for glass positives, and it was certainly not a turpentine varnish. My present purpose is—firstly, by the addition of white wax to make an imitation ground glass for stereo. transparencies; and, secondly, to varnish the *film* side of some glass positives recently taken, so that this varnish shall resist the—or rather any—action of Bates's black varnish when the outline of the portrait is filled up with the latter. This, I think, crystal varnish will do. This is a very pretty way of finishing glass positives, for the portrait then appears to have been taken on ivory, if white, or cream paper be placed beneath.—W. F. STEVENS."——In reply: We know of at least two classes of crystal varnish—one consisting of a solution of Canada balsam in turpentine, and the other a benzole solution of gum dammar. The latter will probably answer the purpose of our correspondent. With regard to the method of finishing glass positives referred to: if we are not mistaken it was extensively practised by Mr. John Urie, of Glasgow, a-quarter of a century ago. We think that he also obtained a patent for the method in question. We are not at present quite clear whether it was the film side or the glass side to which the black varnish was applied.

Exchange Column.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

NOTICE.—*Each Correspondent is required to enclose his name and address, although not necessarily for publication. Communications may, when thought desirable, appear under a* NOM DE PLUME *as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.*

PHOTOGRAPH REGISTERED.—

Thomas Forrest, Cambrian Studio, Pontypridd.—*Photograph of the Town of Pontypridd.*

AMATEUR.—We presume so, though we have not really tried it. Why not make the experiment yourself?

C. B.—By all means employ a slow bromide plate, and one that will yield a dense image. The other plates are by no means so suitable for your purpose.

ERRATUM.—In the article on page 561, twenty-four lines from the bottom of first column, for "slightly *focussing* with ammonia," &c., *read* "flushing," or rinsing.

JOSEPH HOLMES.—The prepared paper is not an article of commerce in this country. It is quite possible that you can procure it through Dr. Liesegang, of Dusseldorf.

SILVER.—1. There is no silver in the waste developing solution.—2. A very small proportion of the deposit only is silver, the major portion being oxidised pyrogallic acid.—3. No.

GEO. SMITH.—There appears to be something wrong in the figures somewhere. You had better write to the agents for the sale of the instruments in this country for an explanation.

J. C.—We presume the label will be copyright if the registration were legally effected. If you have any doubt on the subject you had better consult a respectable solicitor before commencing litigation.

J. G.—1. You will find a table of the solubility of the salts in question on page 252 of our ALMANAC for the current year.—2. We should surmise the remedy would be efficacious, but the only way to test it definitely is to make the experiment.

J. E. Z.—The negative appears so very much over-exposed that we fear you will not succeed in bringing it up to sufficient density to yield satisfactory prints. Try the effect of sulphite of soda as a blackening agent, instead of the hyposulphite.

A. E. D.—1. The cause of the fog in intensifying the negatives was due to your insufficient washing between the separate operations.—2. A certain amount of oxidation will always take place. However, filter the solution and then try its efficacy by developing a plate.

A. G. Hopkins.—1. The fittings are generally made to the order of the camera-makers, most of whom have their own particular pattern. Perhaps some of the camera-makers will supply what you require.—2. Lampblack mixed with white hard varnish, thinned with methylated alcohol, is the best material with which to blacken the inside of the camera.

O. Evans.—1. The camera is much too short for the purpose.—2. You will find a table giving the length required in enlarging and reducing in our Almanac for the current year, page 261.—3. Better try the experiment. We have not done so. As a rule, you will find the formula issued by the maker of the plates more suitable for his particular plates than that of any other maker.

Patience Passe Science.—You had better provide yourself with two lenses. Those marked Nos. 1 and 4 on your list you would find most generally useful. If you politely explain to the Customs officials that the boxes contain photographic plates which would be spoilt by exposure to light, we imagine you will experience no difficulty, particularly if you offer to show them in a non-actinic light.

Amateur (Liverpool).—1. You may avoid the prints adhering in future by treating the glass either with powdered talc or bees'-wax.—2. The bicarbonate of soda toning bath should give you the tones you desire—that is, if the negative be a rich and vigorous one and the paper suitable. Remember, the tones of the prints very much depend upon the quality of the negative. The prints are returned as requested.

Bordesley.—We have no means of knowing with certainty if the work in question be copyright except by searching the records at Stationers' Hall. But we have not the slightest doubt in our own mind that it is, as no one would think of publishing such a work without securing copyright. Of course if you copy the picture, and it possesses copyright, you will render yourself liable to a penalty of ten pounds for every copy you sell.

Laurence.—We fear, as the ends of the negatives are so totally different in character and density, that you will not be successful in joining the prints, or combining the negatives, so as to get a panorama without the joins being painfully conspicuous. If you carefully re-read the articles on combination printing you will find one or two plans which may prove useful, or at least materially assist you, in this particular instance. From the prints it is clear that much will depend upon your skill in retouching the different negatives, so as to equalise their density at the parts to be joined.

E. S. D.—1. The prints produced on gelatino-bromide paper will be different in appearance to those made on albumenised paper.—2. The tone does not depend upon the burnishing.—3. If your negatives are inferior it will be impossible for you to get rich-toned prints from them.—4. Not useless, but less energetic in action.—5. All things being equal the results would be the same.—6. The only way of settling the point is by trying the lens and judging its quality.—7. It would be useless to devote space in these columns to describing what may be found in any elementary manual.

Received.—E. H. Farmer; Archer Clarke; H. E. Harris; "R. S.;" "X X X;" "W. M."

Drop Shutters.—Drop shutters and instantaneous shutters are common enough as applied to lenses of somewhat small dimensions; but it is the exception rather than the rule for any one to possess one of these appliances suitable for being employed with a lens having a diameter of from three to five inches. Here is a method which we can recommend from experience as being easily adapted for utilising large lenses in taking instantaneous views; at anyrate, it is sufficiently rapid to take pedestrians and street traffic under such circumstances as enable the moving figures to bear examination with a magnifying glass of moderate power. Provide two caps for the lens. These may be made of pasteboard or cloth. Provide also two squares of stiff pasteboard considerably larger than the front of the lens, or (say) seven by eight inches, which is the size we employ. Fix a cap to the centre of each of these. Now, when the camera is directed toward the object to be taken the lens must be capped by one of these squares, the right hand being relegated to this use. The left hand must hold the second capped square in such a way that it will be higher than its fellow to the extent of four or five inches, this forming a degree of separation sufficient for every purpose. The exposure is made by gently withdrawing the cap and quickly moving the covering square downward, the second covering-piece being simultaneously moved downward by the left hand, which works consentaneously with the right. The cap on the second square now replaces that by which the lens was previously covered. No one can form any idea of the rapidity and ease with which an exposure can be made by this method unless it were tried; still some conception may be had of it by taking hold of two pieces of card, one with each hand, and keeping a space of a few inches between them, giving them a quick downward descent, until one occupies the place of the other. The rapidity much exceeds that of a simple drop-shutter actuated by gravity. If desired, both pieces may be attached to each other, or even one card may be made to answer by having a large square aperture cut in it, ample space being left for attaching the caps.—*Photographic Times.*

New Cards.—We have received from Messrs. Marion and Co. samples of their new designs for appointment cards. These are tastefully designed and printed in three colours, presenting a chaste and ornamental appearance.

Photographic Club.—At the forthcoming meeting of this Club, at Anderton's Hotel, Fleet-street, on Wednesday next, the 17th inst., the subject for discussion will be—*On Mountants.*—The Saturday afternoon outing will be at Hale End, leaving Liverpool-street Station at 2.2 p.m.

Portrait Painting in the Provinces.—The Merthyr *Express* speaks in high terms of a life-size portrait in oils of a lady of local celebrity and her daughter displayed in the window of Messrs. Harris, Son, and Co., artists, 88, High-street, Merthyr, just off the easel of Mr. Geo. F. Harris. It is characterised as being the highest effort in local portrait painting which the *Express* has seen for many years.

An Improved Egg-Beater.—Various means have from time to time been devised for beating albumen into a froth. We have received from Messrs. M'Nicol and Walsh, of Manchester, a specimen of their "climax mixer," which consists of a tin cylindrical vessel wherein works, through an aperture in a closely-fitting cover, a piston rod that actuates pistons attached thereto, and which are pierced with slots in such a manner as when quickly moved up and down among the albumen converts this latter into a frothy mass. This little instrument will prove useful to photographers and others.

Destruction of a Photographic Studio by Fire.—On Wednesday evening last week a fire broke out in a detached studio belonging to Mr. Whitehead, of 4, Pembridge-villas, East Acton, W. The building was 18 feet × 8 feet in circumference, and contained photographic apparatus and other valuable articles, which were all destroyed, the building being, in fact, gutted in a very short space of time. The damage is roughly estimated at £100. Mr. Whitehead believes the fire to have been caused by the accidental ignition of some drapery from a paraffine lamp.—*Acton Gazette.*

The Addition of Blue to Collodion.—Herr G. P. A. Garjeanne, of Amersfoort, says he has found that the addition of a blue dye to collodion considerably increased its sensitiveness. He had a remainder of collodion prepared according to the following formula:—

Ether	200 parts,
Alcohol	200 ,,
Cotton	4 ,,
Iodide of ammonium	2 ,,
Iodide of cadmium	2 ,,
Bromide of cadmium	1 part,

and a trace of nitric acid.

The collodion had become golden-yellow and was turning red; it worked slowly and hard. He stained it with Hofmann's violet BB (an aniline colour), after which the negatives became much richer and the sensitiveness was greatly increased. He then prepared another collodion—

Ether	200 parts,
Alcohol	200 ,,
Cotton	4 ,,
Iodide of cadmium	3 ,,
Pulverised bromide of potassium dissolved in a few drops of water	2 ,,

and stained it with methyl-violet. With a poor single lens and this collodion he took photographs with an exposure of five seconds in the shade, and almost instantaneously in the full sunlight. He, therefore, asks whether greater sensitiveness could not be imparted to collodio-bromide of silver by using a blue stain.—*Archiv.*

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician,
For the Week ending September 10, 1884.
These Observations are Taken at 8.30 a.m.

Aug.	Barometer.	Wind.	WetBulb.	Dry Bulb.	Max. Solar Rad.	Max Shade Tem.	Min. Tem.	Remarks.
4	29·43	W	54	55	77	63	54	Raining.
5	29·62	NW	52	56	102	67	47	Bright & Clear.
6	29·71	SW	52	57	85	62	47	Overcast.
8	30·15	W	56	60	84	64	53	Cloudy.
9	30·21	W	61	64	84	71	58	Overcast.
10	30·26	E	60	63	98	69	60	Overcast.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

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SULPHUROUS ACID AND THE SULPHITES OF SODA.

The perusal of the Rev. L. Macdona's formula for a soda developer in our last issue raises once more the question of how best to utilise the advantages derivable from sulphurous acid as a preservative of the pyro. solution and a preventive of pyro. stain. That sulphite of soda has secured a permanent position amongst the photographer's list of chemicals cannot now be denied, though there are still some who dispute its efficacy, and others again who insist that it is absolutely detrimental. In the course of the present article we shall attempt to show where these discrepancies may, perhaps, arise.

The history of this application of sulphite of soda may be said to date back as far as 1877, when in an article on the late M. Sammann's "hydrosulphite" developer (vol. xxiv., p. 26) we pointed out the peculiarity exhibited by that solution, viz, that, however long it might remain exposed to the air, and however much discoloured it might become, it remained clear and free from sediment. In connection with collodion films this was a matter of minor importance, and it was only on the introduction of gelatine plates and the advent of the new trouble—pyro. stain—that the peculiar action of sulphurous acid assumed a special value. Mr. H. B. Berkeley was the first to recognise this, and in our Almanac, some three or four years ago, published a formula for development in which sulphite of soda figured. Subsequently Mr. J. Y. McLellan recommended sulphurous acid itself as being preferable on account of its exercising no slowing action upon development. The alleged existence of this latter fault appears to be the chief, if not only, argument brought to bear against the employment of the sulphite.

Such extremely-divergent opinions have been expressed on this point that it seems at first sight scarcely possible to reconcile them; and yet, upon inquiring closely into the matter, much of the discrepancy is explainable. Sodic sulphite, as our readers are well aware, is an extremely unstable salt, changing rapidly to sulphate by absorption of oxygen from the atmosphere. Sodic sulph*ite* and sulphurous acid are most powerful reducing agents, and, as such, aids to development—a fact which we first pointed out in 1877, in the article already referred to, when we showed that either the neutral or acid sodium sulphites, in conjunction with pyro., were capable of development. More recently—within the last few months—we have gone more fully into the matter. Sodic sulph*ate*, on the other hand, as first pointed out by Mr. Berkeley, though apparently neutral in its reactions, exercises a powerful restraining action upon alkaline development; and here we have the key to the secret of the discrepancies to which we have alluded.

Thus, given a new and good sample of sulphite, we shall have the maximum of preservative action without any restraining—possibly with an actual acceleration or increase—of development. However, as the sulphite becomes oxidised not only is its beneficial effect lowered, but an injurious restraining action is set up; and it is easily conceived that with a badly-oxidised sample the balance may be strongly in the latter direction, and consequently against the use of sulphite.

That the alleged slowing action of the sulphite is usually attributable to the employment of impure samples is, we think, proved by the fact that where such complaints have been made they have generally been accompanied by another—that the salt will not dissolve to the extent given in the various formulæ. Now, sodic sulphite is a very soluble salt, while the sulphate is much less so; consequently, as the mass of sulphite becomes oxidised it becomes less soluble—that is to say, it requires a larger proportion of water to dissolve it.

It may be remarked incidentally here that, in using the sulphite of soda, the method usually recommended of making a saturated solution is far preferable to that given with some formulæ of weighing out a definite quantity. The following considerations will make this plain. Suppose, for example, we are using a sample of sulphite which has become oxidised to the extent of twenty-five per cent. If we weigh out the correct quantity to make a theoretically-saturated solution we shall have it really only three-quarters saturated, whereas by allowing the water to act upon an excess of the crystals it will become saturated both with sulphite and sulphate. In that case, though the preservative action of the solution will be at its maximum, so also, probably, will be the restraining power of the sulphate.

Looking at the uncertainties which surround the use of sodic sulphite the recommendation to substitute sulphurous acid seems a good one; but unfortunately matters are not very greatly improved for the majority in that case. Sulphurous acid, or rather the solution of the gas which goes by that name, is quite as variable—in strength at least—as the sodic sulphite, and as the ordinary source of supply is in many cases a country chemist the article obtained is not likely to be of a very definite character. At its best the commercial article is but a feeble solution, the strongest obtainable containing less than ten per cent. of real acid. In the majority of samples from commercial sources we have examined the proportion has been less than four per cent. A freshly-saturated solution made specially for the purpose of testing showed barely nine per cent. It is clear, then, that except under most favourable conditions the use of sulphurous acid presents little chance of securing certainty of result; but it has at least one advantage in the absence of restraining power: though it may deteriorate in strength the falling off is not accompanied in inverse ratio by an increasing slowing action. We are leaving out of the calculation, as of no practical moment, the gradual conversion into sulphuric acid. This is not likely to produce any appreciable effect.

The acid sulphite or bisulphite of soda offers another alternative. This, though an even less stable compound than the neutral salt, contains a much larger proportion of sulphurous anhydride, and is at the same time readily soluble. It is thus possible to prepare a more concentrated solution. We are not prepared to say what are the precise changes that proceed during the process of oxidation but *prima facie* it would seem that so long as the bisulphite gives evidence of containing free acid its efficacy should be above suspicion. From the looseness of combination of its elements it is probable that the first change is a reduction to the state of neutral sulphite, in which case so long as the salt smells of sulphurous acid we know that it is in a condition fit for use. On the other hand, if the formation of sulphate (and of sulphuric acid) proceed as rapidly as in the case of the neutral sulphite, the smell of sulphurous acid is little more than evidence of decomposition, and the bisulphite is of less value than the neutral salt.

It must be borne in mind that when the free acid or the bisulphite is employed an extra allowance of alkali must be made in the developer.

As regards obtaining a supply of the bisulphite, there need be no more difficulty than in the case of the neutral salt, and the price is about the same. In these days, if any difficulty exist in obtaining a supply of chemicals, in even the remotest country places, the parcels post opens up a ready means of communication direct with the manufacturing chemist.

A convenient method of preparing the acid solution, and one requiring little or no chemical skill, is to decompose calcium sulphite with sulphuric or oxalic acid, filtering out the insoluble lime salt. If definite proportions of the materials be adhered to, a solution of uniform strength can be prepared at any time at a few moments' notice, provided the calcium sulphite be pure. There, however, is the difficulty, and this plan is only recommended to those who do not care to follow a more difficult one. For a more perfect result proceed as follows:—Fit a glass flask or retort with a good cork, through which a bent glass tube passes; in the flask place some strong sulphuric acid and a few clippings or turnings of copper. Arrange so that the glass tube dips down to the bottom of another vessel containing distilled water, apply heat to the flask, and allow the gas to bubble through the water until it is saturated. If a solution of carbonate of soda be substituted for water, saturated with gas and then mixed with the same quantity of carbonate solution as that used at first, the result will be a solution of the neutral sulphite. The operation must be performed out of doors or under a flue with a good draught, as the fumes given off are very suffocating.

HINTS ON ARTISTIC MOUNTING.

There is no question whatever that, since the introduction of gelatine plates, the art aspects of photography have undergone a marked improvement. Pictures which, comparatively, a few years back were looked upon as really artistic productions would scarcely pass muster at the present time, and it is very gratifying to all that the general public is at last beginning to fully appreciate artistic qualities in photographic pictures.

Now, seeing that the artistic merits of the pictures themselves show so great an advance, and that these qualities are being appreciated, it becomes important, as we mentioned a fortnight ago, to devote more attention than hitherto to the subject of the mounting and framing, so as to render the picture an artistic one in all its bearings. With this end in view we shall now redeem the promise made at the time, and here give some practical details of mounting on what is technically known as "linen and stretcher." This system of mounting for large photographs, whether portrait or landscape, when neatly done is far more artistic than that of placing the picture in the orthodox cut-out mount, and, at the same time, it possesses the merit of novelty.

The first thing, in commencing operations, is to decide how much margin is desirable to the picture, and then to get a light frame or stretcher of the proper size made in pine, about three inches wide, morticed and glued at the corners. It is best to have the inner edge of the front of the frame rounded off, so that there be no sharp edge that can mark the margin of the picture when finished. Any carpenter will construct this for a trifling sum, and many picture-frame makers and artists' colourmen keep suitable stretchers in stock of different sizes. It is not necessary or desirable that the frame be "keyed" at the corners, similar to the stretchers of canvases for oil paintings; neither need it be so strongly made. However, it should be constructed of pine wood, as that is less liable to warp or cast than common deal.

On this frame must now be strained a piece of thin calico of fairly-good quality, and secured on the edges with small tacks. The calico need not be strained very tightly, as the after-treatment will tighten it up considerably. We next require some paper with a fine texture and of good colour wherewith to cover the calico. This paper should be sufficiently strong to allow of being conveniently handled while wet without fear of its tearing. That known as "drawing cartridge" is very suitable; but cartoon or continuous drawing-paper is far preferable, in consequence of its fine texture and pure whiteness, which it will retain better than most papers. It may be procured from all artists' colourmen, of various widths—from thirty-six to sixty inches—and of any length up to one hundred yards; so that, as a rule, it will be found not to cut so much to waste as that supplied in sheets. It may also be had of different shades and thicknesses. For our present purpose white will be found the best; for the smaller-sized pictures the thin is to be preferred, and for the larger the thick.

A piece of this paper is now cut sufficiently large to cover the frame and to lap an inch and a-half or two inches over the back. The print must then be carefully trimmed with a sharp knife and straight-edge. In trimming, care must be taken that the print is cut completely through with a single cut; otherwise a sharp, clean edge will not be obtained. It is very essential that it should, as it greatly enhances the effect to the picture when finished. What is now required is a basin of clean water, a couple of clean sponges, and the mountant. The mountant usually employed by picture-frame makers, who generally do this style of mounting, is common flour paste, frequently with alum and size added. But, for photographs, starch paste is far preferable for many reasons. The starch should be made as thick as possible and allowed to cool. When cold it should be so firm that it can be broken between the fingers.

All being ready the cartoon paper is laid upon a sheet—or, if it be very large, on several sheets—of perfectly-clean paper placed on a flat, even board, such as a drawing-board. The trimmed print is also laid, face downwards, on a clean piece of paper. It may be well to explain here that one side of the cartoon paper is much smoother in texture than the other. It is the smoother side that is to receive the print, and, consequently, it is that side which must be placed downwards. One of the sponges is now dipped in the water and the back of the cartoon paper is gone over evenly with it up to the extreme edges, so as to thoroughly moisten it—in fact, to make it decidedly wet. The calico is then evenly wetted with the sponge, and the back of the print also similarly treated. All is now allowed to remain until it is judged that the paper, calico, and print have expanded to their fullest extent. In the case of the cartoon paper this will take a considerable time; hence the reason for wetting it first.

Some of the starch is now put into a clean basin, and, with the dry sponge, is thoroughly broken up, so that it is quite smooth and free from lumpiness. A thin but even coating of the starch is then applied to the still-moist calico and well worked into the fabric with the sponge, taking care that the edges of the frame as well as some of the back are also covered. The back of the cartoon paper is next evenly starched all over. After resting a short time for the starch to penetrate, the stretcher is laid face downwards on to the paper, and the calico well rubbed down upon it from the back. When the calico and paper are in even contact—which is readily secured, as all air-bells are easily forced through the fabric—the frame is turned over, and the edges of the paper lapped over the edges and back of the frame, the corners, of course, being cut out to permit of this being done with neatness. Care must be exercised that the paper is well secured to that portion of the calico which is in front of the woodwork, as this cannot well be rubbed from the back.

Next, the back of the photograph is evenly starched, care being taken that the edges are well covered, but there should be no excess of starch to exude when the print is rubbed down in mounting. While the starch is soaking into the print the cartoon paper should be marked with two or three small dots made with a pencil, to serve as a guide as to where the print is to be placed. All that now remains is to mount the picture just as if it were being done on cardboard, taking care that it is well rubbed down at the edges and, at the same time, that no particles of grit or dirt get imprisoned between the print and mount.

If the print be of a very large size two persons are required in the operation—one to hold it, and the other to arrange it in position and rub it down. The margin of the picture should now be carefully examined; and if it have become accidentally soiled it should be gently cleaned with the sponge and water. But it is better not to wet the face either of the paper or the photograph, if it can possibly be avoided. The picture is now deposited in a place where it can dry free from contact with dust.

While all is wet the picture will look a very unpromising affair indeed; but, as it dries, it will shrink, and eventually become as "tight as a drum." Possibly during the drying the stretcher may twist or cast a little, but this will be of no moment, as it will become perfectly flat when framed. However, the warping may be avoided by securing the stretcher firmly to a wall or other flat surface while it is drying.

On a future occasion we propose to give some practical hints on mounting on india-paper and plate-making.

PATENTS.

A correspondence at present going on in our columns respecting a certain invention for which a patent has been obtained prompts us to offer some remarks upon patents, in what they consist, and the subjects for which they can be obtained.

A patent is virtually a monopoly conferred by the State upon an inventor, for giving up to the public upon certain terms the fruit of his invention. The State in this case is the trustee of the public. In effect it says to the inventor:—"You have an invention of which the public as yet knows nothing, but, as it will be of great utility, and it is undesirable that it be for ever retained as a secret, we will grant you a monopoly in its manufacture and use for a certain number of years, provided you will publish such a clear description of the same as any intelligent man can quite understand." Thereupon the inventor divulges his secret, makes payment of certain fees—at one time so exorbitant as to be deterrent, but now quite moderate—and the State protection is extended to him. This protection implies that the invention is that of the individual making the application, that it is one for a useful purpose, and that it is new in the sense of no prior publication having been made.

Some confusion appears to exist in the minds of many persons as to what forms the distinction between a subject for a registration and one for a patent. Broadly speaking, an ornamental design may be protected by registration; a piece of mechanism is a subject for a patent. The now extinct Ottewill's registered folding camera was, as implied in the name, made the subject of a registration, and, because of ignorance on the part of the public, no attempt at infringement was ever made, as it was believed that the protection of registration was all-sufficient. But had any case ever been brought before the courts it would have inevitably broken down, as it would then have been shown that the protection of registration applied only to such a design as could be drawn upon a flat surface, and not to any piece of mechanism involving configuration of parts. If an ornament, such as a floral or geometric design, had been introduced upon the top or sides of the camera *that* could have been protected by registration; but the camera, as a camera, is a subject for a patent.

A good and valid patent may be obtained for anything formed entirely out of a well-known and even patented parts, provided these parts are combined in such a manner as to form an apparatus not previously in use. But, while the inventor of such combination can obtain a patent for it which shall be valid, he will not be at liberty to make use of it until he has previously made arrangements with the proprietors of the respective parts referred to, provided they have been patented. In the specification of his invention he virtually says:—"I take that wheel which has been previously well known and I combine it with this lever and that pulley, both also well known; and by this combination, not previously known, I produce certain effects. I claim the combination, not the individual parts of which it is composed, as my invention."

A new application of a previously-existing invention is also permissible under certain circumstances. The yellow alloy known as brass is composed of copper and zinc, and in compounding these two metals it would be difficult indeed to specify proportions that have not been employed for some one or other purpose; yet, when Muntz obtained a patent for the application of a particular brass—the proportions of which it was formed having been specified—to the sheathing of wooden ships as a substitute for the copper previously in use for that purpose, an outcry arose, and much litigation ensued. The courts, however, ultimately decided that the Muntz-metal patent was valid. From this we may learn that minute differences in not merely the nature, but in the application, of an invention are recognised in the Vice-Chancellor's court when patent cases become subjects for adjudication.

THE CHOOSING AND USING OF A CAMERA.

A discussion of a very interesting character regarding what has been termed the "camera of the future" is at present proceeding in our columns, and its continuation can be productive of nothing but good, carried on as it is by gentlemen and with courtesy. At its outset the requirements of the tourist, who desires as little baggage as quickly unlimbered as possible, formed the chief topics under consideration; but photography and photographic outfits are too important to be treated from a single standpoint, and the photographer who needs to take out every convenience capable of being a real help to him is by no means a factor in the question that can be ignored. Perhaps he may mainly be found among professional ranks; but, at the same time, he exists and has requirements which may on no account be passed over. His first demand is efficiency, and then convenience, portability, and adaptability. His camera must be steady and, of course, provided with a swing-back. It should be as compact as possible and as easily to be used; in fine, must be a thorough combination of strength, convenience, and lightness.

Though the last two considerations have been well treated, some very important qualifications have been almost ignored; and, seeing that as much as possible is naturally always attempted to be carried out with a single camera, it will not be an inopportune moment to supplement the discussion by some practical remarks with this bearing, which shall also enlarge upon points of prime importance, consistent with the requirement that every class of work should be provided for in the one instrument. Whether such an instrument exists is another question.

We first take under our purview the tailboard. It will be noticed that the presence of a tailboard is almost constantly assumed; yet we venture to state that a camera with a tailboard is an unmitigated nuisance. Many patterns are to be had without such an *addendum*, and the practical photographer is aware of the great difficulties which frequently attend upon its use. There is little inconvenience with small apparatus; but when a 12 × 10 camera is used what can a man do with a dozen inches of tailboard under his chin when taking a dimly-lighted interior, a thickly-wooded glen, or an architectural view? Such subjects often require a lens with a focus of little beyond half the length of the plate, and it is then next to impossible to clearly see the most important part of the picture sufficiently closely to ascertain upon the ground glass the extent of the subject embraced. With a camera, however, which extends from the ground glass frontwards no difficulty whatever is experienced; the darkest view is easily seen, as the head can be placed in any position relative to the ground glass. The ground glass does not, as is so often supposed, exhibit the view as a picture equally brilliant in every direction. To see it clearly when the illumination is dim and the lens has not a large angular aperture it is necessary, as the practical man well knows, to place the eyes almost in a line with the image and the centre of the lens. We would, therefore, emphatically say that when choosing a camera, all other things being equal, the one without a tailboard should be selected; and we may further say that sufficient importance is rarely given to this consideration.

From the back of the camera we pass on to the front. When the tailboard is dispensed with the front of the camera has to be furnished with some analagous provision; and in too many cases this construction introduces another evil, which is not always either taken into account or thought of when purchasing a camera.

We refer to the possibility of the field of view being limited by the bearing upon which the front moves; whence it may happen that a negative when it comes to be developed may have a patch of almost bare glass projecting into the field of view, thus completely spoiling the picture. This is, again, not a light evil; but it is possessed by some very well-known cameras of otherwise most excellent and ingenious construction, both English and American. The camera may be of such a design that it will not show with a long- nor yet with a very short-focus lens. As a matter of fact, we have seen the work of professional photographers quite marred in this manner; yet it would be avoided with no great exercise of ingenuity if only the maker would exercise it or think it called for.

We saw a capital 10 × 8 camera the other day which had a folding framework in the front that was kept folded up for a short-focus lens, and let down for use with those of medium or long focus. With, however, an eight-inch focus lens—a size of wide use for a 10 × 8 plate—we found that the upright plate had a full inch and a-half cut off its usefulness by the image of the front bar of this extension framework being thrown upon the lower part of the plate. This could have been entirely avoided by hinging this front in two pieces. A similar result (the restriction of the field of view) is to be perceived in most patterns where the focussing is performed by the lens, and not the ground glass, being moved too and fro. The full force of this last consideration can only be completely demonstrated when the photographer has an important work in hand, and he finds that his favourite camera —mostly used with a plate placed horizontally—fails him at a critical moment with a subject requiring a short-focus lens worked with a plate vertically placed.

Then, again, upon this very point of upright or vertical position of the plate: all designs for a perfect camera will be incomplete which do not include a reversing back or its equivalent—a reversing back, we may explain to the less-skilled of our readers, being a loose framework to hold the dark slide, and capable of having its position reversed so as to enable the dark slide to be placed in either an upright or a horizontal direction, the power to do which is of great usefulness. Indeed, we may say that we think this comparatively recent invention one of the greatest practical boons given to the profession for a long time past.

The tyro often asks the question as to the difference in the use of a vertical and of a square camera, which, with the dark slides also, he sees the price lists always quote as being different in price. The answer is obvious; but with a reversing back a square camera only could be employed, a counterbalancing advantage, however, being found in the diminished price of the dark slides, which are necessarily constructed narrower in one direction than the other. Then the photographer, upon commencing operations, need be under no anxiety in regard to the position of the plate in the slide, as often happens with a square camera. With a reversing back he can put his plate in either direction, and can always be certain how the plate lies in the slide without any need to fly to the dark-room or to the changing-box.

There are many other considerations that we might dwell upon, but they will serve for another occasion. We have said sufficient today to lead any intending camera purchaser to look upon the instrument under additional mental illumination.

It would appear as if the determination arrived at some time ago to enforce the law in the suppression of the improper use of the royal arms by photographers and others who are not qualified to do so is about to be enforced. We learn that on Tuesday an application for a summons against a well-known firm was made at Marlborough-street Police Court for styling themselves "photographers to the Queen," and for making use of the royal arms in connection with their business. The summons was made returnable on the 30th of this month. This being the first case of the kind that has been brought before a court for adjudication much interest will, doubtless, be felt in the result.

The performance organised by the Balloon Society on Monday last for the purpose of celebrating the "centenary" of ballooning in England came off at Moorfields, the drill ground of the Honourable Artillery Company at Finsbury. Three balloons were sent up—one of them, the "Monarch," carrying our enthusiastic friend, Mr. Cecil V. Shadbolt. Great and special preparations had been made for the supply of the necessary gas to fill the three large balloons, and after their departure the surplus energy was, we believe, let off in the form of speeches.

From an announcement in another column it will be seen that the closing time for the receipt of exhibits intended for the forthcoming Exhibition in Pall Mall is now very near—indeed, will have passed when our next number appears. Lest any of our readers may have forgotten the necessity for action at this time we give them a reminder. From reports that reach us privately we believe that this year's collection will contain more than the average of foreign work; so it behoves our own representatives to do their utmost.

We learn with regret that the American fortnightly journal, *Photography*, which was started only a few months ago, in Chicago, has ceased to exist with the number of the 15th of the present month.

As a matter of journalistic enterprise it is worthy of notice that *Harper's Weekly*—a New York illustrated paper—has, in connection with the recent meeting of the British Association, given a series of portraits of the leading scientific men of Great Britain and the Association. Amongst these we are glad to find that of Mr. James Glaisher, F.R.S., the well-known and popular President of the Parent Society.

Iodised collodion is now nearly a thing of the past, but we have just come across a new application of iodine. Encountering one day a bottle, on the label of which the word "iodised" was very prominent, but the shape of which was not collodion-like, we found it to contain "iodised cod-liver oil!" Our first thought was that "they will 'iodise' anything now that collodion is out of fashion;" but we have since heard a good deal of the beneficial and curative effects of this novel preparation. In one special case that has been brought to our notice the value of the preparation has been shown in an unmistakable manner. Iodine manufacturers may, therefore, note that their occupation is not yet gone.

A long time is required to thoroughly bring the fact home to book illustrators that there is such a mode of illustration as permanent photography, and that an absolute *facsimile* is produced by its means. We still have hand-drawn or written reproductions of maps and similar subjects, and the days of elaborate and expensive prettinesses of engravings from photographs of natural phenomena—indifferent photographs, it may be, but still containing the only evidence available—are not departed. Yet photographic aid is constantly being brought to bear in an increased degree, and every evidence of its value is satisfactory. An excellent case, bearing on the point we persistently maintain, occurs in the current number of the *Athenæum*, which, criticising the illustrations to a work of archæological interest, says:—"The photographic *facsimiles* of the map and bird's-eye view of the castle, drawn by Sir C. Hutton's steward in the year 1588, are far superior in authenticity to the repetitions of those drawings given by Hutchings in his county history." Yet the pretty engravings and the striking effects of the cartographer's art will continue to flourish for a long time.

The straits to which photographers in out-of-the-way places are frequently reduced have often formed the basis of amusing stories; but it is some time since we had so interesting an account of embarassments overcome as that given by a gentleman at a recent meeting of the Virginia State Pharmaceutical Association, who was describing his experiences of the difficulties attending pharmacy during the civil war in America. He said:—

Nitrate of silver was soon in demand. An artist friend in Richmond, and in the employ of the Government, wrote to me that he must have some. Fortunately I had several carboys of different acids, and silver was not very hard to procure; indeed, every article, from a silver button to a solid salver weighing some ten pounds, found its way into the greedy maw of nitric acid. But, again, the appliances of the laboratory were wanting. One single half-gallon evaporating-dish was all I had, and I soon found this article was beyond all price. For many months it was true and loyal, doing double duty as a vessel both for solution and crystallisation. The silver, as picked up wherever I could find it, was very impure. This was first dissolved in equal parts of nitric acid and water; then, with a saturated solution of salt, precipitated as a chloride, then carefully washed until all impurities were gone, reduced by zinc to metallic silver, redissolved, filtered, and crystallised. But the hospital soon demanded lunar caustic. Where were the moulds to come from? I drew a plan, and, after much persuasion, a gunsmith undertook the manufacture of the moulds. But first the brass plates had to be moulded, and the foundryman said he had not time to make the pattern, and, even if he had the pattern, had no brass with which to cast the plates. Fortunately I remembered that an expert in pattern-making was then living in Lynchburgh, and he kindly made the pattern. Then I hunted up some old brass, and, after much delay and begging, the plates were cast. But a new difficulty presented itself: I had nothing in which to fuse the crystals. As stated before, I had but one evaporating dish, and I feared to risk this; so, after writing to every city and town in Virginia, I at last procured a four-ounce porcelain capsule, for which I paid the moderate sum of forty dollars. A pair of pincers made of wood—one blade concave and one convex to fit the curved surface of the capsule—formed the handle, and very soon lunar caustic was produced in sufficient quantity to meet the demand. Bad as were the times, we confederates still tried to keep up appearances. Grey hair had to be turned to black, and our friend, Dr. Hugh Blair, used much of this nitrate of silver in the preparation of his most excellent hair dye.

For some time past the American dealers in such photographic chemicals as collodion, ether, &c., have been mulcted in a two-dollar license; but quite lately this has been pronounced illegal by the higher authorities.

Why Tropical Man is Black is the title of a recent article in *Nature*, the general aim of which may be summed up by saying that the writer looks upon the black of the negro's skin as similar to the backing of a plate to prevent the local action being lost or to increase its accentuation. He concludes his paper by giving an extract from Carpenter's *Physiology*, which he considers to demonstrate, extraordinarily, "the truth of the proposition that skin colour is in direct proportion to light rays;" and by saying: "May it not, therefore, be claimed that there is much foundation for the suggestion that the black skin of the negro is but the smoked glass through which alone his widespread sentient nerve-endings could be enabled to regard the sun?"—that the coloured natives are, in fact, a species of walking photometer.

A propos of the subject of the atomic weights of the elements so often discussed in our columns, we may call attention to the fact that the exact numbers representing these weights as usually given in the text-books are not borne out by experiments, and, in fact, the whole subject of the weights of the elements is not in the most satisfactory state. We have on more than one occasion called attention to points of special interest in Mr. F. Wigglesworth Clarke's important series of calculation of the atomic weights, and we now give a list of the weights of a few important elements as found by the best investigators, and also as corrected by an allowance to be made for errors introduced by weighing the silver when it contained oxygen, most samples of silver having been found by Dumas to be thus adulterated, so to speak. (As we have before stated, the weight of a large number of the elements depends upon that of silver):—

	Uncorrected.	Corrected.
Silver	107·923	107·896
Chlorine	35·451	35·478
Bromine	79·951	79·978
Iodine	126·848	126·875
Potassium	39·109	39·083
Sodium	23·051	23·024
Sulphur	32·058	32·058

Our contemporary, the *English Mechanic*, gives some recipes for colouring brass which seem to bear the impress of real usefulness. A black such as is used for diaphragms may be imparted by dipping in or painting with a mixed solution of chloride of platinum and nitrate of tin. The Japanese use for bronzing a boiling mixture of sulphate of copper, alum, and verdigris. Success in bronzing depends upon the temperature of the solution and the article to be coloured. Steel colour is produced by a boiling solution of chloride of arsenic, while a concentrated solution of sulphide of sodium gives a blue colour. A brown colour is developed by keeping the object in moistened sand for some time; another shade of brown by immersion in a solution of nitrate or chloride of iron; and an olive-green by a mixed solution of chloride of arsenic and iron.

ON TOURISTS' CAMERAS, &c.

Having read with considerable interest the various articles which have recently appeared in the Journal on the subject of tourists' cameras and their shortcomings, it has appeared to me that, assuming Mr. A. Pringle to have expressed his wants as an accomplished amateur, and Mr. George Smith his experiences as a practical manufacturer, &c., neither of them have written from the point of view of the principal person concerned—that is, the average gentleman amateur who practises photography as a hobby (among perhaps many others), or who simply wishes, with as little trouble as possible, to secure mementoes of his wanderings.

With the view of ventilating this last gentleman's wants and opinions the following notes are added to the discussion. Do not let anyone imagine for a moment that I wish to pose as an average amateur; but, having launched a small army of them on their troubles during the past season or two, I may perhaps be permitted to know a little about their wishes on the subject. "It is a great bother carrying the apparatus," says one. "It is *too much* trouble ditto ditto," says another. "I *dread* the *impedimenta* necessary," says a third. In these or similar words I venture to say the great majority of tourists would express their principal objection to the kits they employ.

On analysing this objection to carrying the necessary apparatus it is found to be produced by two causes—first, its weight; second, the awkward way it is usually arranged for carrying. These two causes, which at first sight appear distinct, are, as a matter of fact, inseparable; for the weight which a man can carry with comfort depends almost entirely upon its disposal about his person. For instance: a set of apparatus weighing (say) seven pounds can, if supported *comfortably* on the back, be carried during a twenty-mile walk without one's hardly being aware of its presence; while the same set carried in one hand would be to most people an intolerable nuisance.

It is, of course, obvious that any improvement which reduces the weight of apparatus must prove invaluable, since it will enable the tourist to satisfy his longing for larger pictures; but, unless it be a change in the material with which apparatus is made, or Mr. L. Warnerke's roller slide becomes practicable with gelatine films, it does not appear possible that the weight of apparatus as constructed by our first-class makers can, consistent with retaining sufficient strength, be materially reduced.

Coming, now, to the second cause—the awkward way apparatus is usually arranged to be carried: it appears to me there is room for considerable improvement. A thick leather case with sling strap often strong enough to carry twenty times the weight, and together in the smaller sizes weighing as much as a third or even more of the total weight of the kit, is the sort of thing usually employed to contain the camera, &c., and which, when slung over the shoulder, jolts and knocks against the back in a most uncomfortable manner, the result being that it is usually taken off and carried by hand. Besides this, there is the stand, or, in other words, another awkward parcel to carry.

Why should not light, flexible cases be constructed for the smaller-sized cameras, sufficiently strong to protect them from injury, and yet which can be carried on the back with comfort? Something after the style of the tourists' knapsack is what I have in my mind; or, if it be said that unless the case be rigid it will not protect the apparatus from injury when consigned to the "tender mercies" of the railway porter or carrier, then I should still prefer the light case, and pack everything for railway travelling, &c., in a portmanteau. To put the required conditions in general terms: *the tourist's want is a kit in which everything (including the stand) can be carried on the shoulders or back in comfort, leaving the hands entirely free;* or if the stand cannot be packed up with the other things it should fold up to use as a walking-stick.

For a recent trip I made attempts to get a set which could be carried in comfort during long walks and climbing expeditions, and a description of them will perhaps give an idea of what is wanted. "A 5 × 4 patent light camera, please, and let me have *as light a case as possible*, with sling to carry over the shoulders." On receiving the set it weighed, including three backs with plates, three portable lenses and stand, *nearly eight pounds*, the case alone weighing one-third the amount. The first improvement was to get rid of the separate stand. I got Mr. Steward, of the Strand, to make three pieces of light brass tube ten inches long, with U-pieces and clamping screws at one end; also, a light, triangular piece of wood with slots at each angle for the screws to slip in and clamp the pieces of tube tightly to it. When put together the three tubes and piece of wood formed a very short but firm tripod. I likewise obtained at the Crystal Palace three of the so-called "portable walking-sticks," which may be described to those who have not seen them as spiral bands of steel which, when pulled out—the overlapping portions twisted tightly together, and the loose ends slipped into sockets—form perfectly rigid walking-sticks. The loose ends of these tubular sticks, on being placed in the open ends of the short tripod, formed at once a camera stand quite as rigid as an average portable stand, but about half its weight, and which, by being packed in the case with the other things, obviated carrying two parcels.

As regards the practical value of this stand: it has not turned out to be everything one would wish. Several persons on seeing it have suggested that the spiral supports should be made the full length so as to fit at once into sockets on the wood top. This would be a great improvement, but cannot be done unless a different method be employed for tightening them; for, by the present mode of doing so, the arms have to be extended the full length of the spirals. Another fault is that the japan has come off and the iron rusted. To be durable much better material must be employed and by some means prevented from rusting. These modifications effected, a nearly-perfect portable stand for small-sized cameras would result.

Finally: I had a light strap made which fastened the case on the back in the same way as a soldier's knapsack, so that my hands were left free. The total weight now was about six and three-quarter pounds, and the kit could be carried tolerably long distances with a moderate amount of comfort. A much greater improvement resulted, however, by adopting a method of carrying the apparatus employed by a gentleman I had been visiting for carrying his dark slides. The leather case was discarded and the whole apparatus carried in a schoolboy's common flax satchel, whereby the weight was at once reduced to four pounds, and a degree of comfort hitherto unknown to myself obtained.

The next want to portability in tourists' apparatus to which I attach the greatest importance is getting rid of the focussing-cloth. I have heard many amateurs, especially lady amateurs, object very strongly to this at present necessary adjunct. Many will doubtless say this is a purely imaginary objection; nevertheless it is a very general one. In my own practice a thin Macintosh cloth, white on the outside, is always recommended, and it is astonishing what a difference even this little modification makes in people's feelings. As for the thick velvet cloths with their gaudy yellow linings, which dealers usually supply, a single look at them is sufficient to horrify people with æsthetic proclivities. The only way which suggests itself of getting rid of this nuisance would be to hinge a reflector on to the bottom of the focussing-glass, and fill up the sides and top—excepting two apertures on the top for viewing the image—with flexible cloth. If feasible, the additional advantage would be gained in the image not being inverted.

A third improvement wanted is that the lens should not have to be taken off the camera every time it is used; and how is it, by-the-bye, that opticians still recommend the rapid symmetrical as the best type of lens for general work? In these days of rapid plates the exposures required for most outdoor subjects are unnecessarily and too quick to be accurately timed by ordinary cap exposing, besides the convenience of rotating stops. I think eleven out of twelve photographers would recommend the portable symmetrical type of lens as the best to use where only one is employed. Mr. George Smith says he always employs a rapid symmetrical lens having a small stop where possible. Knowing his great experience with lenses I should like him to tell us why he prefers it to a portable symmetrical.

Returning to the subject of keeping the lens on the camera: an arrangement for fixing it so as to be flush with the camera front, with space for removing the cap and rotating the stops, would be very convenient, especially to the great number of amateurs who always use the same lens. Three stops, instead of half-a-dozen, would also, I think, be less confusing in the average amateur's eyes. I can heartily endorse all that has been said regarding the tripod-screw nuisance. Mr. Hare's method of fixing the screw to the top of the stand, as mentioned by Mr. Pringle, is a great improvement.

E. H. Farmer.

GRANULARITY WHEN COPYING.

The articles on avoiding granularity in copying paper photographs possessed great interest for me, as much of my business lies in that direction.

In giving my experience in this class of work I do so with the sole intention of showing by what entirely opposite means similar effects can be obtained, and how that in this department of photographic practice "one man's food may be another man's poison."

The recommendation given in the articles referred to are to illuminate the photograph by a *side* light in order to get rid of the grain. My own experience does not favour this method, as I have invariably found that, from a mountain downward to the minute granulation on the surface of a sheet of paper, the best and, indeed, the recognised way to render a protuberance visible is by the aid of a side light, which, in my experience, applies equally to the nose on one's face as to mountains or granulations on paper.

The principle of lighting a photograph so as to obliterate any asperities of surface is by a process of counterbalancing. If a protuberance or a pit on the surface of paper be lighted from the side it is brought into visibility by the shadow cast from it—a principle well recognised by microscopists in examining minute objects, and by astronomers when viewing the mountains, caves, and general rugosities of the earth's satellite. Whatever may be the experience of others, I find the same principle to prevail in my photograpic copying practice.

I well remember how, several years ago, either the late Mr. Jabez Hughes or Mr. John Werge brought before the public an arrangement for copying paper prints so as not to show their grain, and which, in my estimation, was absolutely sound in principle. It consisted in placing the picture to be copied at one end of a large tunnel covered with translucent paper, the camera being placed at the other end. This ensured a nearly equal illumination from all sides alike; and it comes up to what I have since found, by an extended experience, to be the best conditions for destroying granularity.

In ordinary practice I illuminate the picture by nearly direct light, shutting out all strong side light. To get a beam of direct or front light to fall upon the print I have a mirror placed close to that side of the camera on which the sun's rays are received, and projected directly on to the print. In this way I get rid of granularity or texture; but I invariably find that when I employ a side light the texture is visible.

Again, and as an illustration of another point in which doctors differ: I take special care not to move either the lens or the back of the camera during an exposure. Such movement may, and doubtless will, produce softness to any extent, by placing the image out of focus; but in my own practice I aim at the greatest degree of sharpness attainable, and, therefore, adopt every precaution against movement of the camera.

George Newton.

THE SODA DEVELOPER.

As I have been working in a not too roomy tent in the hot weather of this summer I experienced no little inconvenience from the fumes of ammonia, so I decided to give a trial to some other alkali. I tried first of all potash, but soon gave that up, owing to the "bottle-stout" character the developer acquired, and because of the unpleasant colour of the resulting negatives. I then tried soda, and of this I cannot speak too highly. I would not willingly return to ammonia. I do not mean to say that soda has no disadvantages, for it undoubtedly has; but its advantages very greatly outweigh them.

In the first place, it is much slower in its action, though I do not think it slows the plate; in fact, the result seems to be the reverse. I purposely under-exposed two plates, developing one with ammonia and the other with soda, and the latter was by far the better negative and a quicker printer; but it takes from eight to ten minutes to get sufficient density. Personally I do not mind this, as even with ammonia I like a slow developer. This, however, may be a serious inconvenience to a professional photographer in a studio.

The advantages of the soda developer are its extreme cleanliness and brilliancy of the negatives without hardness, even in under-exposed plates. I exposed a plate at a group which turned out to be under-exposed, and I am perfectly certain that with ammonia I should have got an unprintable negative. I enclose an under-printed proof and also one of a landscape. I gave this four seconds in order to get detail in the near trees, and I think you will agree with me that there is a fair amount of detail in them, considering how much there is in the distance.

Some of your correspondents have complained of frilling. I have never had a sign of it, and have been using four makers' plates. I use the chrome alum of citric acid before fixing (as recommended in the Journal some six weeks ago), but no alum afterwards.

The constancy of the developer is a great charm. An amateur who makes up a developer with ammonia, using (say) half, and has no occasion to use it again for some time, and then only at intervals, really knows little of its strength.

I have not succeeded in doing away with the bromide, as some of your correspondents recommended; for I could get no density except with an excessive amount of pyro.—five or six grains to the ounce. I use anhydrous carbonate of soda, as I then know where I am, and it is much more soluble than washing soda. I employ the sulpho-pyrogallol of the Platinotype Company or a similar compound, and make up the soda thus:—

Anhydrous carbonate of soda	6 drachms.
Sulphite of soda	3 „
Ammonium bromide	1 drachm.
Water	9 ounces.

To develope a whole plate take—

Sulpho-pyro.	60 minims.
Soda solution	1 to 1½ ounce.
Water	3 ounces.

I add the soda by degrees in the ordinary way. The development is under far more control in my hands than the ammonia was. I also have handy ten-per-cent. solutions of soda and bromide, but very seldom have to use them. I find it almost impossible to get a hard negative or to fog one.

On reading over the foregoing I find I have only mentioned one disadvantage of the soda, viz., its slowness. I was going to add the difficulty of getting density, but this is entirely obviated by the use of a bromide. W. N.

P.S.—The negative becomes a cold grey with not a trace of yellow.—W. N.

THE LATE DR. J. J. WOODWARD.

The death is announced of J. J. Woodward, surgeon, United States Army, the well-known microscopist, whose admirable photomicrographs, produced during his official connection with the Army Medical Museum, Washington, have given the pre-eminence to America for this branch of scientific microscopy. About 1866 he undertook an exhaustive examination of the microscopic test-plate of nineteen bands of lines ruled by the late F. A. Nobert, of Prussia, and succeeded in photographing and counting the lines as far as the fifteenth band (at the rate of 90,090 lines to the English inch) by means of Powell and Lealand's dry 1-16th object-glass. Later, using the then new immersion 1-16th object-glass of the same opticians, he photographed and counted the lines in the four highest bands of the same test-plate (19th band ruled at the rate of 112,612 lines to the English inch). These photographs were submitted to M. Nobert, who had up to that period doubted the possibility of resolving the lines ruled in the four highest bands. After inspecting them M. Nobert acknowledged that the lines were resolved and accurately counted, agreeing with his record of the numbers actually ruled.

Dr. Woodward subsequently made a large series of photomicrographs of test-objects, blood corpuscles of man and various animals (on a micrometer plate, so that the respective diameters could be estimated by inspection), and many physiological preparations representing his official work at the Museum, and these formed a notable feature at the Philadelphia Exhibition of 1876. His latest work in microscopy was the production of a number of photomicrographs of the diatom *Amphipleura pellucida*, with object-glasses on the homogeneous immersion formula. The various series of photomicrographs were forwarded from time to time to the Royal Microscopical Society of London, of which Dr. Woodward was elected an honorary fellow in 1875. In the production of his photomicrographs Dr. Woodward used sunlight (with mechanical heliostat), oxyhydrogen light, and magnesium, publishing full details of the methods he practised.—*The Times.*

PHOTOGRAPHY IN BELGIUM.

[From Our Special Correspondent.]

The Production of Belgian Ordnance Maps by Photographic Aids.

In continuation of the description commenced in my last communication of the method of obtaining a design upon copper by photographic aids, for the purpose of reproducing Belgian military maps at *L'Institut Cartographique Militaire*, near Brussels, it was stated that the apparatus for taking reduced negatives from large tracings of the maps is placed in two huts on the top of a hill. The camera is in one hut, and the tracing is mounted on apparatus beneath the slanting roof of the other hut, but so well forward that the direct light from the sky falls freely upon it. The camera will draw out to the length of two metres, and is large enough to take plates 50 × 60 centimetres in size; it is very solidly mounted on a heavy iron stand. The camera is chiefly formed of three wrought-iron pieces of framework—two of them of about the dimensions of the dark slides, whilst the third is but large enough to carry the flange of the lens. This small frame and one of the larger ones are united by means of a copper cone, which thus forms the front part of the camera. The movable back of the camera is joined to the front cone by a bellows body, and its distance from it is regulated by means of an endless screw. The camera rests upon two rails made in the same piece with a circular plate, which turns by friction upon a second disc on which it rests. These two plates have a common axis, round which one turns by the motion of a screw with a handle. The lower plate carries two trunnions, by the operation of which it rests upon a structure of cast iron. A graduated circle fixed under this plate, normal to the trunnions, permits the communication of a vertical angular movement to the camera by means of a winch. By combining this motion with the angular horizontal motion obtained by means of the plates, it is easy to place the optical axis of the lens with scientific precision perpendicular to the plane of the map to be copied. The map is then necessarily truly parallel to the ground-glass focussing-screen of the camera.

The screen to carry the map to be reduced is so made as to carry the map in a truly vertical position. It is so constructed that by means of winches a series of movements can be given in any direction. Two cast-iron uprights, which serve as guide rails, carry a platform, to which a vertical motion can thus be given. This platform carries another, to which a horizontal movement can be given by mechanism constructed on the same principle. This second support carries apparatus by which a swing motion can be given to the map, and it has four fastenings to hold the plate carrying the design.

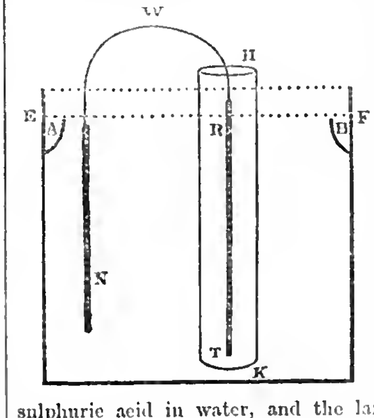
The camera with its stand runs upon rails truly levelled, and laid in a direction perpendicular to the face of the screen. Thus the adjustments of the whole apparatus to reduce the map with exactitude are firm, heavy, and work with scientific precision.

For the very large plates used in this apparatus the wet collodion process is found, all things considered, to be the best. Gelatino-bromide plates have, however, sometimes been tried, and in the days of old even the Taupenôt process and Russell's tannin process have been used. Rapidity is no object; the chief points desired are clear whites and blacks and good definition. Collodion, with a somewhat acid reaction on the bath gives this, and the intensity is obtained by the excellent plan of using bromide of copper, as described in my last.

The map has now to be copied from the negative upon thin sheet copper. A proof is first printed upon carbon paper, and the undeveloped sheet is placed face downwards upon the copper. Four thicknesses of dry blotting-paper are then laid upon the back of the paper proof, and upon these four wet sheets of bibulous paper: then without a moment's delay the whole is subjected to the hydraulic pressure of 200 atmospheres. By this clever plan the proof is under immense pressure before the moisture has time to first work its way through dry sheets, so that when the gelatinised carbon paper is at last wetted it cannot expand under the pressure; if it did so the ordnance maps would not be true to scale. Neither the paper nor the gelatine is allowed time to swell before the pressure is upon it, and the pressure is continued for half-an-hour.

The map is then developed upon the copper by means of warm water. The plate is next allowed to dry, after which plumbago, of specially-selected good electrical conducting power is distributed over the plate with a large, soft brush. The plate is breathed upon at times to facilitate this blackleading operation, which enables the copper, subsequently deposited by electricity, to spread over the ridges of oxidised gelatine as well as over the original copper plate. Without the film covering of plumbago the gelatine lines forming the design would have no appreciable conducting power for electricity.

The accompanying diagram represents the means by which the electrocoppering is performed. It will be seen to be of the simplest and cheapest description, no separate battery being employed. The battery and decomposition cell are in one. In the arrangement at the Brussels Military School the porous cell H K is seventy-five centimetres high and twenty centimetres in diameter. The zinc plate R T is seventy centimetres long, eighteen centimetres wide, and one centimetre thick, connected with the copper plate N, with its map design, by the wire W. The blackleaded face of N is turned towards the zinc plate R T, and is twenty centimetres from the exterior of the porous cell. The porous cell is filled to the level E F with a ten-per-cent. solution of sulphuric acid in water, and the large outer vessel is filled to the same level with a saturated solution of sulphate of copper. The electro-deposition of the copper then goes on slowly, it taking from ten to thirty days to throw down a plate of sufficient thick-



ness. As the copper is slowly deposited upon N, the sulphuric acid of the salt is deposited upon the zinc plate, which it slowly dissolves. The sulphate of zinc formed in excess crystallises on the outside of the porous cell. In course of time some free sulphuric acid finds its way through the porous cell into the sulphate of copper solution. As this interferes with the quantity and quality of the copper deposited Lieut. Massaux neutralises it with oxide of copper. It is not necessary to perform this neutralisation more than about once in six months. Acidulated water has to be added to the zinc cell now and then. In order to keep up the saturation of the sulphate of copper solution, crystals of sulphate of copper are placed in vessels pierced with holes, and suspended at the four corners of the outer tank; one of these vessels is represented at A and another at B. When, as is usually the case, the copper sheet to be deposited is very large, two zinc plates in porous cells are connected with it instead of one. In order to obtain the electro-deposition of good malleable copper, it is necessary that the surface of zinc employed should bear a certain relation to the area of the surface of the copper, and the distance between the zinc and the copper plates is a matter for regulation. Unless the intensity and quantity of the current be properly regulated it is possible to throw down the copper either in a brittle, crystalline condition, or as a soft, brownish-black mud. The rule given by Alfred Smee for obtaining copper in the malleable condition is that the current shall be so strong that free hydrogen is almost on the point of being given off from the copper plate, though it must not be strong enough for the actual evolution of hydrogen. The copperplate designs obtained by this process are very fine, and will bear high magnifying power.

M. A. de Blochouse uses the hydraulic press method of placing designs upon zinc, and at the Brussels Military School, as we have seen, it is used to place designs upon copper. It is preferred to the plan of printing direct from the negatives upon the plates themselves. The method employed at the Military School to impress designs on stone and on zinc is the following:—A ten-per-cent. solution of bichromate of potash is mixed with an equal bulk of a twelve-per-cent. solution of gelatine. The resulting mixture, therefore, contains—

Bichromate of potash	5 grammes.
Gelatine	6 ,,
Distilled water	100 cubic centimetres.

The gelatine is of good quality, and the bichromate of potash is purified by several successive crystallisations. This mixture is applied uniformly by means of a soft sponge to the surface of the stone or zinc, as the case may be. In a few moments it is dry, and the surface may be exposed to light under a negative. It is necessary that the surface should be absolutely flat, so as to be in good contact with the negative at every part; the stones, consequently, are very carefully dressed and polished. The duration of the exposure to light is necessarily variable; sometimes about a quarter of an hour to direct sunlight is given, but a longer exposure in the shade is preferred. The stone is then taken into the developing room, the negative is taken off it, and the stone surface is rolled with a mixture of equal parts of ordinary lithographic ink and an oily "transfer" ink. The face of the stone is then gently wiped with a sponge dipped in tepid water containing a little starch. It may be remarked here that this plan of mixing a little starch with the developing water when soft rubbing by a sponge, or otherwise, has to be applied is much in vogue at Brussels; it reduces the friction and the danger of rubbing away any fine details of the original design. Under the action of the warm, starchy water the soluble portions of the gelatine couch come away, leaving the design clear and sharp upon the stone. This design is then inked afresh, and copies worked off as by the ordinary lithographic process.

A desire existed in Belgium for a chromolithographic chart of the country, to the scale of $\frac{1}{20000}$, and at the same time an objection existed to throwing new charges on the Treasury; consequently a rapid and economical plan had to be devised. In the first instance much handwork was necessary, and the results were not quite true to scale. In this fashion the environs of Antwerp were printed off in 1864. Just before this time the method employed at the English Ordnance Office at Southampton had attracted attention, as published in 1862 by the authority of the Secretary to the War Office. The plan, with some modifications, was tried at Brussels, but the results were found to be inexact in the matter of scale—a defect which threw discredit upon the whole system. The difficulty was overcome by using the photolithographic process just described. Major Hannot (from whose reports, as well as from the information and ocular demonstration given me by Lieut. Massaux, I have drawn largely) said that experience had proved that a second-rate design, if on a large scale, and vigorously drawn with a very black ink, would furnish excellent results when reduced by photography, and the work could be done by the less expert draughtsmen. Had this not been the case the expense of the work would have been much more heavy. In printing the maps in colours it is necessary to take each colour from a separate stone, on which the design for that colour has been placed by photolithography. Six stones are necessary for one map. On one of these stones red patches denote houses, lanes, and macadamised roads; on a second water, rivers, and streamlets are inked in blue. Another colour is a ground tint indicating cultivated soil (this indication having been found to be useless is omitted in the later maps); another tint represents gardens, another moors, and another woods and forests.

As attention has been directed in England to the delay in finishing the home Ordnance Survey, those who wish to investigate the matter might compare the speed of work and accuracy of result with what has been done in this respect in Belgium. In the latter country the entire land has been mapped to two or three different scales, and a chart of the nation in six colours printed off by chromolithography.

A PHOTOGRAPHIC WALKING TOUR IN WALES.

[A communication to the Derby Photographic Society.]

Having been requested to write a paper for this Society, and only having a short time for this purpose, I have decided to write on the subject of my holiday. It may interest at least some of my amateur brethren, and perhaps give them a "wrinkle" for the future when they are meditating on what to do with themselves during their holidays. Last Easter a friend and I were talking over our coming holidays, so it struck us that nothing would be better than to have a short walking tour in Wales, and the matter was then and there decided. As the time drew near for our holiday I confess to feeling a considerable amount of pleasurable excitement in getting my "traps" ready. I may as well at once describe the photographic kit which I took with me. In the first place, I took a 5 × 4 camera, by Watson and Sons, fitted with three double backs. The lens was of the rectilinear type (of foreign make, I believe), and having a back focus of seven and a-half inches; it is a most excellent lens, although it wants the maker's name. The camera, lens, and back were fitted into a case of American cloth, and the legs were of a light, folding pattern. The camera, legs, &c., weighed about eight pounds. For changing plates I took with me a folding lantern, which I obtained from Mr. J. Werge, of Berners-street, London. I consider the lantern is so excellent both for changing plates and developing by, and so very portable, that I have brought it for the inspection of the Society. Besides the plates which I took with me I took a few empty boxes and paper in which to pack my exposed plates. Here let me give a word of advice to those who wish to carry plates safely when travelling, viz., let them pack them in their portmanteaus between articles of clothing. I did this, and, although our luggage frequently had very rough treatment, I had not one plate broken.

At last the eventful day (the 4th of August) arrived, and we started from Derby for Conway. As you all know what the weather was at that time, I need not tell you what our journey was like. We arrived at Conway a little after three o'clock, and after making arrangements for dinner and beds I, the impatient photographer, felt bound to rush off and photograph the well-known castle. I first went inside, as I wished to have a "shot" at the interior of the banquetting hall, or whatever they call it; but unfortunately I found my lens was too long in focus to get what I wanted. After trying every position I reluctantly left the interior to try my luck outside. I took two views of the castle—one from near the entrance, the other from the shore. These two views are shown in the prints (Nos. 1 and 2). The next morning we started off to walk from Conway to Bettws-y-Coed by the right bank of the river Conway. The walk is a very beautiful one, but for the first few miles I did not light upon any subject for my camera. After we had gone about six miles we came upon a man with a cart going to Llanrwst with empty soda-water bottles. This good Samaritan offered us a lift, which we thankfully accepted, as we were nearly melted; and, seated on boxes full of empty soda-water bottles, we made a triumphant entry into Llanrwst. There I had my first "shot" for the day, and secured a good photograph of Llanrwst bridge from the river. This is print No. 3.

Resuming our journey, in about three and a-half miles more we reached the old bridge called Pont-y-pair, at Bettws-y-Coed. I at once attacked the bridge, and then took a "shot" from the bridge looking up the stream—the Llugwy. The results are shown in prints 4 and 5. The next view I took (No. 6) was of the stream in front of the "Royal Oak Inn," while my companion went on to secure rooms and see after the luggage. After luncheon we determined that we would go and see the well-known Miners' Bridge. This bridge I consider a decided fraud. In former days it was a strong ladder reared from one edge of the stream to the top of the bank on the opposite side, and there might have been something curious, if not picturesque, about it; but at the present date it is merely a wooden bridge with a hand-rail at each side, and is neither curious nor picturesque. However, I got two nice views (Nos. 7 and 8) of the stream near the bridge. The next morning we were up early and started for the Fairy Glen. Unfortunately, the light came the wrong way for getting the best photographs of the upper part of the Glen; an afternoon light would have been better. However, I got two pictures of that part (Nos. 9 and 10), which were good, considering that the sunlight was almost coming full into the lens. I got three pictures of the lower part of the Glen (Nos. 11, 12, and 13), for which the light was better. We then returned to our hotel, and on the way back I got a view from a field just below the Waterloo Bridge (No. 14). When we got back to our hotel I made inquiries as to a cellar in which I could change my plates. They took me to the so-called cellar;

but, when I got there, I found that it was not underground, and that floods of white light kept streaming in from different parts. This looked bad. However, my friend and I took off our coats, and, after a great deal of trouble, we managed therewith to block out the greater part of the light, and then proceeded to change our plates in fear and trembling. If any plates ran a chance of being fogged mine certainly did on that occasion. However, "all's well that ends well," and the negatives developed as brilliantly as one could desire. After lunch we started for Pandy Mill. I took duplicate photographs of the mill, and show a print from one of the negatives (No. 15); and I then took a picture (No. 16) of the bridge below the mill, which would have been improved if the sun would have kindly got under a cloud for a few seconds. We then went on to the Conway Falls, of which I also took duplicate negatives; both negatives were fair, and I show a print from one of them (No. 17). On our way back to the hotel we came across a lovely pool where we could get a plunge into fifteen or twenty feet of water. We made a mental note of this place. Next morning we were up early, and started off for our pool; there we had a luxurious bathe before anyone was about. You may fancy the luxury of such a bath during the tropical weather we were having. After breakfast we started by coach, intending to drive to Pen-y-gwryd, but at Capel Curig we were so charmed with the scenery that we determined to leave the coach and photograph. Here I got two photographs (Nos. 18 and 19)—one of the stream with rustic bridge, and the other of the stream and trees, with Moel Siabod in the distance. After this we began the hottest walk we had during the whole of our tour. During the entire of our walk from Capel Curig to Pen-y-gwryd there was not an atom of shade, and the heat was intense. How grateful was the shandy-gaff when we reached our hotel. I took one photograph only (No. 20) on this part of our walk.

I had wished to get a good view of Snowdon from this part of the road, but there was a great heat haze over the mountain, which foiled my intentions. After luncheon we started down the Pass of Llanberis, and here I took three photographs, two of which I show (Nos. 21 and 22). The third, which was very good, I unfortunately managed to scratch after it was finished, and it is utterly spoilt. After spending that night at Pen-y-gwryd, we started off on our way to Beddgelert, through the lovely vale of Gwynant, past the Lakes of Gwynant and Dinas; this I consider to be the lovliest part of our whole tour. I show three views of the Lake of Gwynant (Nos. 23, 24, and 25), and one of Lake Dinas (No. 26). When close to Beddgelert I had another "shot." I hardly know what to name the view, so I have called it a view near Beddgelert (No 27). We put up at the well-known "Goat Hotel." After a short rest we explored Beddgelert and its surroundings; but I did not take any more photographs, as I did not care again to risk changing my plates in the daytime. The next day we started off to walk over the mountains to Tan-y-Bwlch. I had two shots at the Pass of Aberglaslyn before we struck off into the mountain path. I show one of these views (No. 28); the other was much over-exposed.

The walk over the mountains is exceedingly beautiful, and I cannot speak too highly of the charms of a certain mountain stream which we came across. There was a lovely deep pool under a bridge, and I should think we amused ourselves for over an hour bathing in this said pool. I show one photograph taken on this walk (No. 29) secured from a place called Croesor. At the end of this walk we came to the "Oakley Arms" at Tan-y-Bwlch, which is a quaint old inn and well worth a visit.

Next day was Sunday, and intensely hot, so the only exercise we took in the daytime was to stroll about the beautiful grounds of the Oakley family. In the evening we took the mail car to Festiniog, and thence went by rail to Dolwyddelan. From this place we walked by Pont-y-Pant to Bettws-y-Coed, and I only regretted that it was late in the evening, for the scenery was beautiful. The next morning, after a bathe in our favourite pool, we set off for the Swallow Falls; but, alas! on our arrival there, just as I was setting up the camera, down I fell with it on to the rocks. The camera was an utter wreck, and one of my legs was damaged. However, I cared more for the camera than I did about my leg, for I was just about to attempt some lovely pictures.

This ended our tour, and we came back. In conclusion: I may say that my exposures ranged between one second and two minutes, and that the quantity of soda and milk which we swallowed would have floated a good-sized fishing smack. CHARLES E. ABNEY, B.A.

WHERE TO GO WITH THE CAMERA.

[It is hoped that this series of articles will be continued at regular and frequent intervals during the vacation months, and we shall be glad to receive contributions to the series from any friends able to treat of new and interesting ground.]

BOURNEMOUTH AND ITS NEIGHBOURHOOD.*

THE Madeira Walk for invalids is in the gardens that run right through Bournemouth and continue on for over two miles. The "walk" forms at almost any point a pleasing picture; but with trees sunshine is needed, and a negative taken either before the sun is too high, or towards the afternoon with the long east shadows, gives the best result. Expose for the shadows and let the lights take care of themselves, using but little pyro. at the beginning. One of the most successful examples of this arrangement of light is a picture of Branksome Chine, Bournemouth, taken by Messrs. Debenham and Gould, photographers, Bournemouth. The sun is evidently well to the front, left of the camera, and just shines on the sides of the trees—one side being in high light and the reverse in deepest shadow, giving a Payne-Jennings effect; in fact, the whole series come nearer his work than any photograph I have ever seen. Bournemouth has been favourably gifted with regard to good landscape views. Messrs. Vaughan and Whitfield exhibit some large examples, chiefly in carbon—notably, *Shoeing the Mare;* and Messrs. Day and Son's landscapes are like real gems—not large, but exquisite little "bits."

Close by the Madeira Walk is St. Peter's Church—a most beautiful structure. The spire of this church shows to advantage all over the town, and often makes a pleasing addition to an otherwise uninteresting composition. The edifice is in Mr. Street's most happy style, and the interior—architecturally elegant and captivating—is well worth a couple of plates, for which permission must be obtained; for, although the church is always open and is perfectly free so far as pew rents are concerned, I was given to understand that certain amateurs had abused the privilege accorded to them, and the vicar is very particular now as to whom he accords permission. The churchyard adjoining—a remarkably pretty one, and exceedingly well kept—is universally admired, and contains a large cross over twenty feet high. The general effect is most striking, for besides this cross most of the tombstones are also in the form of a cross. Being of white marble, with red, black, and gold letters, the effect amongst the pines and firs, especially during sunshine, is most charming.

There are other churches and chapels in and around Bournemouth, but the Roman Catholic church is the only other one that I noticed which calls for special attention, and this because its architecture is considered to be as pure and chaste an example of the Gothic style as any building in the South of England.

The various chines and ravines are a curious feature at Bournemouth, and these require a late sun with strong light and long shadows to produce anything like a pictorial effect. The pier should be taken looking east and west, getting in one or more of the seats and sandhills as foreground. Take these views when some of the steamers or yawls are about; otherwise the sea looks flat.

From the pier steamers frequently start for Portsmouth and Southampton; also for the Isle of Wight, calling at Yarmouth, Totland Bay, Alum Bay, Cones, and Ryde. Excursions are also made round the Isle of Wight, passing the Needles. Now, on board the boat the captain is supreme. Everyone is bound by his orders, from which no appeal is allowed; therefore, if you intend taking photographs on board by all means obtain his permission first, or otherwise you may be told to take away that "darned machine!" A rapid shutter enables passing ships to be secured, *if the weather be calm;* for under other circumstances we find only the hull or a fine set of furled sails and no ship. Then there are excursions to Branksea or Brownsea Island, for it is known by either name. This is the outing *par excellence.* The island belongs to the Right Hon. G. A. F. Cavendish Bentinck, M.P., at the present time, and, unless an excursion visit is made by the "Lord Elgin" steamboat, permission to land must be obtained. "My island," said a newspaper with the "largest circulation in the world;" and at one time a part proprietor of the *Daily Telegraph* was the owner of it. There are plenty of negatives on this island; for there are no police, no poor, no public houses, no rates, no taxes, no gas, no beggars, no business competition, no legislation, no catching of trains, no van-demons, no school board, no burglaries, no squalor, no poverty, no walls or palings to fence off intruders. Old Father Neptune has girt it round with the briny sea, and a notice-board warns the intruder not to land without permission. Having landed from the above steamboat the first thing that attracts attention after the aforesaid notice-board is that the landing place is called Piazza del Castello. Proceeding on, one passes the Cassino, Villino, Magazino, Venetia Park, and then the Castle.

"My island" is at the entrance of Poole harbour, and according to the newspapers of last month things are slightly different at Poole. The castle was in olden time a fortress, and legendary lore says Canute landed there. Now the castle contains all the vast art-treasures its present owner has collected abroad, though he does not reside there but in a comfortable villa close by. I cannot remember half the curios, but there are statues from Rome, Italy, Corinth—of Pan, water nymphs, Flora, Hercules, &c., old Corinthian pillars and capitals, stained and ground glass, old fonts, tablets from ancient continental churches, carvings in wood and stone, fountains, beautiful ferns and exotics, winged lions, oak doors, Roman bath—all these things and many others lie scattered about all over the building, "upstairs and downstairs, and in my lady's chamber." There is no attempt at numbering, no putting in order, and no stiff museum style about the place. Many of the marble statues, fonts, &c., look as if the carriers had just put them down in the first convenient place and left them there.

The church is a gem, and from notes from a little work given us by Mr. R. H. Fry, the managing director of the Branksea Island Company, Limited, who make the Branksea pottery, I find that the oak roof came from the council chamber of Crosby Hall, as did the gold and silver

* Concluded from page 551.

repoussé lamps suspended from the cross beam; the coloured glass from Sainte Chapelle, Paris; the brass candlesticks (1716) from the Benedictine Monastery near Padua; and the winged angels were part of the altar of St. Lucchia, Venice—one of which formed the reading desk and the other the pulpit. The baptistry contains a picture by Murillo. The rood screen comes from one of our city churches, and the screen at the west-end once adorned some Roman place of worship. The chairs and hassocks are all hand-worked. In the churchyard—here so well kept—is a rare specimen of the weeping holly. In the conservatory the well of red marble, with its marble conduit or "lavabo," comes from St. Salvestro, Venice. Mr. Fry was most kind to our party, and presented my wife at parting with a cabinet picture containing his daughter and "Carlo," the watchdog, standing against a magnificent piece of carved marble. There, as at Bournemouth, are pines, the turpentine from which is said to be so soothing for weak lungs. Birds of all sorts—peacocks, pheasants, ducks, wild and tame, pigeons, poultry, &c.—all lend enchantment to this picturesque spot.

Returning by water to Bournemouth the cliffs show some good bold points well worth a plate, as the boats keep pretty close to the shore, and no difficulty is experienced. From Bournemouth visit Christ Church, with its priory. A view across the river can be taken from 10.30 till the afternoon, as it faces south. There is capital fishing in the river. The interior of the priory suffered much from the Commonwealth, and has not been to any extent restored. Here is to be seen a fine monument to the poet Shelley.

As the station is some distance from the town take the hotel 'bus. The same applies to Bournemouth, and with double force if one arrive at the East station—that is, the station from London and the east side of Bournemouth. Swanage, a harbour town like Poole, does not present any special features. Both make pleasant excursions. The Tillywim lighthouse and its ridges of rocks at low water are worth a plate. This also faces the south, but the best view is obtained from the west.

Wimborne and its minster ought not to be missed. The old church is well worth two plates—one close up, just as you come from the market square, and the other from between the church and the station by the brook, taking in the bridge. There are many interesting objects in the church; and the curator—an old man of sixty, who boasts of having been connected with this church, man and boy, all these years—has published a book on Wimborne, price one shilling. To sell one of these books gladdens his heart more than the same sum given as a gratuity. An astronomical clock in the west tower and the ancient books in the library of the minster should also be seen.

From Wimborne we proceeded to Salisbury, but the letter conveying permission to photograph the interior having by some error of the post-office been sent astray, and the weather coming on dull, it was thought desirable to return home.

I believe I have not done justice to the beauties of Bournemouth, and feel sure one might "fire off" over a hundred plates, all of which would probably produce beautiful pictures. There is nothing about the place of an ancient character, as will be gathered by the fact that when George III. visited Weymouth there were but three smugglers' huts on the spot now known as Bournemouth.

Respecting the development and changing of plates: the first operation was deferred till our arrival at home, the plates having been tested before starting. The camera was a half-plate one, and had six double dark slides. I found, as a general rule, that if you called upon one of the photographers they would allow you to change the plates; although most of them did not care to permit you to develope them, for the operation entailed trouble. But when you go either early or late—not in the busy part of the day—a man who takes portraits only is much more likely to oblige than the photographer who "goes in" for landscape work.

ARCHER CLARKE.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 12,184.—"Automatic Regulator for Calcium Lights." (Complete specification.) JAMES BOWIE, 46, Bryantwood-road, Holloway, London.—*Dated September* 9, 1884.

No. 12,389.—"Folding Cameras." J. T. CHAPMAN and T. SCOTT.—*Dated September* 15, 1884.

No. 12,482.—"Vignetting Apparatus." E. D. ACOCK.—*Dated September* 16, 1884.

PATENT SEALED.

No. 7,746.—"An Adjustable Instantaneous Shutter." THOMAS FURNELL. —*Dated May* 15, 1884.

IMPROVEMENTS IN THE PREPARATION OF PHOTOGRAPHS AND THE TREATMENT OF DRAWINGS OR DESIGNS PRINTED UPON PAPER OR OTHER SUITABLE MATERIAL FOR THE PURPOSE OF IMITATING STAINED, GROUND, CUT, OR EMBOSSED GLASS, OR TO BE EMPLOYED FOR OTHER USEFUL OR ORNAMENTAL PURPOSES.

SPECIFICATION. By GEORGE RYDILL.

MY invention consists in producing, treating, and applying photographs, printed drawings, or designs either upon sensitised, white, tinted, or coloured paper, satin, cotton, linen, parchment, glass, wood, or other suitable material printed or produced from glass negatives, wood blocks, stone, metal, glass, engraved or etched metal plates, or by any of the known methods of printing in one or more colours.

In order to describe my invention and its various applications for useful and ornamental purposes I will explain one process for producing printed copies of photographs.

As it is important that when printed photographs, printed drawings, or designs are treated with castor oil, pine oil, olive oil, dissolved fats, white wax, mineral oils, or spirits they should be thoroughly penetrated quickly to prevent the picture from getting dull, I place the printed drawings or photographs in a closed metal vessel subjected to hydraulic, atmospheric, or vacuum pressure, and pump in oil, dissolved fats, or wax with a hydraulic pump; or air may be pumped into the vessel to give pressure, or air may be pumped out of the vessel to form a vacuum, and oil, dissolved fats, or white wax is let in warm under atmospheric pressure to force the oil or dissolved fats or wax into the paper to make it translucent. On the pressure being taken off from the vessel the printed drawings, designs, or photographs are removed and passed betwixt india-rubber rollers or placed in a hydro. extractor to remove the excess of oils, fats, or wax. Having photographed, drawn, or transferred a *facsimile* on stone or other substance, the finished photograph is printed upon on the back side in one or more colours or tints, either in oil, water, or other colours or tints, to bring up the coloured features of a person, dress, ornaments, or a coloured landscape, or other coloured printings representing nature or works of art. The paper on which each photograph is taken is fixed in a true position in the printing-frame, so that the outlines on the back exactly line with those on the face of the photograph. When thought desirable one part of the printing of a person or a landscape or other design may be partly printed on the back side of the translucent photograph; and another part of the printing, to finish the picture, is printed upon another paper on the face side and fixed to a second glass put behind the photograph. A sheet of glass is then placed on the front side, and for some purposes I place another picture on the back of the second glass, and then the three sheets of glass are cemented together. When the whole of the colours are printed on the back I place any coloured printing or design on the back, covered by a sheet of glass. Then the two glasses are cemented together round the edges with ground glass, liquid isinglass and mastic, or other glass cement. Or the photograph printed on the back as a finished picture may be placed on the inside of a glass shade or vase; or it may be fixed at the back of a looking-glass, and a glass being placed over it the two glasses are cemented together round the edges with glass cement. This method of printing on the face and back of translucent paper tends to bring up the colour, and may be fixed with copal or other varnish or adhesive substance to any shaped glass or glasses. When the printed paper is found too thick for producing a good transparency it may be rubbed down with fine sand-paper.

Or a photograph of a landscape is taken; and when finished as a photographic picture I print on the back of the photograph with such colours as shall represent the true nature of a landscape, either in oil, water colours, transparent colours, or inks, in the usual way of lithographic printing, which system of printing coloured photographs applies to persons, animals, natural views, works of art, machinery, articles, or things. The transparent sensitised paper forms a thin film or covering of the colours printed upon the back, making the photograph printed in colours permanent. The oil colours may be of the usual class for painting or printing, or the transparent colours may be wholly or partially mixed with pine oil, dissolved in alcohol or turpentine; or the photograph or photographs after being printed upon and become dry may be varnished with copal, mastic, or other varnishes, which may be mixed with, or coated over with, dissolved pine oil in spirit, which preserves the colours and protects the picture from moisture.

Or I take two photographic negatives of the same figure or picture exactly alike, and having sensitised photographic paper on both sides. I place one negative on the front side and one on the back side, so that they stand exactly opposite each other, and are held firmly in a screw-clasp frame, so that the light for printing may act on one side at a time, or on both sides at the same time. When taken out of the frame and finished in the usual way as a picture, such may be made translucent with castor or other oil, pine oil and varnish, or varnish alone, or it may be painted or printed upon with oil.

Or a transparent photograph is covered on the back side with coloured, transparent, or non-transparent paper, or other material cut out or coloured to represent any part of the features, coloured dress, background, or drapery. Or a background is printed upon paper representing any design filled up with other suitable paper and placed on the back of the photograph. Or gold or silver leaf or other metallic alloys may be applied. I then place at the back any other picture and enclose the same betwixt two sheets of glass, cementing the edges together with ground glass cement.

And in order that the oils, fats, wax, or varnish may be made to penetrate any thickness of unprinted or printed paper glazed by means of hot rollers, I subject photographs, printings, drawings, etchings, engravings, or stencils to hydraulic, atmospheric, or vacuum pressure by placing them in a closed metal vessel and pumping in varnish or oil, fats, or wax, with a hydraulic pump; or the air may be pumped out of the vessel, and, by means of a tank pipe and valve connected with the vessel where a vacuum has been produced, by opening the valve the oil or varnish is let in under atmospheric pressure to force the oil or varnish into the paper. The pressure on the vessel is let off, the lid removed, and the photographs or printings taken out, and the excess of oil, fats, wax, or varnish removed by passing the same betwixt two rollers, or with a hydro. extractor.

Or I take a sheet of glass—glass shade or other glass—and varnish it on the back with copal, mastic, or other translucent varnish or gelatine. When the varnish is almost dry I press upon it a photograph, engraving, or print previously steeped in water, and when dry I varnish the back side of the paper with pine oil and varnish. This brings up a translucent picture or drawing according to whatever style of photographing or printing it might be, and if placed on to a glass shade or vase the translucent photographs, printings, etchings, or drawings show by gaslight the same as daylight. The light passing through the top or sides shows the photograph or printings distinctly. The bottom of the glass shade I make up with a glass cup or stand to protect the photograph, printings, or drawings from dust and moisture; and if for a window, door, partition, or interior or exterior decoration I place the translucent photograph, lithograph, printing, etching, or drawing representing any figure or design betwixt two sheets of glass and cement them together at the edges with ground glass, mastic, and isinglass.

Or a glass shade, vase, or a sheet of glass is varnished over with copal, mastic, or other varnish, and when the varnish is almost dry an engraved print or a coloured print, having been steeped in water, is pressed on the varnish; and after remaining until the varnish is dry the paper on which the engraving or printing has been printed is wetted with water and a sponge, and rubbed down with sand-paper, the finger, or india-rubber. I then varnish the same, and after it is dry I place a varnished translucent sheet of bank post paper, or other highly-glazed translucent paper, either white, tinted, or coloured, and I cover the back side with a sheet of glass, and cement the two sheets of glass together at the edges. Or, instead of a translucent sheet of paper being put on the back to bring up the colour like stained glass, I place white, opal, or coloured glass at the back, and the two sheets of glass are cemented together at the edges and enclosed with a metal frame.

When printing from engraved or etched metal plates, lithographing, or other printing of any colour or design, which I wish to put on to glass without the tedious labour of rubbing of the paper, I coat one side of paper with liquid starch or gelatine, either by means of a brush or with a varnish machine. When the starch is dry I print upon the starched or gelatine side of the paper any figure, colour, or design by any of the known methods of lithographing or other printing. I then varnish or coat with gelatine the back surface of glass. When it is almost dry I press the printed paper which has been placed in water on to the varnish, and when the varnish is dry I wet the back of the paper with water and a sponge, which readily comes off. I then give the design on the back of the glass a coating of dissolved pine oil to protect the colour or colours from change. When dry I give a coat of varnish: or varnish and pine oil may be mixed together, which I prefer to use. A sheet of translucent paper prepared with pine oil and copal, mastic, or other varnish, either white, tinted, green, yellow, or any other colour or design may be printed upon it to suit. The design is laid on the back, made to represent any design of stained, cut, ground, or embossed glass. A second sheet of glass is placed on the back, covering the translucent sheet of paper, and the two sheets of glass are cemented together at the edges. Or white opal glass, or white pot metal, is put at the back to show clearly the colours. Or any coloured glass may be placed at the back. Or I take a sheet of moderately-strong paper and coat the back with starch or gelatine. I then take the thinnest of white, tinted, or coloured paper and place it upon the starch, which paper I prefer to be glazed, or the same may be glazed after being fixed on the starched paper on one side by passing the two starched papers betwixt hot rollers. I then lithograph in oil, transparent, or water colours any figure or design representing stained glass, works of art, or other designs; then the printed colours are, when dry, coated with gum, gelatine, size, or varnish, as circumstances require. In transferring the same on to a sheet of glass I dip or pass the whole paper through water; then place the same on glass and press out all air-bubbles. The starch having become soft the paper on the back of the printed design is removed. When dry it is varnished over, and when the varnish is dry I place another sheet of glass on the back—either ordinary, white, or coloured glass—and cement the two sheets together with ground glass, mastic, and dissolved isinglass, or other glass cement; then the same is enclosed in a metal frame. This means of fixing designs enables imitations of stained, cut, or embossed glass to be prepared in the sheet and cut to any required size with a diamond and backed with glass or applied to glass shades. In some instances the paper on the back of the transfer may be dispensed with and transferred on to silvered looking-glass.

Or glass is coated with varnish or gelatine, and when dry it is printed upon with type or any figure or design formed of india-rubber to enable an even and soft pressure to act upon the glass. A sheet of india-rubber or a bag of india-rubber filled with air or water is laid over the glass and evenly pressed to produce an impression.

This improvement in producing translucent designs upon glass enables the same to be applied to looking-glass backs. Taking, for instance, a dressing-table looking-glass, I take a sheet of plate or other glass and form a border round, which border may be etched with fluoric acid; or a varnished border is formed round the outer edge of the glass with copal or other varnish mixed with dissolved pine oil, and a printed transfer border forming any design is pressed upon the varnish. When the varnish is dry the paper is wetted on the back with a sponge and removed; then the whole, including the border, is silvered with nitrate of silver and tinfoil, or by the liquid silvering process, in the usual way, on the back side of the glass, which causes the bordering to appear as if in relief on the front side. The silver on the back of the glass is coated over with mastic, shellac, or other protecting substances. I then take another sheet of glass of the same size, and on the back of this second sheet of glass I place a translucent or a non-translucent sheet of paper on which has been printed any figure or design that will give a pleasing effect. The back surfaces of the two glasses are closely pressed together and held firmly with set screws, clamps, or twine; then the edges of the two sheets of glass are cemented together with glass cement that will protect the silver or design from dust, damp, or moisture. The dressing-table glass has an improved appearance on the front side of the glass to the room, and the back side of the glass facing the window gives a good effect when seen through the window from the outside.

Or a translucent or a non-translucent ornamental border forming any figure, colour, or design may be placed on the front side of a sheet of looking-glass that has been coated with silver on the back side. I then place a clear sheet of glass on the front side of the looking-glass to protect the border, and, after the silver has received a coat of varnish, shellac, or other protecting substance, I place on the back of a third sheet of glass a translucent or non-translucent sheet of paper on which has been photographed, printed, stained, stencilled, or embossed any figure, colour, or design. The back surface of this third sheet of glass is placed to the back side of the silvered glass, and the three glasses are pressed closely together and held firmly with set screws or clamps. Then the three glasses are cemented together with ground glass, mastic, and isinglass; or any other glass cement may be used, and the cement and edges of the three glasses are protected with a metal rim, or a composition frame, or with paper and cement.

Or a sheet of glass is silvered on the back side, which may be plain or have an ornamental border, the silver on the back of the looking-glass having been coated over with varnish, shellac, or other protecting substance. Then on the back side of a second sheet of glass I place any woven, plain, figured, or printed satin, silk, cotton, linen, lace, or other fabric or material, or embossed or pierced paper, forming any figure, pattern, colour, or design. Then the back surfaces of the two glasses are closely pressed together with set screws or clamps. Then round the edges of the two sheets of glass are cemented together and strengthened with grooved tin, brass, or other metal or composition.

Or the bordering placed betwixt two or more sheets of glass may be pierced and embossed, and this part of the glass left unsilvered, so that the light will shine through when placed opposite the light.

Or the surfaces of glass may be partly silvered, so that the other part allows for any bordering being placed over the unsilvered parts; or the front is a plain, silvered surface, and the back forms any colour, figure, or design.

Or paper or other fabric forming any figure, pattern, or design as described may be put on the back of a silvered looking-glass having a wooden back to protect the silver, which may be covered over with woven satin or printed silk, paper, or other ornamental substances, forming any design, which may be covered with a sheet of glass; or the paper may be fixed to the wood and varnished over, so that a pleasing effect is given if viewed from the outside.

Or I pass a sheet of paper through starch, or I starch one side of a sheet of paper, then give the starched side a coat of gelatine or ivory dust gelatine. When this is dry I coat it with dissolved pine oil in alcohol or turpentine, which forms a thin, transparent skin or film, which resists the action of air, water, or acids, and allows the most delicate colours and tints known in the arts—from the likeness of a person to the most delicate flower—on which I print any figure or design, either by lithography or any other process of printing; when the printed figure or design has been printed in oil, water, or transparent colours upon the oil of pine, and when dry, I give the print a coat of pine oil, and when dry the printing is protected from the action of the air, water, or acids on both sides. It is then coated over with varnish; when dry it receives a coat of gum or gelatine. When required it is passed through water and laid, I will say, on a sheet of glass, all air-bubbles being pressed or rolled out. Then the paper is readily removed by the softening of the starch with water, as there is no fear of injuring the printing by the resistance of pine oil to water. It is well washed and run over with a roller. When dry it is varnished, and when the varnish is dry a sheet of glass is placed over it, and the edges of the two glasses are cemented together with ground glass, isinglass and mastic, or other glass cement. The cemented edges are then allowed to stand in a solution of sulphate of iron and water for some hours, which fills up the pores of the cement. Then the printing will stand the action of all weather.

In some cases I print on gelatine placed on paper, or on varnished paper that has had the colouring matter mixed with the varnish, but I prefer to print on white, tinted, or coloured paper or other material, any figure or design in one or more colours for making windows, in imitation of stained glass, translucent pictures, signs, and lamps, for making cabinet work represent a variety of inlaid or other woods, which is also applicable for architectural purposes, such as the ornamentation of interior or exterior of buildings, chimney pieces representing facings of marble, granite, or other stones, in producing ornamental designs or works of art attached to metal or other material for making panels for imitation of stained glass, finger plates, or for advertisements.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is—

1. The treatment of photographic or other prints or paper in a vessel with pine or other oil or varnish, as described, under hydraulic, vacuum, or air pressure to make the same translucent and preserve the colour.

2. Printing photographs or other printings on the back, either before or after they are made translucent; and on another paper, to finish the picture, is printed on the face side a background, or the background may be printed on the face side of the photograph.

3. Placing photographs between two sheets of glass and cementing the edges together.

4. Placing a printed design on the back of a photograph mount.

5. Printing photographs on both sides of sensitised paper at one time by the use of two photographic negatives.

6. Cutting out photographs to be placed on a background, or cutting out coloured paper or material to be placed behind translucent photographs.

7. Placing material or designs on the back of looking-glasses; also placing a border on the front or back side and enclosing the same between sheets of glass, and cementing the edges together as described.

8. Placing transfer borders in imitation of stained glass, or placing designs on glass to imitate stained glass so as to be cut with a diamond as described, and for the ornamentation of glass shades.

[The specification is illustrated by drawings which are not required to make it sufficiently well understood.]

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
September 23	Bolton Club	The Studio, Chancery-lane.
,, 24	Bristol Amateur	Studio, Portland-st., Kingsdown.
,, 24	Photographic Club	Anderton's Hotel, Fleet-street.
,, 25	London and Provincial	Masons' Hall, Basinghall-street.
,, 25	Liverpool Amateur	Free Library and Museum.
,, 25	Oldham	The Lyceum.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society, held on the 11th instant, Mr. W. Cobb occupied the chair.

Mr. W. M. Ashman said that in order to endeavour to ascertain the cause of the different results obtained by Mr. A. Cowan and himself when using the developing mixture of Mr. Munroe, and to try, in the first instance, whether this difference was due to its suitability to one make of plate rather than another, Mr. Cowan had given him (Mr. Ashman) some exposed plates to develope. He had found, with the plates he had been using himself, that the image came out of a good blackish colour. The negatives were produced, and it followed that, whatever might be the cause of the yellow colour of negative which Mr. Cowan and some others found to result from the use of this developer, it must be sought for otherwise than in the make of the plate.

Mr. A. Cowan suggested that possibly the water used might have something to do with it, being supplied by different companies. He would experiment further.

Mr. W. E. Debenham inquired how long the development took when compared with the usual pyro. and ammonia.

Mr. Ashman replied that with fresh developer it was quicker than ammonia; but if the same solution were used for several plates in succession, as it might be, it became slower.

Mr. Cowan referred to the formula given by Mr. Derham, in which lactic acid was employed. He had tried the addition of this acid in varying proportions, and showed the negatives obtained thereby, from which it appeared that lactic acid acted as a restrainer, and that, in proportion to the amount used, it slowed the developer.

The Chairman observed that the experience of another gentleman who had tried the addition of lactic acid coincided with that of Mr. Cowan.

Mr. A. Haddon said that, in order to make proper comparative tests with an acid in the developer, it should first be converted into a neutral salt. In the case of lactic acid each addition of this substance deprived the developer of a certain amount of the ammonia available for reducing. If it had first been converted into lactate of ammonia this would not be the case, and the effect could be compared without the complication of having to take into account the effect of employing less free ammonia.

Mr. Waltenberg showed a plate covered with small, slight protuberances, and inquired if the members could suggest the cause and remedy, as it was of a make that he would like to continue to employ if this defect could be avoided.

It was considered to be a case of incipient frilling.

Mr. Cowan suggested the use of an alum or chrome-alum bath before fixing.

Mr. Waltenberg remarked that he used alum in his fixing bath.

Mr. Cowan said that practice was wrong, but he had no doubt that the remedy he suggested would prove effectual. For himself, he preferred to put chrome alum into the emulsion itself, thus avoiding the use of an alum bath.

Mr. Debenham suggested that plates showing these little blisters should be immersed for a short time after washing in methylated spirit to tighten the film of gelatine.

LEEDS PHOTOGRAPHIC SOCIETY.

The ordinary monthly meeting of this Society was held on Thursday, the 11th instant,—Mr. J. W. Ramsden, Vice-President, in the chair. Messrs. Corson, Middleton, and Armistead were elected members.

A report was given respecting the outdoor meetings at Adel and Otley, and prints from negatives taken on these occasions were shown as follows:— Instantaneous views, by Mr. Hardy; views of Adel Aqueduct, by Mr. Branson; and landscape studies, by Messrs. Armistead, Rodwell, and S. Marshall.

Mr. Duncan Law gave an interesting account of a successful photographic tour in the Savoy, and in illustration of his remarks exhibited some dozens of views. On the mount of each was stated the lens and stop used, time of exposure, and other particulars. He also exhibited an instantaneous shutter of foreign make, which elicited some criticism as to its merits and otherwise. He (Mr. Law) gave interesting details respecting most of the views he exhibited, and spoke of the various incidents that had occurred. He said the difference in the light in the Savoy and in England was very great. A view that in England on a clear day would require seven seconds would, on a similar day in Savoy, only require three seconds. He had some little trouble in getting the plates to his destination. Knowing the delays on the continent, he had ordered some plates to be sent a month before he started, but, despite this, the plates did not arrive until a week after he got there. Then the English Custom-House officers on his return, in their anxiety to discover a stock of dynamite amongst his luggage, insisted upon opening a box of plates—some exposed and undeveloped, and others not exposed. Fortunately he had placed the unexposed plates on the top, and these were opened and, of course, spoiled.

Mr. Law's remarks were listened to with great interest, and elicited considerable applause.

Mr. W. Teasdale doubted the advisability of going on a lengthy tour with only one kind of plate. Selecting two or three of Mr. Law's views, he pointed out how better results might have been obtained by the use of a slow plate, similar in speed to a wet plate. The contrasts would not have been so violent, and a more harmonious picture could have been obtained. Mr. Law had spoken of the difficulty of obtaining slow plates. This he knew to be a fact, and he much regretted that the rage for rapidity induced plate-makers to aim at producing rapid plates only.

Mr. Teasdale also exhibited some transparencies taken on gelatino-bromide plates by the light of the August full moon at the time of its southing, the exposures being seven to thirty minutes.

The following questions were found in the question-box:—"Does a plate that is not developed until five or six weeks after exposure work out differently from one developed at once? I had some plates exposed in a very dry air which I developed after that interval, and they seemed extraordinarily slow in coming out; but the result was very good, and showed no signs of under-exposure."

The Chairman, in reply, said that the film on a gelatino-bromide plate got harder with keeping—so much so that plates which had a tendency to frill would, by keeping, lose that property. He had not had much experience in developing plates that had been kept some time after exposure, but he could imagine that any physical change which had taken place in the bromide of silver would be permanent; whereas any surplus actinic force might be dissipated, and thus cause a longer time to be taken in development.

The same peculiarity had been noticed by Messrs. Law, Marshall, and Kitson on their return from continental tours.

It was also pointed out that if two plates of the same batch were taken—one exposed and developed after keeping five or six weeks, and the other exposed and developed at once, although of the same age and kept under similar conditions—the one developed immediately after exposure would come up much more quickly than the other, thus bearing out the Chairman's idea as to surplus actinic force being dissipated.

The next question was—"What is the best way to mount gelatino-bromide prints in a book?"

Mr. Teasdale advised a solution of glue with spirits of wine added.

There being no further matter for discussion the meeting was adjourned.

DERBY PHOTOGRAPHIC SOCIETY.

A meeting of this Society was held at the London Restaurant, Derby, on Wednesday, the 3rd inst.,—Captain Abney, R.E., F.R.S., President, in the chair.

The minutes of the previous meeting were read and confirmed.

Captain Abney then gave a short address on photography generally, and proposed that subjects for study be instituted, the results to be produced at the next quarterly meeting.

The subjects chosen were:—1. *An Autumn Evening.* 2. *Still Life.* 3. *Animal Study.* 4. *Rest*—life study.

A sub-committee, consisting of Messrs. R. Keene, J. Merry, A. J. Cox, and the Hon. Secretary were appointed to consider the conditions.

Mr. Charles E. Abney, Vice-President, then read a paper entitled *A Photographic Walking Tour in Wales.* [See page 600.]

A conversation ensued as to arrangements being made for technical meetings for practical demonstrations, the matter being referred to the committee of management.

A cordial vote of thanks to Captain Abney for presiding and for his address, and also to Mr. Charles E. Abney for his paper, brought the proceedings to a close.

Correspondence.

AMERICAN CORRESPONDENCE.

Philadelphia, September 4, 1884.

The American photographic journals are full of the late Convention at Cincinnati. Some very sharp personalities have passed between the late officers and their critics; but the prevailing opinion appears to be that there might have been less squabbling and more business of a photographic character.

A great deal of regret has been expressed that the officers of the Convention did not take advantage of Mr. A. L. Henderson's presence to get a paper or an address from him upon the making of gelatino-bromide emulsion. There are many photographers who do not hesitate to say that the dry-plate makers did not want him to tell *publicly* what he knew about making dry plates, while they were willing to get what information they could out of him for *themselves.*

Mr. Henderson was quite the lion of the Convention; and, to show how easy it is to become a "professor" here, I may add that Mr. Gilbert, the inventor of the retouching machine which Mr. Henderson bought, with real American "push" got a testimonial out of him, and now advertises—"See what *Professor* Henderson says about it." But the funniest sight—if only the members of the London and Provincial Association could have witnessed it—was seen at the "Zoo," where Mr. and Mrs. Henderson, Mr. Inglis, and your correspondent, perched upon the back of an elephant, became the focussing-point for three or four cameras and for all the jokes of a crowd of onlookers. One of these jokes was so peculiarly American in its exaggeration that I must repeat it. Mr. Henderson being rather cramped in the very small space he occupied on the back of the elephant, put one of his feet outside. This was instantly greeted with the shout—"Take in that foot, or *we won't be able to see the elephant!*"

American photographers have done honour to Mr. Henderson because he is a representative contributor to English photographic journals and an indefatigable experimentalist. He freely publishes the results of his experiments, and so has largely contributed to the history of photographic progress. Such men are few on this side of the Atlantic. If a man get hold of anything at all which he thinks will advance the art —or if it will not advance it, but only sell—he rushes, not into print, but to the Patent Office to secure its supposed advantages for himself. There is not the same free discussion of things photographic in the American journals that is such a characteristic of the English journals. Neither are the American journals so independent; that is, those published in the interest of the stock houses would not, of course, admit anything which did not further the purposes of advertising their particular houses. This, combined with the fact that most of them are only published monthly, makes a vast difference in the relations here between photographers and photographic journals. Mr. Gentilé's new issue of the *Photographic Eye*, which is the only weekly journal in America devoted to photography, may create a want in that direction.

I have been asked to correct some statements made in THE BRITISH JOURNAL OF PHOTOGRAPHY by Mr. J. T. Taylor, in answer to a letter of inquiry about the best place to set up an establishment for the production of magic lantern slides on this side of the Atlantic. In his reply, Mr. Taylor quoted prices which, to my knowledge,* are unknown here; and with regard to Philadelphia being the best place to start such a business the opinion of those who should know best is that this city is overdone in that respect. There are, at least, five firms in this city who regularly undertake this work. The retail price for average slides is fifty cents each; that is, you can take in any negative of your own and get a lantern slide made from it complete for fifty cents (about 2s.). I know that this price is about double what it costs in England; but you have also to consider the enhanced cost of production here. Labour, rent, in fact everything, is higher here than in England. The glass has to be imported, and the duty upon it is very high. I know one operator, whose time is exclusively taken up in making these slides, whose wages are £7 per week, and the assistant operators average from twelve to fifteen dollars weekly—that is, from £2 8s. to £3; yet, notwithstanding this, they are produced wholesale for the dealers at from twenty to thirty cents each. I will leave your readers to judge if there be very much to be made at this.

Then there is another obstacle to a newcomer: the old-established firms have their stock of original negatives of various subjects, from which they are incessantly making slides, and to which continual additions have to be made. During the last twelve months two of the Philadelphia firms have had men making fresh negatives in Great Britain and on the continent, to supplement the hundreds of subjects already in their possession. Then there are thousands of negatives of home subjects obtained at great expense, to say nothing of negatives made from special drawings to illustrate history, botany, and every "ology" under the sun. This is an impartial statement on this subject from one who is not interested in any way in the production of magic-lantern slides.

On the subject of wages I have been making inquiries here, and find that the wages of operators are not so high as they were some years ago. Mr. Gutekunst told me the time was when he paid as much as sixty dollars weekly to an operator (about £12 English); "but," he added, "we don't pay that any more." Thirty-five dollars (or £7 English) is considered good wages for an operator. Twenty dollars (£4) is the average in this city; and printers average from fifteen dollars (£3) to twenty dollars (£4). The hours are longer, for they commence at eight in the morning and leave at six in the evening, having only about half-an-hour for dinner at noon. Then during the months of July and August, when everyone is away from the city at the seaside or on the mountains, the photographic assistants are compelled to take a vacation of from two to five or six weeks, *without pay*.

The prices charged for cabinet photographs average very low. Mr. Gutekunst still gets the best price here—ten dollars per dozen (£2 English)—and he gives in one tinted photograph. Gilbert and Bacon come next with eight dollars (32s. English) per dozen; but they make them cheaper "under the rose"—that is, for certain people who produce a certain card or circular they do them for five dollars (20s.). The average price, however, is five dollars openly, and three dollars (12s.) by circular or card. This system of club or circular portraits at lower prices than the supposed regular price is carried on to a very large extent, and by almost all the photographic studios in this city.

Finished enlargements are a great feature in every studio. Carbon is not used, the enlargement being made in the solar camera, and mostly by the platinotype process of Mr. Willis. The results are very fine indeed, and very reasonable in price. They are of a fine, rich black, which matches exactly with the crayon used for finishing. I am surprised this process of enlargement is not used in England; but I suppose the principal reason is the limited amount of sunshine, which makes solar camera work so uncertain in England. The price obtained in the principal studios here for a life-size head vignette, upon a 25 × 30 enlargement, is from £10 to £12. The price paid to the artist for finishing is £4. The cost of the enlargement mounted upon calico stretched upon a fine frame is fourteen shillings. The artistic work is not done here, as it is in England, with the crayon points. It is done with crayon sauce, put on with stumps and chamois leather, all the lights, white drapery, lace, &c., being covered up, then taken out with india-rubber and ink eraser, and the point of the crayon is used to finish. This style of work is not so thorough nor so artistic as the English hatching and stipple; but it is liked here by the public, and it is a much more rapid method of getting effects. There is not much work done in colours by photographers. When painted portraits are wanted the public go direct to the artist for them, so that the crayon portrait is the staple portrait supplied to the public by photographers. A very large number of them is done in this city alone, and, doubtless, also all over the States.

The International Electrical Exhibition was formally opened on Tuesday, the 2nd inst., but as yet it is in a very imperfect state. There are some exhibits which will be interesting to photographers, but as they are not completed I will wait till they are before reporting.

There was very little of general photographic interest transpired at the monthly meeting of the Philadelphia Photographic Association on the evening of Wednesday, the 3rd inst. Mr. Carbutt called attention to the method of reducing the intensity of negatives, detailed in Mr. J. T. Taylor's report upon the *Progress of Photography*, which he quoted from THE BRITISH JOURNAL OF PHOTOGRAPHY. He said he had tried it for both transparencies and silver prints with great advantage. Mr. Carbutt also showed some prints from negatives made in a coal mine by electric light, by Mr. G. M. Betts, of Pottsville, claiming that they were the first pictures taken in a coal mine in America. The meeting was of an informal character, the members, who are mostly amateurs, showing the results of their summer vacations and talking about their experiences in little groups all over the room.

I have been fortunate in getting an early glimpse of some of the results of Mr. Muybridge's experiments here which he is conducting for the University of Pennsylvania. Mr. Muybridge's former pictures of animals in motion were black against a white ground. These pictures are all taken against a dark ground, and there is considerably more detail in them. There are some few animals; but the majority of the pictures are of male and female figures in a state of nudity—walking, running, jumping, and wrestling. There are male figures throwing stones, turning somersaults, jumping upon a horse's back, &c., &c., each act being taken two or three times in rapid succession. For instance: in the figure jumping upon the horse you first see him just rising from the ground; in the second picture he is higher, with one leg extended; in the third picture he is astride the horse. The same in the wrestling group: you see the two nude men in the different positions—from the time when they are first locked together to where they are both on the ground. One picture shows a male figure throwing water out of a bucket; there is also a female figure doing the same thing. In both pictures the water looks more like a shower of sparks of fire than water. There is also a very curious series of a child walking on all-fours (hands and feet), showing some most curious distortions in the act of so walking. In some you would think that the child must be deformed. But the most amusing set is of a female figure with a child across her knee (both nude). In one the woman has just administered a sharp slap upon a certain prominent part of the child's body; in another picture, taken immediately after, her hand is raised to repeat the blow, and the child has placed its hand behind to receive it. Some of the pictures are so much under-exposed that they are only phantoms, while others are very successful in depicting expression and muscular exertion. I am unaware what result is being aimed at in these pictures. I am told that the University has voted large sums of money for these experiments, but I cannot learn for what end. G. H. CROUGHTON.

HONOR CUI.

To the EDITORS.

GENTLEMEN,—My friend Mr. Locke Macdona's letter in reference to the soda sulphite developer might lead to the supposition that the formula first appeared in the *English Mechanic*. He is correct in saying that I saw it there; but as none more than yourselves would be desirous of giving honour where it is due I shall be glad if you will allow me to say that, to the best of my belief, it was a rescript from the *Photographic Times*. At all events, those who have access to the *English Mechanic* of June 6th will be able to verify for themselves.

Although I use but one maker's plates I frequently experimentalise with different developers. They invariably give good results—the secret, perhaps, lying in the manipulation; but, undoubtedly, for beauty of appearance and the most perfect clearness in the shadows, commend me to the soda sulphite. I use the same solution for a whole batch, and it performs quite as well on the last plate as on the first.

* Mr. Croughton has evidently not been informed that the prices given by Mr. Taylor were quoted from the catalogue of one of the reputed Philadelphia manufacturers and importers, and were verified by us under circumstances published in our issue for June 20th.—EDS.

There is no need, as you ask, for any bromide for restraining purposes.—I am, yours, &c., J. CARTER BROWNE, D.D.
September 13, 1884.

P.S.—Some time ago you promised us an article on staining diaphragms. Perhaps you are reserving it for the longer nights of winter.—J. C. B.

THE SODA DEVELOPER.

To the EDITORS.

GENTLEMEN,—Pray pardon my stupidity in mixing parts and definite quantities. Please read "ounces" instead of "parts."—I am, yours, &c.,
Leicester, September 15, 1884. HENRY LAW.

To the EDITORS.

GENTLEMEN,—Having seen various formulæ for the soda developer, all of which seem to differ considerably, I now give you mine, and hope that it may receive a fair trial; for in my hands it gives plenty of density and the shadows are perfectly clear.

I make the following:—

1.

Water	54 ounces.	
Sulphite of soda	4 ,,	saturated solution.
Citric acid ....about	1 ounce	,, ,,
Pyrogallic acid	1 ,,	

2.

Washing soda	5 ounces.
Bromide of potassium	30 grains.
Water	50 ounces.

To develope I use one ounce of each solution. In fact, I use No. 2 the same as I would use the ammonia-bromide solution, decreasing it if I think I have over-exposed, and *vice versâ.*

Will you please inform me by what process the print of *The Little Beggar*, in your ALMANAC, was produced?—I am, yours, &c.,
32, *Fenchurch-street, September* 13, 1884. A. MCKINNELL, JUN.

[The picture referred to in the last paragraph of our correspondent's letter was produced by the Woodburytype process.—EDS.]

To the EDITORS.

GENTLEMEN,—In reference to the Rev. L. Macdona's letter, in last issue, permit me to say that the developer he so highly commends, and which was "spotted" in the *English Mechanic*, was first published by Mr. George H. Monroe in the April number of the American *Photographic Times* this year.

Mr. A. Cowan was the first to publicly call attention to it (THE BRITISH JOURNAL OF PHOTOGRAPHY, June 27th), since which time it has been largely employed—a fact which one would have imagined a gentleman who has written so much on photographic matters should be acquainted with.

From an extended daily use of this developer I would ask Mr. Macdona to use it constantly—for (say) a month—instead of "in all cases where the necessary exposure can be accurately defined, as, for instance, in interiors and copying;" then publish the results of the trial.

I cannot agree with him that it is at all necessary to employ an alum bath at any stage, either before or after fixing, as the purple-black is easily obtained without it, provided the proportions of Nos. 1 and 2 are carefully adjusted. In the original formula No. 1 contains eleven ounces of water—one more than Mr. Macdona gives.

In reply to the Editors' query, I beg to quote from the original article. Mr. Monroe says:—"If upon the first appearance of the image a negative is found to be over-exposed, lift the plate out of the developer and pour over it, from a bottle, a solution of bromide of potassium or ammonium (bromide, five grains; water, one ounce), letting it run off the plate into the tray containing the developer without draining off too much. Place the plate in the tray, and proceed with development. The above operation can be repeated with the same plate in extreme cases."

In ordinary cases the developer is sufficiently restrained, no soluble bromide being requisite.—I am, yours, &c., W. M. ASHMAN.
September 15, 1884.

P.S.—Any of the soda or potash developers give a black or grey image if sufficient sulphite of soda enter into their composition.—W. M. A.

A CURE FOR BLISTERS.—THE HYDROKINONE DEVELOPER.

To the EDITORS.

GENTLEMEN,—I noticed in your issue of the 5th instant a very interesting article on the "frilling" and "blistering" of dry plates in hot weather, and though I have never been troubled with the former I have had several bad instances of the latter. In every case I removed all traces of them by pricking the film, while wet, with a needle, pressing gently round the blister with the finger, and then drying with spirits of wine.

I should be very glad to hear what is thought of the hydrokinone developer. I have used it for some time and with great success, while its cleanliness is a great comfort. I have no doubt it is referred to in back numbers, but I only have had the Journal since the beginning of the year.—I am, yours, &c., JOHN S. GLADSTONE.
Liverpool, September 15, 1884.

EXHIBITION OF THE PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

To the EDITORS.

GENTLEMEN,—Will you kindly permit me to remind intending exhibitors that packing cases from the country must reach our agent, Mr. Bourlet, at 17, Nassau-street, Middlesex Hospital, London, not later than Thursday next, the 25th instant, but it would be better that they should be delivered *before* that date; also that pictures delivered by hand must be left at the Gallery, 5A, Pall Mall East, on Thursday next, the 25th instant (open until 9 p.m.).

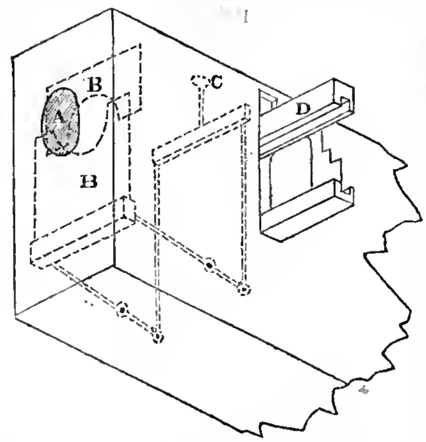
Any information respecting the Exhibition, as also slides for the Monday evenings with the optical lantern, may be obtained from,—Yours, &c.,
57, *Queen's-road, Peckham, London, S.E.* EDWIN COCKING.
Assistant Secretary.

"DISSOLVING PHOTOGRAPHIC VIEWS."

To the EDITORS.

GENTLEMEN,—About four years ago I made several experiments with the single lantern to dissolve one view into the other, but none answered the purpose so well as one made from my designs by Mr. J. T. Chapman. The principle was as follows:—

The body of the lantern was made so that it formed a square box between the condensers and the objective. In this, close to the lens and sliding in grooves, were pieces of cardboard cut as at B. B., and connected by a cord passing over a roller at the top. By pressing the button C the light was cut off, and at that instant the double carrier D was pushed until the end was flush with the side of the lantern. Pressure was then taken off the button and the shutter opened, the lower portion being weighted.



By a little practice I was enabled by the apparatus to show a series of slides with one lantern without the audience seeing any change of picture or any darkness between the different views. The apparatus is quite out of sight, with the exception of the projecting end of the carrier and the small button C. By a slight modification I can use it as a dissolver for two lanterns.—I am, yours, &c., J. W. WADE.
Manchester, September 17, 1884.

"A CHAPTER IN THE HISTORY OF COLOURED IMAGES."

To the EDITORS.

GENTLEMEN,—Mr. Herbert B. Berkeley having complained that I had attributed the production of transparencies of warm colour on bromide plates to Mr. J. B. B. Wellington, while he claimed priority for himself, I asked (in your issue of July 18th) for the date of Mr. Berkeley's published researches. In your issue of the 29th ult. Mr. Berkeley replies at great length, but omits to furnish the date requested. On the other hand, however, he states that he had never claimed priority of *publication*, but only of production.

I, therefore, now quote from the letter of Mr. Berkeley to which I referred, and which will be found in the *Journal of the Photographic Society of Great Britain* for May last:—

"I wish to add, in relation to a remark made by Mr. Debenham (see page 107), that the publication of Mr. J. B. B. Wellington's results—the production of transparencies of varied tints upon bromide plates—had some interest for me, bearing out and illustrating, as they do, my statement made some time ago in the columns of the *Photographic News*, in reply to certain claims set forth by Dr. Eder, namely, that bromide of silver worked in a suitable manner is equally capable of producing varied tints as is the chloride of silver. Of this statement I had proof, having produced with modified developers various shades, including ruby. An example of the latter you probably now possess, since, when you asked me for it a few years ago, you stated that it had an interest for you. You would thus be able to testify that I (and doubtless others have had similar experience) had good ground for my contention in regard to the capabilities of silver bromide. I believe I am correct in saying that if a bright ruby colour can be produced almost any other shade may be secured by modifying the treatment."

—I am, yours, &c., W. E. DEBENHAM.

[This correspondence must now close.—EDS.]

"EDWARDS'S MACHINE FOR COATING PLATES."

To the EDITORS.

GENTLEMEN,—I have read Mr. S. Fry's letter in your last issue, and am somewhat amused at the ingenious way in which he attempts to mislead and throw dust in the eyes of your readers. Mr. Fry knows perfectly well that it is not true that my "entire machine has been in manufacturing use for years;" neither has any similar machine been used for coating plates. The argument that other machines which may possibly be similar in principle have been used for totally different purposes is quite irrelevant, and needs no further discussion. If Mr. Fry will refer to my drawings and specification (or get someone to explain them to him) he will at once see that any attempt to use my "entire machine" for making "floor cloths" or "medical plasters" would result in disastrous failure.

I should also pity any plate-maker who attempted to use for coating plates one of the "floor cloth" or "medical plaster"-making machines described by Mr. Fry, and I challenge him for £200 to produce any such machine which has been, and, as an "entire machine," can be, successfully used commercially for coating photographic plates with gelatine emulsion.

Mr. Fry may rest assured that I am not so ignorant as he chooses to assume regarding the machines hitherto used for coating plates, including the one he refers to as having been long used in Belgium, a similar "simple" machine having been tried and abandoned by me several years ago. I am also quite familiar (perhaps much more so than Mr. Fry imagines) with the ingenious little appliances used by Mr. Fry and others for coating plates, and which, however convenient they may be in economising the labour of coating by hand, can scarcely be dignified by the name of "machines," as a mechanical engineer would understand the term.

If Mr. Fry is so satisfied with the "perfect success" of his system of so-called "machine coating," let him continue to use it. I shall certainly not try to induce him to change. If, however, he is anxious to adopt my improvements without paying the licence fee, let him infringe or oppose my patent. He will then have an opportunity of attempting to *prove* the truth of his statements before the proper authorities.

With regard to the "well-known defects" alluded to in my former letter: if Mr. Fry wishes me to describe them more particularly I am ready to do so, or, with his permission, I will cause publicly to be shown plates of his own make which are glaring examples of these defects, and which are entirely obviated by the use of my improved machinery.

Mr. Fry's assumption that my machine patent is intended to "exclude the photographic community from using it" is not correct. He is evidently ignorant of the new patent law, by which an inventor is bound, under certain conditions, to grant licenses on reasonable terms. This I am making arrangements to do, and also to supply the machine to others at a less cost (inclusive) than they could construct the machine and get it into successful work without my assistance.

I may add that the number of applications I have already received from plate-makers in various countries is alone sufficient evidence of the novelty and value of my invention.—I am, yours, &c., B. J. EDWARDS.

The Grove, Hackney, London, September 16, 1884.

To the EDITORS.

GENTLEMEN,—Upon reading the letter in your last issue from "Looker-on," it appears that he has somewhat misunderstood the opinions expressed by "A Patent Agent."

If a man were debarred from using portions of mechanical appliances already in use it would be next to impossible to construct *new* machinery for any purpose whatever.

Many of the best patents are simply improvements on former inventions, or applications of known appliances to a new purpose.

It is difficult to see the distinction between a cab and an omnibus wheel, either as regards construction, application, or use, and, therefore, this illustration can hardly apply to the case in point.—I am, yours, &c.,

1, *Westminster-chambers, Westminster, S.W.,* ENGINEER.
September 16, 1884.

To the EDITORS.

GENTLEMEN,—As an inventor, also a user, of dry plates I have watched with much interest the communications in the Journal relating to Mr. B. J. Edwards's plate coating machine.

From "Looker-on's" vague illustration of a cab wheel we are given to understand that if you take parts of several machines and make a whole machine used for a totally different purpose to that for which its component parts had been applied it will not make a valid patent.

For the sake of illustration, and to make this clear, let us take the at present important subject of aërial navigation. Supposing I employ a balloon, and I find that, by adding the sails of a boat, the screw of a steamer, and a steam engine to work the screw, I am able to propel my balloon in any direction, am I to understand that because I have invented a totally new method of navigating the air, and have used sails, screw, and steam engine (which parts have been used for other purposes), I am to be debarred from securing my invention? If so, where is there a patent of the present day that is valid? I feel assured nine-tenths of the patents are but combinations of old mechanical ideas.

Is the law of progress to be thus barred? It would, indeed, be most effectually barring progress if inventors were not allowed to secure their inventions or improvements on existing patents or machines.

I am much surprised at Mr. S. Fry's remarks on this subject. As a maker of dry plates it appears as though he is "riled" because Mr. Edwards has invented a machine which causes his plates to lose the defects which Mr. Fry is troubled with in his method of coating. Why not act the man? Why not adopt the better method, and let the inventor have his just due? Why try, because its advantages are so manifest and likely to affect him commercially, to condemn the invention by such foolish arguments as that parts of it have been employed before for floor cloth and medical plaster making?—I am, yours, &c., AN INVENTOR.

London, September 16, 1884.

Notes and Queries.

J. A. PEACOCK says:—"I should like, through the medium of the Journal, to ask Mr. F. W. Hart if the shutter spoken of by him, as reported on page 574 of the current volume of the Journal, is to be procured commercially. And, if so, from whom? Also, to say if there be no injurious vibration from the use of the movable stop? With regard to Captain Abney's formula—peroxide of hydrogen (twenty volumes) one drachm, water five ounces—in which to immerse the plates after fixation, I should be obliged if any reader could give me some idea of the number of 5 × 4 plates which could be cleared from hypo. in the five ounces of solution."

GEORGE RICHARDS inquires:—"Can you inform me when the Rev. T. F. Hardwich resigned the Professorship of Photography in King's College, London, and by whom he was succeeded?"——In reply: Mr. Hardwich resigned the position mentioned at the close of 1860, and was succeeded by the late Mr. Thomas Sutton, editor of *Photographic Notes.*

"Is there any preventive or cure for the decolorising of the silver bath for sensitising albumen paper? Please give me a hint, or refer me to a manual of instructions, and oblige.—THOMAS B. RICE."——In reply: The discolouration may be prevented by various means, such as adding a pinch of bicarbonate of soda to the silver solution, by which a precipitate of carbonate of silver will be formed. This must be allowed to subside and should not be filtered out. After sensitising the paper pour the bath back again into the stock-bottle containing this precipitate and shake up. Kaolin, also, is much employed as a decolorising agent, and has a deservedly high reputation.

I. O. X. writes:—"Will you kindly inform me, at your earliest convenience, where I can obtain in quantities the microphotographs that are inserted in the fancy goods (penholders, &c.) sold at seaside places? If only made, as I suspect, in France, I would be greatly obliged by being supplied with any address there. Could I produce them myself without great trouble and special expense? Where could I obtain the tiny lenses to photograph them?"——In reply: Our correspondent should obtain the apparatus for the purpose required, which he can do through any dealer in photographic materials. When once the apparatus is obtained there is no difficulty whatever in making the pictures.

R. S. says:—"In last week's *Notes and Queries* I saw a formula for an 'iron' toning bath. I made it up, and liked it so well that I should wish to understand it more thoroughly. Kindly let me know what is the action that takes place. What part does the nitrate of silver play in producing the colour? What is the exact amount of perchloride of iron? The formula says—'Solution of perchloride of iron one and a-half ounce;' but does not give the strength. Does the sediment do any harm? Why is there such a *large* amount of hypo.? Lastly, why is it not more used? Is it more or less fugitive than chloride of gold?"——In reply: We should like our correspondent to make a special study of this toning bath and give us the result of his experience and deductions.

"WILL you kindly inform me if there is any known direct process of copying engineers' tracings by photography in black lines on white ground, similar to the ferro-prussiate negatives in ordinary use? I am informed that a black process has been recently introduced in Paris. Is there any information published on this subject?—H. J. S."——In reply: We are not aware of any method by which rich, pure black lines on a white ground can be obtained; but processes have been published by which such lines can be made of a black that partakes of a slightly reddish or greenish hue. We refer more particularly to the aniline process. This process, however, so far from having been "recently introduced in Paris," was discovered and patented in England nearly twenty years ago.

Exchange Column.

No charge is made for inserting these announcements; but in no case do we insert any article merely OFFERED FOR SALE, *that being done at a small cost in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a* NOM DE PLUME *be thought desirable), otherwise the notice will not appear.*

I will exchange a Victoria camera, nine lenses, new, cost £7, for anything useful.—Address, C. P. GEE, Weymouth.

I will exchange two splendid lime-light gasometers for anything useful.—Address, BRADSHAW, Oxford-road, Altrincham.

I will exchange a well-bred fox-terrier bitch, value £4, for anything useful to an amateur.—Address, A. F. S. KENT, Corringham, Romford, Essex.

I will exchange a pair of large lime-light gasometers for anything useful; also triple lantern and dissolving effects, cost £90.—Address, A. SCOTT, 71, New Briggate, Leeds.

Wanted, a tourist's camera, quarter-plate or size larger, in exchange for a cabinet burnisher (new), or offers.—Address, CHAS. WM. APPLEYARD, photographer, Miall-street, Bradford.

What offers for a portable half-plate camera (closes to two and a-half inches) with two double dark slides, quite new?—Address, PHOTO., 44, Melville-place, Myrtle-street, Liverpool.

Wanted, a half-plate instantograph (Lancasters') in exchange for twelve volumes of the *Lancet,* well bound, in perfect condition, from the year 1851 to 1856.—Address, E. ELLIS, 17, Trinity-street, Ryde.

I will exchange a Lerebour's lens with stops, almost new, half-plate studio camera, good condition, and landscape background, for a good quick-acting *carte* lens.—Address, J. BARKER, 72, Bond-street, Macclesfield.

Wanted to exchange, a good saloon gun, by Watson and Son, for a Kinnear or other good whole-plate or 10 × 8 outdoor camera; difference adjusted, or will exchange for anything useful in photography. Dark cloth background wanted.—Address, J. HUBERT, 238, Mare-street, Hackney, E.

I will exchange a very fine Voigtlander's *carte* and cabinet lens, three and a-half-inch diameter, seven-inch focus, in good condition, originally cost £15 15s., for a *carte* lens by Ross or Dallmeyer, shorter focus than the above, outdoor set, or gold hunting-watch; or what offers?—Address, H. M. ASHLEY, photographer, 28, East John-street, Exeter.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

NOTICE.—*Each Correspondent is required to enclose his name and address, although not necessarily for publication. Communications may, when thought desirable, appear under a* NOM DE PLUME *as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.*

S. WALLIS.—We shall write to you privately.

R. C.—Write the name and number on the film with pencil before development

JAS. SMILES.—You will, doubtless, be able to procure what you require from Messrs. Nettlefold and Son, 54, High Holborn, W. C.

WM. J. SMITH.—We are not aware where the caps are to be obtained. You had better write to the gentleman himself; he will, doubtless, give you the desired information.

ANXIOUS.—All, of course, will depend upon your qualifications and whether there may be any vacancies. You had better advertise, stating where you have been engaged and what you can undertake.

C. J. E.—The result is produced by the decomposition of the albumen surface, and is, we fear, irremediable. Soaking the prints in dilute solution of alum may possibly prolong their existence to a slight extent, but they cannot be expected to last long.

T. W. H.—Instead of nine feet you had better make the studio twelve or thirteen feet wide. We prefer a ridge roof or a "lean-to" roof. Make about five feet at each end of the roof and side opaque, and the rest of glass. There is no work published on the subject.

J. F. Z.—1. The plates only require washing thoroughly after the treatment with sulphite. Any other application will probably spoil the image.—2. We are aware of no such possible addition; judgment alone must be the guide.—3. You will find a series of articles on the subject in our volumes for 1878-9.

W. B. L.—Mica is not a manufactured article, but a natural product. It cannot be procured in pieces larger than four or five inches square suitable for photographic purposes. It may be obtained at many wholesale gasfitting establishments, as it is largely employed as a shield for preventing the smoke from gas flames discolouring ceilings.

T. W.—You can certainly employ the apparatus for copying—that is, if the camera will expand sufficiently to copy the object the size you require. If it do not, you can still utilise it for the purpose by fitting an elongating cone on to the front to carry the lens. The time of exposure will, of course, depend upon the size of the stop employed and the quality of the light at the time. A few trial plates will set you right in this matter.

J. H. A.—The best advice we can offer you is to get some elementary work on photography and read it carefully. With regard to amateur portraiture, you cannot do better than study the articles on that subject which appeared in our volumes for 1882-3. We cannot in this column undertake to give instructions in "photography in general," or to re-write articles which have so recently appeared, and with which the general body of our readers are quite familiar.

X X X.—Yes! You certainly have done some harm to your residues, inasmuch as you have given yourself a great deal of extra trouble. When you added the salt, and the chloride of silver did not subside, you should have put in a few drops of nitric acid, when all would have gone well and the precipitate subside to the bottom. By adding hyposulphite of soda and cyanide of potassium you have redissolved the chloride of silver already formed by the salt. Your best plan now is to add sulphide of potassium (liver of sulphur), and so throw down the silver as sulphide. In this way you can still recover the metal.

T. EDGE.—1. We should say the direct enlargement would be no better than a print made from an enlarged negative, unless the small negative be very perfect. When an enlarged negative is used there is great facility for improving the result if the original be an inferior one, inasmuch as the transparency can be improved by retouching, and so can the enlarged negative.—2. No difference.—3. This question cannot be answered, as all will depend upon the power of the light and the density of the negative.—4. Not specially made for the purpose; any lighting machine will answer, but you will require a lamp that will retain the light at a fixed point. Messrs. Siemens Brothers supply such lamps.—5. With care the engine and machine, if good in the first instance, will be very durable.—6. Doubtful; however, it may prove a commercial success.

ALPHA.—1. With the data given it is difficult to account for the stains, as they may proceed from several causes. The first thing that occurs to us is that the plate may have been removed from the bath before the whole of the iodide and bromide were converted, or the alcohol and ether washed out of the film. Or it may be that the plate is insufficiently drained before it is placed in the camera, and then the developer applied while the silver solution was still in streaks or tears, so that the developer does not mix readily with it. Perhaps, however, it may be a combination of the whole. We have seen streaks similar to yours produced by using "methylated finish" instead of alcohol in the developer.—2. Distilled water, one ounce; nitrate of silver, forty-five grains; nitric acid, half-a-drachm, is the formula inquired for.—3. Not that we are aware of. An advertisement in our columns would, doubtless, secure what you require.

W. H. W.—1. The spots are caused by the print being kept for so long a time moist between the paper. Probably, also, this was somewhat impure.—2. The stains are caused by the negatives being printed from before all the hyposulphite of soda is thoroughly washed out of the film.

RECEIVED.—G. W. Webster, F.C.S.; S. Highley, F.C.S.; H. E. Lees. Thanks.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—The next monthly technical meeting of this Society will take place on Tuesday next, the 23rd instant, in the Gallery, 5A, Pall Mall East. The chair will be taken at eight o'clock.

PHOTOGRAPHIC CLUB.—At the forthcoming meeting of this Club, at Anderton's Hotel, Fleet-street, on Wednesday next, the 24th inst., the subject for discussion will be—*On the Development of Plates known to be Over-Exposed.* A special general meeting will be held on Wednesday, October 1st, 1884. The Saturday afternoon outing will be at Kew, and afterwards at the Hotel on Kew Green, near Bridge—train leaving Liverpool-street Station at 2 p.m.

THE BALLOON CENTENARY.—We have received the following interesting account of the voyage of the "Monarch" balloon from the Artillery Grounds, Finsbury, on Monday last, the 15th inst.:—"We left the Artillery Grounds at about 4.15 p.m., the "Colonel" balloon having been despatched some ten minutes previously. As we gradually rose above the bricks and mortar of Finsbury the extraordinary interest manifested in the afternoon's proceedings became very evident. Dense masses of people thronged not only the Grounds from which we ascended, but every point of vantage in the neighbourhood appeared to be occupied. Windows were crowded, housetops thickly packed, and the streets below on all sides literally teemed with thousands and thousands of human beings, the sight of whom as we slowly and steadily mounted upwards was one not easily to be forgotten. The view was simply superb. Below us lay the whole of London stretched out in maplike beauty, with its grand and mighty buildings dwarfed into mere toys. There was the noble cathedral of St. Paul with its dome resembling the proportions of the thin end of a gigantic egg; further on the Victoria Tower of the Houses of Parliament stood out boldly like an ornamental matchbox, and a little square-sided set of buildings, with an open space in the centre, the whole appearing of dimensions almost suitable for the waistcoat pocket, was soon recognised as Somerset House. Thus our eyes wandered from point to point as we glided upwards and onwards, now puzzled as to the individuality of this or that building which appeared to stand out more prominently than the rest, and now gratified through the recognition by one or other of us of the various places of interest which we were able from time to time to identify as the vast pile of the outstretched metropolis of the world gradually passed in panoramic procession below us. At 4.25 we were directly over Regent's Park, at an altitude of 2,500 feet, and at 4.44 we sighted the "Robin Hood," which had just risen, and for which we had for some time been watching, while in the opposite direction the "Colonel" could readily be distinguished in the far-off distance, both balloons appearing about the size of peas. Our course then lay almost straight over the picturesque suburb of Harrow-on-the-Hill, and thus we sped onwards on our aërial journey. Somewhat later, on again looking round for the "Robin Hood" that balloon was no more to be seen, its aëronauts having effected a descent near Sudbury, over which district we had ourselves passed some time previously. On reaching Harefield, our supply of ballast having become reduced to one and a-half bags, it became necessary to terminate our journey, which we did at 5.15, after a run of 18½ miles, by bringing down the "Monarch" in a field close to that village.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. STEWARD, Optician,
For the Week ending September 17, 1884.
THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

Sep.	Barometer.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max Shade Tem.	Min. Tem.	Remarks.
11	30·35	E	52	57	101	74	55	Overcast.
12	30·33	NE	62	59	107	74	56	Cloudy.
13	30·24	E	65	61	115	77	57	Hazy.
15	30·06	E	65	62	105	78	59	Overcast.
16	30·10	SW	67	64	110	79	63	Cloudy.
17	30·23	E	69	65	109	83	62	Hazy.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1273. Vol. XXXI.—SEPTEMBER 26, 1884.

FREE SILVER AND THE KEEPING QUALITY OF GELATINE PLATES.

The keeping powers of dry gelatino-bromide films have recently received some attention in these columns, and various opinions have been expressed on the question as to whether such films must *necessarily* deteriorate with keeping. The result of a careful consideration of the subject leads to the belief that deterioration is not a necessary evil—that, given a properly-prepared and dried film containing nothing but pure silver bromide, the plate will keep indefinitely if properly cared for; but that if, from carelessness in preparation or from other causes, foreign matter be present the sensitive surface is sure sooner or later to show symptoms of decay.

Amongst the causes which have been generally agreed upon as contributing to this result is the action of the silver nitrate upon the gelatine itself. Various experimentalists in the early days of the gelatine process have published formulæ in which an excess of the silver nitrate over the soluble haloid was a prominent feature, and these formulæ have been, and still can be, successfully worked, provided the plates are not kept long after preparation; but when the test of time is brought to bear upon such films they have invariably succumbed. In the case of the employment of an excess of silver there is, of course, no shadow of a doubt but that direct combination takes place between the silver and the gelatine; and, indeed, where the silver is not in excess in the formula, it is quite possible, by the method of mixing, to set up conditions which favour such combinations, especially in a neutral or alkaline state of the emulsion. On the other hand, when an acid state prevails there is less danger of such a result, since, as we have before pointed out, the organic silver compound remains probably in a soluble state, and is removed with other soluble matter when the emulsion is washed.

In addition to this, the presence of acid prevents the silver bromide itself from passing into the "fogging" stage, as it would otherwise do under the influence of excess of silver nitrate in a neutral condition of the mixture. This is a well-known fact to all who have worked any of the rapid collodion emulsion formulæ, in which a considerable excess of silver was allowed to act upon the sensitive collodion for some days in the presence of free acid, which served to keep it clear of fog. Here the fogging action of the silver was undoubtedly exerted upon the silver bromide as was proved by the fact that, if the same proportion of free silver were permitted to act for a very long time upon a neutral *plain* collodion, and this was subsequently emulsified, no such fogging action was set up.

In order to decide the point as to whether a gelatine emulsion is amenable to the same system of treatment as that alluded to in connection with collodion emulsion, we some time ago put the matter to the practical test, and have just recently taken the opportunity of trying a number of plates some four months after their preparation. It will be recollected that some time ago, when writing of Mr. W. K. Burton's precipitation method, we threw out the suggestion that it seemed to offer a possibility of employing an excess of silver, the deleterious silver compound formed being got rid of with the other products of decomposition. This suggestion we put to the trial at the same time.

The following were the methods adopted:—An emulsion was made in the same manner as would be adopted in the "boiling" process, but a lower temperature was observed, and a large excess of silver nitrate and free acid were employed. Sixty grains of bromide of ammonium and fifteen grains of gelatine were dissolved in three ounces of water; separately one hundred and twenty grains of silver nitrate and twenty-five grains of citric acid were dissolved in another ounce of water, and the two solutions mixed at a temperature of about 150° Fahr. The mixture was kept at a temperature of about 120° for six hours, and was then allowed to cool and set aside for a week. At the end of that time it was found to be in a liquid state, whereas, when first cooled, it formed a tremulous jelly. One hundred grains of Heinrich's gelatine was now added and left for a couple of hours to swell, after which it was liquefied by heat, completely mixed, allowed to set, and thoroughly washed in the usual manner. In order to make sure of the total removal of all silver the washed emulsion was reliquefied and precipitated by means of alcohol, to each ounce of which one grain of citric acid had been added, and the precipitated mass, after being broken up into small fragments, was again washed until no trace of acid was apparent.

The resulting emulsion was made up to five ounces, the usual proportion of alcohol being employed. In spite of the final washing it was found to be faintly acid, so two or three drops of a solution of carbonate of soda were added to render it neutral.

Plates coated with this emulsion and developed immediately after, and within a few days of preparation, were found to be fairly sensitive (21 on the sensitometer), and perfectly clean and free from fog. Several were put away, carefully packed, for future trial.

At the same time, a second emulsion was prepared by Burton's method, exactly the same proportions being observed in the materials employed. The emulsion was boiled for one hour, set aside to precipitate, and washed in six changes of distilled water, the last two showing no trace of silver or of acid upon testing. This emulsion, like the last, was made up to five ounces, the same quantities of gelatine and alcohol being employed as before.

The plates prepared from the second emulsion were slightly more sensitive but thinner than the others, and, like the latter, perfectly clean and free from fog. The films were more transparent—or rather appeared to have less body—and were coarser and bluer.

With regard to the keeping qualities: we have as yet made but one trial after an interval of four months. As a result, the two plates developed from the first emulsion both show slight signs of metallic fog at the edges only, the centre portions of the plate being as clear as before. That this is the result of the action of the free silver we are not yet prepared to allow, though, from the care exercised in their preparation and storage, there would seem little else to charge with fault. The future behaviour of the remaining plates will probably enable us to decide.

The Burton emulsion films have up to the present entirely preserved their pristine clearness, no sign of fog, discolouration, or deterioration being yet visible. Having stood the test so far, we may fairly hope that they are capable of being preserved indefinitely.

The question that now remains to be decided is whether, and to what extent, the employment of free silver will add to our power of attaining high sensitiveness. Whether a larger excess of silver, longer boiling, or the employment of alkali, after the treatment with and removal of the alkali, will enable us to gain a higher degree of sensitiveness than we now attain, without deterioration of quality, will form an interesting subject for experiment during the approaching long evenings.

STEREOSCOPIC TRANSPARENCY PRINTING.

There are indications of a desire on the part of photographers to devote some attention to stereoscopic transparencies—a department of the art that has for a long period been allowed to fall into desuetude, although we have never yet been able to meet with a photographer who does not profess to cherish the most ardent love for such an application of the art-science. And well he may, for a good stereoscopic transparency is probably the finest outcome of photographic art.

It will be considered only natural if, in writing on such a topic, the process to be employed will be entered upon with the fullest details. This, however, is not our purpose, as our remarks will have special reference to the mechanics rather than to the chemistry involved in printing stereoscopic transparencies; and, further, we shall limit the mechanics of the art, as spoken of in this article, to the printing by superposition of the negative upon a dry plate, no matter how or by what means such plate be prepared.

In the days when the Latimer-Clark stereoscopic camera flourished, or the equally-convenient one of French origin by which the sensitive plate was impressed one-half in succession to the other, the lens and the end to be exposed being moved horizontally and in directions opposite to each other—in those days and by these appliances the stereoscopic negative was so formed as to be ready for printing a photograph, which would cause no necessity for cutting and transposing in order to be seen correctly; for with it the right picture was opposite the right eye, the left being also correct. But with the advent of the more convenient and now universally-used binocular camera the left picture is (on the negative) now opposite to the right eye, and *vice versâ*, the effect being pseudoscopic, or the exhibition of an inversion of relief.

Printing-frames have been devised, and it is not long since we described one of them by which the right-end half of the sensitive plate is placed under the left end of the negative, the reversal being thus effected. But the printing must be accomplished by two independent operations, the shifting of the plate intervening.

Many of the American photographers adopt a method which is very simple, and saves much time and labour in the trimming of the prints. They apply it to the printing of albumenised paper proofs, although, as we have lately experienced, it is admirably adapted for transparency printing; for when the negative has once been prepared and placed in the printing-frame all labour and trouble are at an end. One exposure serves for both halves.

In the finished print, whether it be upon paper or glass, the arrangement of the respective pictures is correct, and they are both united at the centre by a species of hair line, although, as we shall afterwards show, there will be no difficulty in making this line either a-sixteenth or an-eighth of an inch wide, if such be preferred. The directions here to be given are based on those furnished nearly two years ago by a Savannah photographer to the editor of a New York contemporary when engaged in making a round of some of the photographic studios of America.

Suppose that the negative has been taken on an 8 × 5 or a 7½ × 5 plate, the first thing to be done is to place a sheet of paper on the table and draw a horizontal line upon it, erecting subsequently two lines 3½ inches apart. The negative is now laid face down upon the paper, and, placing the half to the left upon the space enclosed between the two lines, see that the precise portion of the picture desired to be seen is enclosed between these lines. Next, with the diamond and a rule cut off the end at the left-hand mark, and then push the negative to the left until the corresponding portion of the other half is brought between the lines. Now cut off the end that projects beyond the right-hand line, and, severing the two halves in the centre, reverse their positions so as to bring their opposite ends together. Lay these halves down on a plain plate of glass the proper size, and bind all together with slips of gummed paper round the margin. The negative is now ready for being printed from.

To print a transparency provide a sensitised dry plate of 6¾ × 3¼ inches—the correct dimensions of a stereoscopic picture of this class. It is quite immaterial here to inquire in what manner it has been prepared or how it is to be developed; for "process" has nothing to do with it so long as the plate is a dry one. Let the back of the plate be marked by an ink mark precisely in the middle, and place it down upon the negative so that the centre of the one corresponds with that of the other. After exposure and development a transparency results, the separate halves of which are correctly placed in every respect, with the exception of a redundancy of subject at the ends.

The best effect is obtained by placing upon the negative a thin mask of opaque paper, having in it two apertures of the forms and dimensions best adapted for showing the selected portion of the picture. The central division between these should be very narrow, and the distance between the extreme ends of the apertures should be six and a-half inches, the height being such as to suit the taste. If this mask be attached to the negative, and an ink mark be made upon it so as to guide in placing the negative in correct position, the printing of transparencies may be proceeded with.

Each picture will be precisely like another, provided that uniformity in the exposures have been adhered to, and the number that may be printed in any given time is limited only by the sensitiveness of the dry plate. From one negative four or five dozens may easily be printed in an hour, the development being deferred until the printing has been completed.

THE EXPANSION OF PAPER IN CERTAIN PHOTO-MECHANICAL PROCESSES.

Our readers are all tolerably familiar with the subject of the expansion of paper when wetted, and the effect it frequently has in producing distortion in prints if they be mounted whilst in an expanded condition. It is pretty generally known, also, that the paper always expands considerably more in one direction than it does in the other, and that if the photographs be allowed to dry before they are mounted the paper resumes, practically, its original dimensions.

We have on several previous occasions pointed out that the greatest degree of expansion always occurs in the transverse direction of the web—that is, as all photographic papers are made in continuous lengths, the expansion is the greatest in the width; indeed, with some papers it is practically *nil* in the longitudinal direction. This property of the expansion of paper frequently causes great inconvenience to photographers, particularly when two or more prints have to be joined to form a panorama, or in joining copies of maps or plans when of large size; for, if one print happen to be on paper cut one way of the web and the other the reverse, it is often quite impossible to make a perfect junction, simply because the image of one becomes larger than the other as soon as it is moistened with the mountant. Even in portraiture, too, it often gives rise to trouble by enlarging the features in one or other direction, and thus producing distortion. A very exaggerated example of this was recently shown at the Photographic Club in two prints from the same negative. In them the difference was so great that if one was a good likeness of the sitter the other was little better than a caricature.

So far our remarks have been confined to silver prints, but the property of the paper expanding, thereby causing inconvenience, applies also in the case of carbon, and possibly in an exalted degree, inasmuch as we have the gelatine coating to deal with as well, its expansive properties far exceeding that of the paper itself. This fact is easily demonstrated by simply immersing a piece of dry carbon tissue in cold water and watching its behaviour. In the first place, the paper absorbs water quicker than the gelatine, and consequently it expands before the gelatine, thus causing the tissue to curl up, gelatine side inwards. When the gelatine has had time to absorb more water the expansion of the two becomes equal. Then the tissue lies flat again. But matters do not rest here, for the gelatine still continues to absorb water and expands after the paper has acquired its maximum of distention; consequently the tissue again curls up, but this time in the reverse direction, the gelatine side outwards. It is quite clear that, as the paper expands more in one direction than it does in the other and gelatine in all directions alike, the direction of the expansion will still be governed by the manner in which the tissue is cut from the web.

For most purposes of the carbon process the expansion of the paper will not cause greater inconvenience than in the case of silver printing; for, if the print be developed on paper, and that be cut, in relation to the web, in the same direction as the tissue, both will expand equally, and when dry the print will be pretty nearly of its original dimensions. We have just said that for the ordinary purposes of the carbon process the expansion of the paper need not cause very serious inconvenience when the picture is developed upon a flexible or yielding support which expands and contracts similarly to the tissue. But there are applications of the carbon process, such as several of the photo-engraving and photo-etching processes, where the image has to be dealt with—not upon a flexible but a rigid support.

Now, it is clear that if an exposed print be affixed to (say) a metal or glass plate while the paper is distended to its fullest extent, and afterwards be developed, it will, owing to the unyielding nature of the support, be somewhat larger (at least in one direction) when finished. Added to this the print may be, and frequently is, considerably stretched in the operation of squeegeeing; hence it will be seen that when great exactitude is required—as in the case of copies of maps or plans drawn to scale—the expansion may entail very serious inconvenience, and, indeed, for some purposes might render a process impracticable.

However, it is possible to avoid the difficulty, and, in our last issue our special correspondent in Belgium described how this is accomplished at the *L'Institut Cartographique Militaire*, in the production of the Belgian military maps. As our correspondent explained, a carbon print of the map is first developed on a thin plate of copper, then the carbon print is rendered conductive of electricity, and an electrotype made from it for printing by the ordinary copperplate process. So far the process appears to be identical with that of Major Waterhouse, except that the image is not grained. Possibly, for line subjects, such as maps, &c., a grain may not be required. Now it is manifest that if the carbon tissue were allowed to expand, as it must do in the ordinary method of wetting, and then be squeegeed upon the copper, it would be quite impossible to obtain the design with any degree of accuracy to scale.

The plan adopted to overcome this difficulty is certainly ingenious, and it is one not very generally known; hence our reason for again introducing it, as the same principle may be utilised in other directions when extreme accuracy is necessary. Instead of the tissue being applied to the copper in a moistened condition, as usual, it is simply placed upon it dry. Over the back of the tissue is then laid a few sheets of dry blotting-paper, and over this several sheets of wet. The whole is then placed in a powerful hydraulic press, where it is subjected to a very heavy pressure for a certain period. The action that takes place is simply this:—The moisture in the wet sheets of paper permeates the dry ones as the pressure is applied, and eventually the carbon tissue becomes moistened; but by this time, sufficient pressure has been exerted upon it to effectually prevent any expansion whatever. Hence, when the image is developed and dried it will be of the exact dimensions of that in the negative.

Here is another method by which the expansion of the image in carbon printing may be avoided when a rigid support is employed:—If the copper or glass plate, or other rigid material, be given a thin coating of a solution of india-rubber in benzole, then the exposed tissue be similarly treated, and both allowed to dry, if the two india-rubber surfaces be now brought in contact and the whole passed through a rolling-press they will become firmly adherent, and no expansion whatever will take place, as the solvent of the india-rubber is inert upon gelatine. The image can then be developed in the usual manner.

The objection to this method of procedure is that there must necessarily be a film of india-rubber between the support and the image, and covering the whole of the plate. This for some purposes would be undesirable, and its removal might possibly involve a further trouble. However, this plan may be useful in many ways, and it avoids the necessity of the hydraulic press, which, for large sizes of plates, is a somewhat costly appliance, especially when only required occasionally or for experimental purposes.

ON THE CHOOSING AND USING OF A CAMERA.

It may be thought that the tenor of our remarks last week was directed more to the consideration of outdoor than indoor cameras, yet such was not the case entirely; for, though the indoor or studio camera is in almost every case an instrument used by the professional photographer, who might be expected to know as much as anyone about the requirements of his business, it may be said that what we wrote has equal pertinence to one or the other class. Furthermore, the professional just as much as the amateur photographer is too apt to work in a certain groove without being sufficiently alive to the progress around him, or to the effects of practice that may not have presented themselves to him, though sufficiently familiar to others.

This statement may be sufficiently exemplified by examining the apparatus employed by any dozen professional photographers. It is probable enough that forms decidedly out of date—or, at any-rate, not up to the mark of first-class modern instruments—will be by no means uncommon, though the results obtained by them may be of such exceptional merit that the artist can bring them forward to prove that nothing more could be needed if possible improvements in his instruments are suggested.

It is but a short time since we were examining the apparatus of a successful photographer, when we found one of his regular studio (cabinet) cameras, though very complete in some respects, yet quite capable of improvement in others. Thus, the adjustment was made not by a rack and pinion but by a screw, which usually is far inferior in handiness when used for fine focussing, a well-made camera with well-cut rack and pinion being quite sufficient to perform any focussing for portrait work without need for racking the lens itself—a feat which is almost impossible of performance, at least with comfort, when using a screw adjustment. So little used, in fact, is the rackwork of a portrait lens that a well-known professional photographer lately said in our hearing that he should save the expense whenever he bought fresh portrait lenses by ordering them with rigid body—that is, without rack adjustment, after the style of some of the old single landscape lenses. Hence, when the purchaser is offered a choice of cameras for indoor work he should undoubtedly choose one with a rack rather than a screw adjustment.

But it must not be lost sight of that some of the American instruments are actuated by a still different arrangement. The adjustment is instantly capable of being unshipped so as to run in and out quickly for rough adjustment, while the finer focussing is only brought into play at the last. American instruments are undoubtedly as far ahead of English in many ingenious directions as they are behind them in the quality of the woodwork. Hence, owing to the high price of labour there, any camera of best quality imported to this country is as high in price as the best here, though greatly inferior in delicacy of workmanship; yet there are many English photographers who are willing to pay the price for the sake of the practical usefulness obtained through the ingenuity of the design.

An English manufacturer informed us that, though his price list pictures a certain style of camera as made with a rack and pinion, he is yet unable to supply a rack for cameras of larger size than ten by eight inches on account of the manufacturers not making the pinion wire in any longer pieces. Beyond that size he has to adopt the screw adjustment, though, in answer to our inquiries, he stated he was able to make the screw to work from the side of the camera instead of at the end of the tailboard, as usually placed—just where it is most in the way.

With regard to the swing-back: sufficient has been written of late to render it unnecessary to dwell at any considerable length upon the subject. Still, there are some one or two points upon which we may lay stress. Thus, in few cameras is there any guiding line or mark to show when the swing-back is brought home, that is, not swung in either direction—a convenience that sometimes would be a great boon, and which could most readily be adopted in the construction of any camera. We might further say that for portrait cameras the use of rackwork to the swings is almost essential to enable their full advantages and conveniences to be employed. For outdoor use the arrangement would be too cumbersome. We might here add that, though the lists most frequently quote prices with one swing, and that one the upright, we strongly advise the selection of an instrument with both side and vertical swings. There are more occasions when real use can be made of a side than an upright swing, and we consider no camera complete without it. Those only know its full use who have practised with it.

The method of using the swing-back, when employed for outdoor work, so as to avoid a perspective representation of parallel vertical lines, has been too often repeated in our columns to need repetition. But we recently saw an instance where, with every knowledge of the principle, and practice in its application, an experienced photographer produced a negative of an architectural subject in which a want of parallelism was distinctly perceptible; and as a similar cause might operate with other workers, we here make a note of the occurrence in the interest of our readers. The gentleman in question, who uses a solidly-built folding camera, was using it with the swing-back home, and he tested its vertical position by bringing one of the edges of the front into comparison with some vertical line in the surrounding buildings. He preferred to use the front for this purpose, on account of the absence of screws, &c., rendering the comparison a simple and easy matter. A close inspection of his apparatus showed that, rigid as he thought his camera was, its front was distinctly out of perpendicular with the base-board, so that every architectural picture taken when he used the front as his guide to vertical position would be spoiled by converging lines when the swing was not in action. For the future, as may be readily imagined, he has determined to employ the back of his camera only to ensure correct perpendiculars.

Of course the plane of a camera front should be parallel to the back; but, after examining several cameras made by the very best makers, and which had been carefully handled in use, we found it the exception rather than the rule to see them free from fault in this respect. We advise our readers to examine their cameras in this direction and to make a note of their condition, as we need not say that the work of the lens would be interfered with when such a condition as we speak of was observed. In the first place, through its axis not being perpendicular to the back, the centre of the field of view would not occupy the centre of the plate, so that the full value of the lens could not be obtained; and, secondly, when used with full aperture there would be great difficulty in getting a good focus all over the whole of the plate.

It is always the aim of the maker of cabinet work to exhibit the beauty of his art in the fitting of the various parts; and, consequently, in the wet-plate days it was the exception rather than the rule to see a dark slide made so as to avoid the drainings from the plate being collected in the grooves where the shutter slides. There is no need now to guard against that particular evil; but we strongly advise all who use dark slides for indoor work to see that not one whit of usefulness is sacrificed to lightness; for, practically speaking, the weight of the dark slide for the portrait studio is a quantity that may be completely neglected.

We will conclude our remarks by indicating the desirability of supplying all cameras—whether for indoor or outdoor use—with a sunshade, really to be used for the sun out of doors, and in the studio to prevent glare from the sky or studio surroundings striking the inner side of the lens, and so producing a species of flare on the plate. The need for this with indoor cameras depends to a great extent upon the construction of the studio as regards light; but there are few, if any, cases where its employment does not tend to facilitate the production of clearness and brilliancy.

Intensification by mercurial solutions has long been a favourite method, and, indeed, from the earliest days of the collodion process it has been employed. Its fugitiveness in many instances has, however, given it a bad name, and whenever it is now used it is with a certain amount of fear for its results upon the future of the negative. The "Edwards'" intensifier gives more beautiful results than any, perhaps, but time has shown that it cannot be trusted. Unlike the ordinary modes of using mercury the "Edwards'" method gives a complete control over the intensity to be attained, as it can be stopped at any stage; and, finally, if when the negative is finished it be found too dense, a little hypo. solution will easily reduce it.

The old method consisted in the treatment of the whitened image by a dilute solution of sulphide of ammonium, and we have seen many negatives so intensified as good as upon the day they were taken—perhaps a-quarter of a century ago. There has been, however, no power of moderating the intensity produced by its aid; but some recent experiments by M. A. Dilté upon the action of solution of sulphide of potassium upon sulphide of mercury would seem to indicate a line of experiment that might lead to good results. He finds that weak solutions of the alkaline salt do not alter the mercurial compound beyond slightly dissolving it, but that stronger solutions act very powerfully. Strong solutions of the potassium sulphide change it into brilliant-black needles, decomposable by water. Highly-concentrated solutions dissolve a large quantity of the sulphide of mercury, the rest being converted into white needles, changeable by heat to a yellow colour. There seems here to be the nucleus of a means of altering the density of a mercury-intensified image blackened by a sulphide.

The compounds of silver and bromine are not usually looked upon as dangerous explosives, but M. Terreil, in the *Comptes Rendus*, describes how, after treating chloride and iodide of silver with ammonia and ammoniacal solution, and heating to boiling point, he proceeded to subject the bromide to the same treatment, but its behaviour was quite different. As soon as the water in the water-bath boiled the bromide melted, and in a few minutes there was a very violent explosion. Fortunately there is no probability of anyone attempting to develope a gelatino-bromide plate with boiling solutions, as, otherwise, unpleasant results might follow.

Casein was employed many years ago for assisting to keep the image upon the surface of the paper in a plain paper print. May it not possibly be employed more after the fashion of albumen? A writer in *Dingler's Journal* describes a compound, which he terms "ammonium albumenate." He mixes a hundred parts of dry casein with ten of powdered carbonate of ammonia and one of phosphate of ammonia until the mixture assumes a uniform appearance and pale yellow colour, the reaction occupying from fifteen to twenty hours.

Some time ago we quoted a passage from a local paper, which stated that the works in the Liverpool Fine Art Gallery were to be photographed for the purpose of illustrating a catalogue. Lately the *Athenæum*, in speaking in very glowing terms of the high quality of the collections of the neighbourhood, said that some paintings in the Royal Institution required more familiar illustration. In the current number it is stated that they have received a letter from Mr. Adam Holden, of that city, who says he is about to publish a series of autotypes of some of these works.

When an interesting archæological object is too large to transport to a special exhibition the proper thing to do is to photograph it. This has been done with regard to some of the huge megaliths discovered in the stupendous ruins of San by Mr. Flinders Petrie. The rest of the more portable objects are now on view in the rooms of the Archæological Institute in Oxford Mansion. The rarest object of all in the collection, which we need not say counts its age by thousands of years, is a glass lens, much exfoliated, but still transparent. This object is considered almost, if not quite, unique.

Dark rooms that are dark are, nowadays, more common than of old, and, as a necessary consequence, there are more breakages of measures and bottles in a busy studio through upsettings and collisions. A novel method of avoiding the former class of casualties is described in our contemporary, *La Nature*, as the invention of a maker whose name they do not publish. The plan consists in making the glass vessels with a narrow groove on the under part of their base, into which groove a piece of red rubber band is fitted.

SUPPLEMENT TO THE BRITISH JOURNAL OF PHOTOGRAPHY. SEPTEMBER 26TH 1884.

H. T. ANTHONY, (NEW YORK.)

INK-PHOTO. SPRAGUE & Co LONDON

This simple contrivance so increases the adhesion to any surface the vessels are placed upon that they may be tilted to an angle of forty-five degrees without falling over or spilling their contents.

Another useful mode of employing caoutchouc is to cover the handles of the taps with a piece of rubber tubing so as to prevent breakages by accidental contact of a developing cup or a bottle against the metal when the tap is turned, the hand being already occupied by holding some vessel or other. When the taps are provided with a projecting handle—by far the best form—this little "wrinkle" will be found of real utility.

MR. HENRY T. ANTHONY.

In our present issue we introduce a portrait of Mr. Henry T. Anthony, of the well-known house of Messrs. E. and H. T. Anthony and Co., of New York, representing one of the oldest firms in the United States engaged in photographic supplies.

Mr. Anthony was born on the 18th of September, 1814, receiving the usual preliminary education, and entered Columbia College when fourteen years of age, graduating with honours in 1832.

In selecting a vocation, that of civil engineering offered the most promising field for his capabilities, and among his early engagements was one on the first survey of the Erie railroad. About this time the New York Croton aqueduct was projected, and Mr. Anthony spent a year, under the direction of Major Douglass, in the preliminary survey and location, and subsequently was appointed resident engineer of an eleven-mile division of this famous work. During this engagement he became greatly interested in the newly-discovered daguerreotype process, and with his brother Edward, who had likewise become enamoured of the magic art, began its study and practice with an amateur's enthusiasm—not, perhaps, with a thought that it would eventuate in a lifelong business avocation.

Completing his engineering engagement on the aqueduct division he accepted a call to a clerkship in the Bank of the State of New York, which he subsequently resigned to fill a position offered in the survey and construction of the Hudson River railroad, the section assigned him being the New York division of thirteen miles. Upon the completion of this service he was offered his former position in the bank, where he remained until his brother Edward had embarked in the manufacturing, importation, and sale of daguerrean and photographic supplies, when he quitted banking and became a partner with his brother in business in 1852, assuming special charge of the manufacturing department, for which previous study and investigation had qualified him.

To become successful in any business or professional pursuit it is essential that one love it, and Henry T. Anthony was, from the start, thoroughly devoted to his work. Every scrap of information bearing upon the new discovery was seized and utilised. His early familiarity with physics and chemistry greatly aided his progress, and with such materials and appliances as could be had on either side of the Atlantic he worked out improvements over existing methods and formulæ, and was foremost in the introduction and practical use of the collodion and paper printing processes.

All the specialities sold for these purposes by the firm of which he was partner were prepared by his formulæ and direction, and he was the originator of very many of the improvements in practical photography and its appliances which are in extensive use throughout the country.

The required brevity of this notice will not permit special mention of many matters connected with the progress of the art and science of photography in which the active brain of Mr. Anthony has been fruitful. Those which have appeared in print in the various journals are voluminous; but his private correspondence in reply to inquiries for needed light on the subject investigated was still more extensive, and hardly less useful in its results. To many new beginners he has been an open cyclopædia of information, and what knowledge he had acquired by diligent research was cheerfully and freely imparted to the craft.

For the purpose of a more efficient vehicle of communication with photographers it was decided by the firm to publish a monthly *Bulletin*, and this, under the editorial supervision of Mr. Anthony, has become a valuable accession to the serials devoted to this department of art industry.

The several local and national organisations devoted to photographic art-science have found Mr. Anthony a generous contributor and co-worker, and, though advanced age may circumscribe the field of his activities, it will be difficult for him to fold his hands and discontinue his interest in a vocation to which he has so long been devoted.

We add that as a man, an active investigator in photographic science, and as one of the oldest editors connected with photographic serial literature in the United States of America, Mr. Henry T. Anthony is universally beloved and respected wherever he is known. Our portrait, which was taken expressly for the purpose, is an admirable likeness of a cultured and worthy gentleman.

A LITTLE MORE ABOUT TOURISTS' CAMERAS.

I should be exceedingly sorry for my remarks on Mr. A. Pringle's denunciation of the draw-out shutters of dark slides to be construed as an insinuation that he was capable of making any statement otherwise than in perfect good faith. The impression I intended to convey was that he had not given them such a fair trial as would justify his sweeping condemnation of the system. From his further remarks I am more than ever convinced that he has not given them a fair trial, and will give my reasons for so believing.

It is wholly impossible for any dark slide to be made absolutely light-tight. I have examined many of them by the best makers, and have rarely found one which did not admit light more or less freely between the shutter and the rail against which it works. No fault whatever attaches to the makers, as wood will shrink and warp and twist. The velvet will wear out, the joints may be strained, and a dark slide which, on leaving the maker's hands may be as perfect as possible, may very shortly afterwards not be so reliable. This is so well known that, even in the old slow-plate days, the ordinary commonsense precaution was always taken, by any operator who took any pride in his work, of protecting the dark slide by a cloth or wrapper, even in the studio, and also of covering the shutter, while being drawn out of the slide in the camera, with the focussing-cloth. With this precaution, which is tenfold more necessary with the modern rapid plate, any old ramshackle dark slide is safe. This much will, I think, be generally admitted.

Now, let us consider the *raison d'être* of the draw-out shutter. The folding shutter has got to be looked upon as very preferable to the simple and more *light-tight* form of a non-folding shutter which does not draw out, for the simple reason that the latter is very awkward sticking out under the focussing-cloth and catches the wind out of doors. The folding shutter has its advantages, no doubt, as it cannot get out of place, and is very easily manipulated; but its drawbacks are serious. If it be hinged the hinge is very weak unless the woodwork be made very heavy; then markings appear, which some attribute to air getting through the joint, and others attribute to light making its way through the same aperture. Leather and other materials are substituted, but the markings still continue—often exactly coincident with the leather or other flexible hinge. In short, the complaints of the folding shutter are both loud and frequent. Note that this is quite apart from the possibility of light getting in at the shutter aperture at the end of the dark slide, and which is so generally—I might say always—guarded against by the commonsense precaution above mentioned.

Now, it is quite true, as Mr. Pringle says, that with the draw-out shutters, unless the shutter be put in absolutely square, light will get in. Would he "be surprised to hear" that the thin shutters—which for the sake of lightness are usually supplied with such dark slides—are not intended to be put in absolutely square? Such is the case; and, knowing that it is really necessary they should be inserted at one corner first, and that some light can (if allowed to do so) enter, be the inner spring shutter ever so elastic, still these dark slides are deliberately made, and by great numbers of people preferentially used, because the above-mentioned simple, commonsense, old-fashioned precaution is full and ample protection to the most sensitive plate.

We now come to the question of what to do with the shutter when it is pulled out. Well, if the camera be a small one there is no difficulty at all about it; and a tailor of even less eminence than Mr. Poole might, at a pinch, manage the job. But as one hand would, I suppose, be wanted to uncap the lens or its equivalent, and the other busy with the pipe, I would suggest that the operator might tuck it under his arm or hold it between his knees, and in this undignified position he could console himself that when his plate was once shut up in the dark slide it was, humanly speaking, safe.

But there is another point of view. I say that it is a disgrace to photographers and photography that it should be considered necessary to carry a bulky apparatus into the field at all. When microscopic objects can be enlarged a hundred diameters, and still require a high power to render the detail, is it not a shame that we cannot take a photograph or a (say) $4\frac{1}{4} \times 3\frac{1}{4}$ plate and enlarge it a miserable four or six diameters? The happy day will come, and better pictures be the result. Even Baker & Co. will be up to a coat which will carry camera and dark slides, let alone the shutter.

When I say we cannot do it, I should say that the most of us have never tried it—I mean given it a fair trial—for it has been done so that expert photographers failed to distinguish between the direct and the enlarged photographs. No fact is more clearly established than that large-sized instantaneous pictures are impracticable; they must be taken small and enlarged. The same general remarks apply to portraiture; the principles underlying both being the same, and apply equally well to ordinary landscape. Less weight, less expense, far better optical advantages; but—and there is the drawback—a little, just a little, more care.

Unquestionably the camera of the future has yet to be designed; but the users of it are still very far from being educated up to it, and therefore don't want it. They have all their own individual "fads" to work out first and foremost. One above all others is that the camera shall be handsome to look at; and this, particularly in the North of England, amounts to a positive craze, efficiency being a very secondary consideration.

As to fixing the camera on the stand-head: if Mr. Pringle will refer to his own remarks he will see that they cannot well be understood to mean anything but an absolutely rigid attachment, such as would prevent rotation, and which would, of course, be inadmissible. I see that there is a real want for something of the kind, and can suggest two methods:—1. The thumb-screw permanently attached to the camera, so that it can be loosened but not withdrawn; and a stand-head with a button-hole-shaped slot in it.—2. Plates on the bottom of the camera (or a sunk button-hole plate) in which a disc of metal attached to a shank (square and passing through a square aperture in the stand-head) should engage. A wing-nut or its equivalent under the stand-head would tighten or loosen it instantly. These fastenings are not applicable to many cameras—my own, for instance.

As to high-class instantaneous work: I still adhere to my opinion that I should prefer to dispense entirely with the swing-back; and, by employing such a shutter as Edwards's, be able to stop down my lens so as not to need the swing for helping out the focus of foreground. I may as well add that, so far as I know, Edwards's shutter is not a commercial article, although it is free to anyone to make or employ it.

This brings me to the question of rapid rectilinear lenses, which Mr. E. H. Farmer thinks I prefer. I do nothing of the kind, for, *per se*, I infinitely prefer the portable symmetrical. When we consider that with thirty times plates an $\frac{f}{30}$ stop is as rapid as one of about $\frac{f}{5\frac{1}{2}}$ with wet collodion, it is evident that a very wide range of rapid work is within the reach of a portable symmetrical. Still the extra aperture of the rapid rectilinear is an advantage sometimes, more especially for portraiture, while the form of the mount makes it particularly suitable for adapting extra lenses. It is in this direction—lessening the number of complete mounts and stops and *paraphernalia*—that the next real progress in tourists' outfits will be made. This is likely to be very soon accomplished—one mount with adjustable lenses for any focus; and then we shall begin to know what kind of camera we want, and possibly, like Mr. Pringle, change our opinions *entirely*. GEORGE SMITH.

EXPERIMENTS WITH SILVER PRINTS.

SOME time ago we had at the societies a great deal of talk about the permanence of silver prints, much being said—not, I imagine, for the first time—about the effect of a trace of hyposulphite of soda left in the print after it was finished, and very contrary opinions being given as to what this effect really was. There were even found some enunciating the theory—till lately held to be heretical—that a considerable quantity of hyposulphite of soda left in a silver print did not endanger its permanency at all. Others, again, denied this somewhat warmly.

Some five or six years ago, having amongst a batch of prints several which were spoiled through double printing, &c., a series of experiments were tried with them. Some were toned without being fixed, others were fixed without being toned, and soforth. The prints were afterwards stowed away and completely forgotten, but came unexpectedly to light the other day. On the back of each was marked the treatment which it had received, and I think it possible that if I give here the notes from the backs of the prints, and then describe the appearance of each print, readers of THE BRITISH JOURNAL OF PHOTOGRAPHY might be able to deduce conclusions more or less useful.

I should state that the prints have remained in an exceedingly dry place—in a writing-desk, in fact—and have been in the dark during the years that they have lain there, this latter fact making the experiments of less value than they otherwise might be.

The prints were on Durand's ready-sensitised paper, and those that were toned were treated with the common acetate of soda gold toning bath. The strength of the fixing bath I cannot remember, but I know that I was in these days in the habit of using one which would be considered strong for prints. Probably it contained four or five ounces of hypo. to the pint of water.

Nos. 1 and 2 are marked "washed"—that is to say, they received the washing which is given before toning to remove the soluble nitrate, but received no further treatment. In one the image has faded almost entirely away, and in the other it has turned a light-brown colour. The first is of a yellow colour throughout, but in neither is there the darkening all over which I should have expected to be seen.

No. 3 is marked "washed and toned," this indicating that the toning solution was not washed out of the print, and that there was no fixing. The image on this print has almost entirely disappeared, and the whole surface and also the back of the print have turned dark brown.

Nos. 5 and 6 are marked "washed, toned, and washed." Here everything has been done except the fixing and final washing. The two prints, which were similarly treated, exhibit in this case a marked contrast. In one the whites have retained almost their original purity, except for some patches of brown, and the image is still fairly vigorous. In the other there is little of the image left, the whole surface having turned nearly black, and showing a metallic lustre.

No. 8 is marked "washed, toned, and dipped in hypo." It still tastes strongly of the fixing salt. The image has disappeared almost entirely, the whole print being of a somewhat deep-brown colour, with a metallic lustre. The appearance of this print indicates that, at anyrate if there be sufficient hypo. left in the paper, the action of damp is not, in some state, necessary to cause fading.

No. 9 is marked "washed, toned, washed, and dipped in hypo," from which I imagine that the last (No. 8) received no washing between the toning and fixing. There is not much difference between the two, however, although there certainly is somewhat more of an image to be seen in No. 9 than in No. 8.

No. 10 is marked "washed, toned, washed, dipped for ten seconds in hypo., and washed." This print has, therefore, received normal treatment in all points except in that of fixing, the duration of which process has been only ten seconds instead of, as usual, ten or more minutes. There is no sign of deterioration whatever in this print. It is as bright as when it was put away with the others. It is, of course, impossible for me to say that it would not have darkened by exposure to light for a length of time; but, so far as the experiment goes, it seems to indicate that the length of time during which we ordinarily fix prints is quite an unnecessarily-long one. It is impossible, as in the case of a plate, to see when the fixing is complete; but it is reasonable to suppose that with so thin a film of chloride as there is in albumenised paper the fixing must be very quick.

I have read in some instructions that it is necessary to fix prints "till it became evident that the silver chloride is dissolved out of them." The author of the instructions omitted, however, to state how the thing was to become "evident."

Another set of experiments made by me a little more than two years ago in connection with silver printing may be worth saying a word or two about, although there has elapsed, as yet, scarcely time enough to allow judgment to be made as to the results. They concerned the question of thorough or slight washing before toning. The matter is one in which instructions varying enormously are given. Some say not to wash at all, but (with certain toning baths) to place the prints direct in the solution; and others instruct us to wash only a little, so that a considerable quantity of the free silver may remain in the paper during toning. There are many who go to the opposite extreme, and say "the longer the washing the better;" or even that the free silver should be precipitated with a soluble chloride—usually common salt.

There is a great temptation to follow out the course indicated—to wash but slightly—because, in the first place, there is the saving of the trouble of long washing; and, in the second place, there is the undoubted fact that toning takes place much more quickly when there is some free silver nitrate in the paper.

I must say, however, that I think the economy of time secured is false economy. I used until two years ago to wash but slightly, and certainly I found that the toning process was very rapid; but I found that the tone so got was greatly lost in the fixing bath. On trying very thorough washing I found that the tone was secured with more difficulty, but that when once it was got there was none of the distracting change of colour in the fixing bath, and that the print came out of this looking as bright as when it went in.

Lately I have curtailed the washing, and have used common salt to get rid of the last traces of silver nitrate. I find that, with ready-sensitised paper at least, it is necessary to use the salt very sparingly, or toning will not go on at all. If the water be distinctly salt to the taste it is too salt. It should be just a little "brackish." I certainly must admit that this practice of tasting is not a very scientific method of making up solutions; still it seems to answer its purpose.

It was not about the question of salt or no salt that I was going to write, however, but as to whether there is a difference in permanence between prints toned with the ordinary baths in the presence of free nitrate of silver and those toned in the complete, or almost complete, absence of it.

About two years ago I toned a set of prints from the same negative, washing some thoroughly before toning and others but partially. I tried to get as nearly as possible the same colour in each case, and, mounting pairs of these prints side by side—one thoroughly washed batch and one partly washed—I laid them on one side. These prints have not been preserved from light and damp, as those in the experiments first described were, but have lain sometimes in a drawer, and sometimes exposed to light, damp, and air. As I said, scarcely time enough has elapsed for the experiment to be considered a complete one, yet I think I can detect distinct traces of fading in some of the prints which were but little washed before toning, whilst I can certainly discover none in the others.

W. K. BURTON.

DEVELOPMENT AND DEVELOPERS.

A FORTNIGHT ago were to be seen in the pages of THE BRITISH JOURNAL OF PHOTOGRAPHY two articles—one a leader and the other from a contributor—referring to the development of gelatine plates, and in each of which much food for thought was contained. The editorial article pointed out the tendency in modern development towards the use of a diminished proportion of ammonia and an increased proportion of bromide, while Mr. Mayes with great cogency showed the absurd methods adopted by the makers of plates in presenting their formulæ to their customers. As this latter subject is one I have felt and written strongly upon, I may at the present moment refer again to it with advantage. The table given by this gentleman, though it may have been compiled for his own help, is, during the continuance of the present absurd fashion adopted by the makers, likely to prove useful to any photographer if he be not entirely wedded to a single make of plate.

The manufacturers would appear to think that all they are called upon to do is to provide a formula which will suffice to enable anyone to use their plates with, utterly regardless of any desire to compare one formula with another—a proceeding which they, whether purposely or not I am unable to say, do their "level best" to prevent. If I purchase a number of plates why am I to be compelled either to mix up certain definite quantities of materials which may not harmonise with either the capacities of my store bottles or the capabilities of my shelves, or to waste time in altering the formula till I can readily not only mix my own pet quantities, but at the same time note how they compare with the proportions recommended by other makers or that my experience has shown to be useful?

The strength of developer should not, in my opinion, be confused with the relative proportions of the ingredients; hence I would suggest that Mr. Mayes' paper be reconstructed so that the strength of pyro. per ounce be given in one column, and that the other proportions be reduced to a scale of one grain of pyro. The figures in the pyro. column he gives might all read as one grain, and the other proportions be altered in accordance. The strength of pyro. per ounce is the least important point. The proportions that govern the character of the picture are—first, those of the ammonia to pyro.; and, next, of bromide to ammonia. The table then would, at a glance, show the amount of ammonia recommended by each maker for every grain of pyro. The fact would be gleaned directly by running the eye down the column instead of, as now, requiring a separate calculation for each line.

If this were done I should take the liberty of suggesting to the Editors that the table be transferred, with Mr. Mayes' permission, to the pages of their valuable ALMANAC, there to remain till the makers adopted a less absurd plan than they now do.

An instance giving point to the remarks I am making has occurred recently in my own experience. Within a comparatively short space of time I have had at my studio the representatives of three well-known plate-makers, and not one of the three could tell me, offhand, either the strength per ounce of pyro. or the amount of ammonia to pyro. his particular plates required. One had a bottle of developer with him, another had left his formula in his bag, and the third "really could not tell; but if I would pass him a bottle of pyro. he would *show* me how much he used." This sort of thing is positively ludicrous, and as far removed from scientific method as the poles from the equator.

Referring now to the question taken up by the Editors, the proportion recommended by the manufacturers—to observe which the table, as it now is, will be found most useful—it will be noticed that the varying amounts of ammonia to pyro. there shown is most remarkable. The highest quantity given is 12 to 1, and the lowest about $\frac{1}{3}$ to 1—one thus needing thirty times more ammonia than the other for every grain of pyro. Then, again, the proportion of bromide to ammonia varies so much as from 12 to 1 in one case, to about equal parts in another. In the early days of gelatine one finds Mr. Bennett speaking of ten minims of ammonia to a grain of pyro., and no bromide whatever. No maker of the present day, however, makes any such recommendation, and the constant tendency is, as pointed out, to indicate a decreasing amount of ammonia and an increasing amount of bromide.

As a matter of fact the experienced photographer knows that it is impossible to use much ammonia with some makes of plates, any excess above half a minim to a grain of pyro. certainly resulting in fog. It is usually my aim, first, to get the highest class of results from a film that it is capable of giving; and then, secondly, to get the briefest exposures. To obtain this class of result my own experience leads me to say very decidedly that nearly every maker (anxious, I suppose, to have his plates looked upon as the most sensitive obtainable) gives a proportion far too high of ammonia and too low of bromide. I have lately with considerable advantage altered the makers' formulæ in this direction, and produced better results than I had ever hitherto been able to average with the same plate when adopting the makers' formulæ. I have noticed, too, that the more thickly-coated plates will not, as a rule, stand without fogging anything like the quantity permissible with a more lightly-clothed sheet of glass.

Gelatine photography has long passed out of the realms of wonderland, and the best possible results of which a plate is capable must always be the aim of the artist who uses them. To obtain this, the alterations I have indicated have in my hands been successful to enable the experimentalist readily to know what he is doing in this respect, and to ascertain how his formula compares with others he will find Mr. Mayes' paper of considerable benefit.

G. WATMOUGH WEBSTER, F.C.S.

ENLARGEMENT FOR AMATEURS.

THE question of the best size of camera to employ is one that gives the tourist a good deal of trouble. Very few who are more than beginners are satisfied with quarter-plate pictures except lantern slides are required; and when even a good half-plate photograph is exhibited beside a 10 × 8 or 12 × 10 it seems more diminutive than the exhibitor anticipated.

It is certain, however, that when half-plate size is exceeded the difficulties of amateur photography increase rapidly. Weight, bulk, and cost all become prominent features in the pursuit. Two dozen half-plates weigh about seven pounds, one dozen whole-plates and about half-a-dozen 12 × 10; and while the former costs about eight shillings, the latter costs about nine shillings. All this means greater fatigue in working and more annoyance over failures, with fewer opportunities of securing good pictures. I have been for some time experimenting at enlarging, and after some trials I have fixed on 10 × 8 as the size to be aimed at, and have succeeded better than I anticipated.

Ten by eight makes a good picture, and the degree of enlargement from half-plate is so moderate that definition is not interfered with to any appreciable extent. This is, of course, almost equally true of 12 × 10, but the former is a more convenient size for several reasons. Amongst others, it permits of four prints being cut out of a sheet of sensitised paper, with power to avoid the margins, which are often defective.

The mode I have adopted has been as follows:—I first of all obtain a good half-plate transparency by contact. In my dark room I have a fixed spot at a definite distance from the gas burner, and I find that with an average negative three and a-half feet from a No. 3 gas burner (with a slit) four seconds is about the correct exposure. I develope fully, so as to get all detail, and it is surprising how much better the transparency sometimes appears than the original negative. The transparency obtained, after fixing and, if necessary, having received merely a provisional rinse, and drying between sheets of fine blotting-paper, it may be used moist to obtain the 10 × 8 negative, if time be precious.

In my dark-room shutter I have an aperture cut rather larger than half-plate size. In front of this a board five feet long projects into the room as a platform on which to operate. A frame fits into the camera, in which I place first the negative, *film* side inwards towards the lens (a Steinheil half-plate size), and a piece of finely-ground glass, with the ground side outward towards the shutter. The camera is then placed on the platform close up to the opening, with the lens pointing into the room, and a black cloth placed round it and attached to the window prevents the ingress of any light into the room except through the camera.

A perfectly-upright easel slides freely on the platform, and stands square to the camera. On this a piece of suitable white paper, smooth and moderately thick, 10 × 8 in size, is fastened with six drawing-pins. The picture thrown from the transparency through the lens is carefully focussed on the white paper, the first thing being to move the lens to or from the paper until the picture fully covers the latter, and then, having arranged the size, to focus by sliding the easel. I find that the whole apparatus is included within a space of three feet. No elaborate calculations are needed, as a few minutes' trial will show the relative positions of negative, lens, and paper. The nearer the lens is to the negative the larger the picture on the easel, and the further the latter must be away from the negative, and *vice versâ*.

If the frame in which the negative is placed be so arranged that the film side presses firmly against the rebate in same, one focussing will do for all the transparencies to be used so long as the whole transparency is to be enlarged to any given size. This is no slight advantage, as an especially clear transparency may be chosen for a preliminary attempt, and all the others will then be placed in the same position without any need for focussing.

The next matter is the sensitive surface, and here comes in the chief novelty in the proceedings, if novelty there be. I use gelatino-bromide paper. I have been for a long time thinking that, if the old paper negatives waxed—in which the negative was actually in the body of the paper—acted so well, modern gelatino-bromide paper, in which the picture is formed on the surface in a separate film of gelatine, ought to do very much better.

A sheet of gelatino-bromide paper will, like the sensitised paper, cut up into four pieces about 8¾ inches by 11, and a piece of this size is fastened to the easel in the place where the paper used for focussing had been fastened, and in the same manner, the paper being removed and the lens having been capped previously. I always use a small stop, so as to secure better definition. When the paper is fixed by the aid of the usual red light the cap is removed and the exposure given. This is the most difficult part of the proceedings. Last week at 4.45 in the afternoon, with the Steinheil above mentioned and stop $\frac{f}{28}$, I gave three minutes and ten seconds with perfect results, while earlier in the day under two minutes would have been ample. In this case the sun was shining full on the ground glass—a condition which greatly simplifies matters, as it makes an astonishing difference in the case of focussing.

I develope with soda developer—carbonate of soda, one ounce; water, ten ounces; bromide, eight grains; pyro, one grain, as recommended by Mr. A. F. Genlain last month. I soak the gelatino-bromide paper, after exposure, in clean water until it lies perfectly flat; and if I fear over-exposure I simply add water to the developer so as to weaken its action. The negative ought to come out slowly, and development be pushed until the shadows begin to discolour. It is now rinsed in water and soaked in alum solution to prevent blistering, then washed and fixed in hypo. It is now well washed, and allowed to dry. When it is *perfectly* dry it must be waxed. The best material is solid paraffine, which is melted and the negative drawn through it slowly, so that it may be thoroughly permeated. This paraffine solidifies instantly, and the negative is placed between two sheets of blotting-paper and carefully ironed with a hot smoothing iron to remove any excess of wax. When this process is completed there remains a horny, semi-transparent negative, which prints with extraordinary facility. I may mention that paraffine may be had at any grocer's in the shape of paraffine candles, a couple of which will wax a great many negatives.

If the original negative be sharp and properly exposed and developed, the transparency made without moving the frame while exposure is going on, and the final focussing done with care, the resulting negative or print will, as I have proved, not only be *apparently* as sharp as if taken direct, but it will be absolutely free from any granularity (owing to its being *on*, not *in*, the paper), and there will be many details visible which were not apparent in the original.

If any one try this process with the care it deserves I am satisfied that the result will be very gratifying. Every amateur has small negatives lying by—sharp, clear, and suitable; and, as all the materials employed are already in hand, there need be no hesitation on the score of preparation. H. NORWOOD ATKINS.

P.S.—It is quite possible that a great many persons who read the above will say that the whole story is as old as photography. The only answer is—try it, remembering that not *novelty*, but *success*, is what the writer claims.—H. N. A.

SULPHITE OF SODA.

I HAVE been much interested in reading the leader on sulphite of soda, and the remarks will go very far to explain many of the apparent contradictions that exist as to the benefit to be derived from its use. But although variations that may exist in different samples and the alteration the salt itself may undergo have been pointed out, there is, I think, another important factor to be taken into consideration before deciding as to its universal adoption in the developer, and that is the plate itself.

I know that one of its ardent supporters has said that any plate not giving good results with sulphite is not worth having. This may be true from his standpoint, but there are plates in the market that cannot be made to give satisfactory results with pyro. and sulphite, but which will give negatives of the highest quality when developed with dry pyro. and ammonium bromide—in the latter case developing free from all stain and fog, with clear shadows and ample density; and in the former giving flat images and films remarkable for their yellow tinge.

This fact has been brought very prominently before me recently. When Mr. H. B. Berkeley first introduced the use of sulphite I at once tried the formula, making up a solution according to his directions, and also obtaining a sample from the Platinotype Company. The plates I used were my own make and capable of giving good negatives either with ferrous oxalate or plain pyro.; but with the addition of sulphite they gave, after a slow development, yellow negatives of a very inferior quality. This, after trying several samples of sulphite in addition to the one sent out by the Platinotype Company, led me to condemn the addition of sulphite to the developer.

But such strong opinions were expressed in its favour by writers in whom I had every confidence that, two or three months ago, I was induced again to try it, and, having in the meantime altered my formula for making plates, to my surprise the results are everything that can be desired. Indeed, so good was the quality that a plate-maker of considerable standing who saw some of the results (although he had previously failed to obtain satisfaction from the use of sulphite) decided again to try it, merely to find that with his plates it was worse than useless, giving only yellow negatives of a very inferior quality. This took place not only with the solution he had made, but also with the solution with which the plates of my own make gave such good results; and yet his plates are equal to anything in the market when developed with pyro. without the addition of sulphite.

There are plates in the market of good quality and plates made by amateurs in accordance with recognised formulæ, both of which will give good results without sulphite and which are utterly ruined by its use. Why this is so I cannot tell, my knowledge of photographic chemistry not being sufficient to enable me to solve the difficulty. But the question is one worthy of the attention of those who are able to investigate it, and, along with the facts mentioned in the Journal, we will thus be enabled to understand more thoroughly the action produced by the introduction of sulphite of soda into the developer. T. W. T.

BOTTLES *VERSUS* GAS BAGS.*

OXYGEN-MAKING APPARATUS: ITS COST AND DANGERS.

THE requirements for making oxygen gas include the oxygen mixture, the retort in which the gas is generated, the source of heat, the wash-bottle, and the delivery tubes.

Oxygen Mixture.—This is usually compounded of commercial chlorate of potash and oxide of manganese. The oxygen is derived from the

* Continued from page 585.

chlorate of potash—the manganese acting mechanically, not chemically; for sand may be used in place thereof, and both, after washing away the refuse potash salt, may be used over and over again. Practically, one pound of chlorate of potash yields four cubic feet of oxygen, though chemical text-books would lead the manipulator to expect a yield of five cubic feet from that quantity. Manganese, sand, &c., is mixed with the chlorate of potash with the view of subduing the violent rush of oxygen which would occur on applying heat were the potash salt employed *per se.* Consequently the proportion is not a matter of exactitude; but one part of manganese to three of potash affords "a happy mixture," whereby the gas comes over neither too fast nor too slow. Some ten years ago chlorate of potash could not be got under 1s. 6d. per pound; now it is obtainable at one-third of that rate in wholesale quantities. The *cost* of obtaining six cubic feet of oxygen is, therefore, 1s., or ready mixed 1s. 6d., at the retail shops.

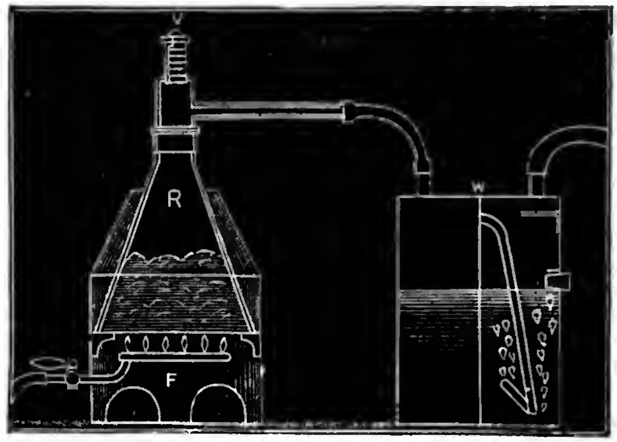
The dangers connected with oxygen mixture are through accidental contamination, producing explosive combinations on the application of flame, or using it in such a form as to lead to the blocking of the delivery tubes. As regards the first cause of accidents: it is within my knowledge that death has resulted through the ores of other metals getting mixed with the manganese in transit, and by soot and coal falling into the mixture during the process of drying on a kitchen hob. In one instance the worn-out end of a piece of vulcanised rubber tube fell into the hot mixture whilst being introduced into the retort, producing a slight explosion, which would have proved a big one had the retort head been screwed on and flame applied. Such accidents indicate the necessity for a careful inspection of the layer of mixture whilst spread out in the drying tray, and during the usual shaking and turning over of the materials. In some old books we were directed to pound the chlorate and use the manganese in fine powder. I soon found such instructions led to unpleasant results. The powdered manganese floats on the surface of the melted potash, and when the gas comes over it carries the powder forward into the delivery tubes and blocks them; then, if there be no valve, *something must give way*—probably with explosive force. If there be a valve of any practical value it will give way, and then a miniature volcano sets in and continues till all the fine black powder is blown off the surface of the gas-yielding potash, even after the source of heat has been removed or extinguished, and the laboratory becomes a sight gratifying to those who believe that "cleanliness is next to godliness." As blockage of the delivery tubes is a source of real danger, always select manganese in coarse grains, and only roughly break down the crystals of the chlorate of potash.

When you order chlorate of potash "see that you get it," as the advertisement says; for I have heard of cases where other white crystalline salts have been, through gross carelessness, delivered to the purchaser, which, if not detected, would have led to disastrous results.

The Oxygen Retort.—Taking the practical experiments of several active lantern workers on the question of cost of "wear and tear" as between copper and iron for retorts, all are in favour of iron. Sheet iron is best, for the reason that, should an explosion take place through blockage, suck-back of water from the wash-bottle owing to the oxygen being given off and a vacuum formed, introduction of organic or other out-of-place matter into the mixture, *wrought iron will only "rip;"* whereas if it be thick cast iron (veritable bomb-shells *have* been introduced for sale as "safety retorts"), *it will fracture and "fly!"* A conical shape is the best form for the body of the retort, with a gun-metal cap and head fitting by a coarse screw, which carries a short delivery tube of large bore, and a safety-valve. I believed in the closed tubular cap of vulcanised rubber as one of the cheapest and simplest of safety valves, till the accident occurred to which reference has already been made. The spring valve was subject to getting clogged with spurts from the melted mixture. The best and simplest proved to be a foot of brass tube of large bore, closed by a soft, sound cork wrapped in tinfoil, which was blown out in the event of the delivery tube becoming accidentally blocked, and also acted as "a tell-tale alarum." The cost of such a retort would be about sixteen shillings; but, as the conical bottoms can be replaced when worn out, in the long run they are not as expensive as the first cost indicates.

The Source of Heat.—In early days—before "the fifties"—the source of heat for oxygen making was the clumsy, clay-lined coke and charcoal furnace. Then house gas came into use in the laboratory. After this Dr. Lionel Beale pumped air from double bellows into a gas jet. He afterwards introduced the long tube, burning a mixture of gas and air on a surface of pumice for analyses crucibles enclosed in a jacket;* and as an outcrop came the neat, adjustable Bunsen burner. The best arrangement for heating the retort, R, is a gas ring, F, arranged to give a blue flame, both being enclosed in a sheet-iron jacket furnace, as shown in *fig.* 1. By this means we have entire control over the flow of the oxygen gas. If it come over with a rush, by a turn of the tap the rush is checked; if too slow, a fuller flame stimulates the delivery. The conical portion of the jacket keeps the upper surface of the mixture melted as well as that next to the flame, and so prevents jerky "bumpings." When house gas is not obtainable a large spirit lamp may be employed, the wick being adjusted by rack and pinion; or the lamp may be withdrawn should the gas come over too fiercely. A little circular grate for charcoal or wood can be placed within the furnace, in which case the furnace and retort must be lifted off should

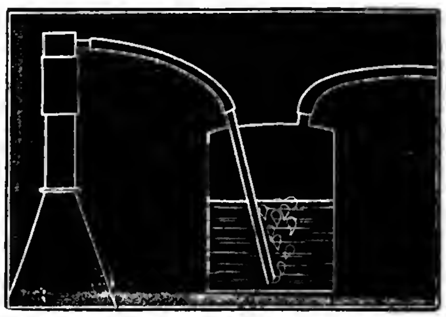
FIG. 1.



the gas come with a rush. The cost of such a "jacket-furnace" would be about twelve shillings and sixpence.

The Wash-Bottle.—The usual wash-bottle consists of a closed zinc can, with a tube passing through the top down to the bottom, and a short delivery tube, as in *fig.* 2. The dip-tube is connected by a short piece of rubber with the delivery tube of the retort, after the bottle has been two-thirds filled with water. The gas is thus forced to pass through the water, and in its passage is washed free from crude contaminations, and then is forced forward through the short delivery tube and a rubber tube connecting the wash-bottle with the gas bag or other receptacle. Some lanternists interpose "a drying-bottle" between the wash-bottle and the gas bag, whereby all moisture is removed from the gas before it passes into the bag, and this with advantage to the receptacle and the gas itself.

FIG. 2.



By this arrangement of the wash-bottle a train is laid for the danger previously specified, namely, the sucking back of the water from the wash-bottle into the retort upon the red-hot mass of exhausted mixture, when, being converted into steam, an explosion follows. To provide against any such accident I divided the wash-bottle into two compartments (W, *fig.* 1), and placed the tube by which the gas is forced through the wash-water in such a manner that direct connection between the delivery tubes from the retort and the water is intercepted. This will be understood by inspection of the right-hand figure in *fig.* 1. The cost of the old form is about 5s. 6d. My improvement was sold for 7s. 6d.

The Delivery Tubes should be of red or black rubber, as these materials, though dearer, are free from the very unpleasant sulphurous emanations which ordinary vulcanised rubber imparts to the hands. As long connecting tubes are not desirable a yard of red rubber is sufficient for connecting the retort to the wash-bottles; and these, with the gas bag and a yard of red rubber tubing, would cost about 2s. 6d.

We are now in a position to "tot up" the cost of oxygen generating materials and apparatus. Every six cubic feet of oxygen gas will cost for—

	£	s.	d.
Chlorate of potash and manganese	0	1	6
Plus a proportion of the cost of the generating "plant," as follows :—Retort, jacket furnace, wash-bottle, red rubber tubing, with case for apparatus	2	5	0

It is always well to have a duplicate retort bottom (to fit the "retort head") in store, especially if travelling. Professor Pepper informed me that for his provincial lectures he found my oxygen-generating outfit a great comfort, as he was never in fear of being placed *hors de combat*, all probable chances against a breakdown being provided for.

HYDROGEN-MAKING APPARATUS: ITS COST AND DANGERS.

House Gas (carburetted hydrogen = C_2H) is usually pure enough at the present day in London and in most country towns to allow of its

* See *Chemical Manipulation*, by C. Greville Williams, F.R.S., C.S., &c. 1856. Van Voorst.

being run off from a gas supply direct into a bag or other receptacle; though in some cases it may prove desirable to run it through a wash-bottle containing drying or purifying materials. When bags are used, house gas is consumed volume for volume when burnt in conjunction with oxygen for the production of the lime light, whereas hydrogen gas (H) is consumed in the proportion of two to one of oxygen. House gas only requires a bag of equal size to that employed for the oxygen, whereas two bags will be required if hydrogen be employed. Practically the house gas or hydrogen bag should be larger than the oxygen bag, as the inflammable gas is necessary for warming up the lime cylinders or keeping them warm, whilst the oxygen is being economised when a continuous run of pictures are not required upon the screen. Thus, if the oxygen bag measure 42 × 30 × 24 "in the wedge," the hydrogen bag or bags should measure 42 × 30 × 28 inches "in the wedge."

Hydrogen-Gas Generating Apparatus.—In a fixed laboratory or lecture theatre a generator made of lead, on the "Doebereiner's lamp" principle, is the most convenient, being always ready for use; and, if made to give sufficient water-pressure from the upper chamber, a gas bag may be dispensed with. For the lecturer travelling, where house gas is questionable as to amount of supply or quality, the "Wonlffe's bottle,"—made of sufficient size in sheet lead, with all seams carefully welded together and gun-metal fittings for inlet and delivery tube, with a companion lead wash-bottle—is the safest and most practical form of generator. *Clean* zinc cuttings are introduced through a wide mouth in the centre of the top, closed by a screw-cap, fitted with a lead washer. Strong commercial sulphuric acid, diluted with seven parts of water, is then introduced (by means of a lead funnel soldered into the top, the tube of which descends to within half-an-inch of the bottom of the closely-closed vessel) till this generator is about two-thirds full, further quantities of the acid being introduced whenever the action subsides and the gas comes over slowly. After passing from the wash-bottle it will prove to the advantage of the bag if the gas be passed through a drying vessel. Glass bottles present the advantage of allowing the manipulator to see what is going on. Earthenware jars are much less costly than lead, but the chances of fracture, while *en route*, are considerable, and so of the lecturer being "tree'd" at some place where duplicates are not obtainable.

The cost of producing pure hydrogen stands thus :—

	£	s.	d.
Clean zinc cuttings, per lb.	0	1	0
Sulphuric acid 1s. per 3 lbs..............................	0	1	0
Plus proportion of the cost of hydrogen generator and wash-bottle in lead, £2 2s.; capped lead bottle for acid, 6s. 6d.; red rubber tubing, 2s. 6d., with case	2	12	6

The dangers of house gas may be reckoned but slight as long as commonsense precautions are taken for not introducing it into a gas bag until that or any other receptacle has been completely emptied of previous contents, and for all practical purposes has been converted into a vacuum chamber. The same applies to hydrogen, with the very important proviso—that before a particle is stored care be taken to ascertain that hydrogen *per se*, and not hydrogen mixed with the atmospheric air that was above the surface of the liquid in the generator and wash-bottle or in the delivery tubes at the commencement of operations, is coming over. Some minutes must be allowed for the hydrogen generated to drive out all such extraneous air. This may be tested by thrusting the weighted end of the delivery-tube attached to the wash-bottle down to the bottom of a mug full of water, and then after a few minutes applying a lighted lucifer to the bubbles coming over. As long as the bubbles explode or snap on the surface of the water they are mixed with air. When this ceases connect with the bag or other receptacle—*not before*. All the serious explosions during the making of hydrogen have occurred through lights being applied to the end of the delivery-tube *to see* if what was coming over *was* explosive! or from not allowing sufficient time for freeing the apparatus from the atmospheric air locked up therein at starting.

SAMUEL HIGHLEY, F.C.S., &c.

PHOTOGRAPHY IN BELGIUM.

[FROM OUR SPECIAL CORRESPONDENT.]

PHOTOGRAPHY AT THE BRUSSELS MILITARY SCHOOL.

To carry on the work of the photo-engraving of the Belgian Ordnance maps, as described in my previous communications, a large staff and extensive ranges of premises are necessary. There, however, is ample accommodation at the Military School, in the commune of Ixelles, near Brussels, and in one part of the establishment is a large hall which the public are invited to visit, to inspect the numerous varieties of map engraving produced in all countries and at different epochs. Among the curiosities exhibited here is a relief map of Belgium, the elevations in which have been made by pasting pieces of paper one on the top of the other; 1100 layers of paper were used in the construction of this map, the execution of which occupied two men for seven months. In the same hall is the machine which was used for enlarging maps mechanically before the advent of photography. Its principle of action is the stretching of a rectangular sheet of caoutchouc evenly in all directions, and at the same time necessarily enlarging the design previously printed upon it. In another part of the building ten large lithographic presses are constantly at work in printing maps. The number of presses would be less, were it not that chromolithography requires several for the production of but a single map. Among the presses is an automatic cylinder chromolithographic machine, which will turn out nearly six hundred proofs per hour. There is also a machine for grinding and polishing lithographic stones. Several of the presses are worked by hand; the rest by steam. The engine is of the horizontal type, and of six-horse power, supplied with steam from a vertical boiler. This engine requires the use of no more fuel than is necessary to warm the room in which the printing operations are carried on. A shaft forty metres long runs from end to end of the printing-room to convey the power from the steam engine to the various presses, by means of drums and belting.

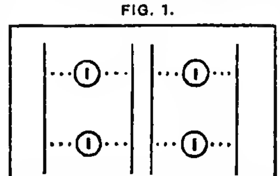
Major Hannot says that to damp a stone with a sponge and to rub its surface with an inking roller appear to be simple matters; but this apparent simplicity is an illusion, as a practical trial would soon prove. Sustained attention is necessary to work a lithographic press. The nature of the inks used must be continually studied, and those only selected which are adapted to the work to be done. Then the amount of pressure requires careful regulation, and only after long practice can the knack be acquired of giving the proper motion to the inking roller.

The work done in the establishment has been recognised to be of high quality in other countries than Belgium, and has received marks of distinction at various international and universal exhibitions, such as those at Paris in 1867 and 1878; the Vienna Exhibition in 1873; the exhibition at Santiago, Chili, in 1875-76; the Congress of the Geographical Sciences at Paris in 1875; and more recently at the exhibitions at Sydney and Melbourne.

Lieut. Massaux drew my attention to a camera which Lieut. J. J. Becker is about to take with him in an expedition on the Congo. It takes plates 6½ inches by 4¼ inches; plates of Monckhoven's of twice that size are cut in half for the purpose. Sixteen plates of the size required for use are stored away in thin, light, dark slides at the end of the camera, which in shape is not unlike a long cigar box. No stand is used with it, but it is held in the hand like a gun, and instantaneous "shots" are then taken with it. Over the slides is an opening on the top of the end of the long box. A bag is fixed over this opening and secured to the wood of the box round the opening by slips of brass, so that no light can get in. The slides are put in turn into their place and the plate exposed by handling them with the cloth of the bag between the fingers and the slides; the latter are so made that they can easily be handled in this way. One lens only is used with this camera. It is a rapid doublet, with a Sands and Hunter's shutter between the front and back glasses of the combination. The focus is adjusted by a plan, devised by Lieut. Massaux, of placing sheets of leather between the face of the camera and the wooden front carrying the flange of the lens. According to the distance of the object to be photographed so is the thickness of the piece of leather laid on. The various rectangles of leather are marked to indicate which of them should be used for any particular distance, so that actual focussing in the field is avoided. Lieut. Massaux has used this camera for a year, and finds it to work well. He is the inventor of a wet-plate camera, inside which plates can be both exposed and developed; its maker is Mons. L. Vanderperre. He also exhibited to me a tourists' camera for exposing and developing dry plates on the spot, invented by Captain Roselle. In this camera all the operations are conducted from the outside by means of an adjustable brass clip, which searches for a plate, grasps it, raises it to such a position that it is in focus, and finally deposits it in the developing trough.

To return for a moment to the subject of photogalvanographic operations described in my last: it may be well to state that several copper plates may be deposited by electricity in one sulphate of copper bath at the same time. For instance; *fig.* 1 represents four copper plates in the bath, and four zinc cells. The dotted lines show how the copper and zinc plates are joined up by the connecting wires. The best temperature for the electro-deposition of copper by the method described in my last communication is about 20° Centigrade.

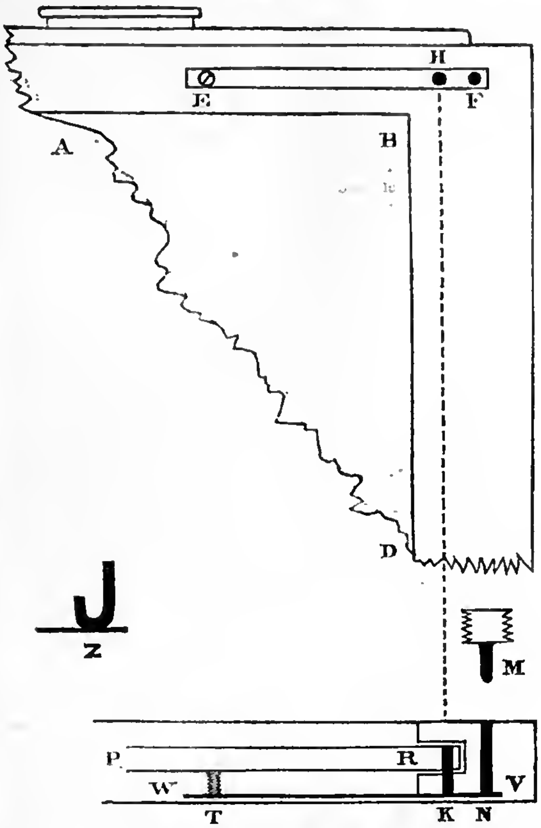
FIG. 1.



THE CAMERA OF THE FUTURE.

As an aid to the development of the camera of the future, which subject is now occupying long-needed public notice, it may be well to call attention to the ingenious plan by which M. A. de Blochous fastens the shutters of his slides, so that they cannot be pulled out except when they are in the camera unless by special means. The plan has another advantage, namely, that the operator cannot accidently pull out the wrong slide and thereby spoil a plate. The plan is represented in *fig.* 2, in which A B D is a portion of the frame of the slide viewed from the inside. E F is a steel spring let into a groove in the wood, and held in position by the screw E. This spring carries two little projecting copper pegs, the circular bases of which are represented at H and F. The same pegs are represented in elevation at K and N; one peg, it will be noticed, is longer than the other. W V is a side view of the spring

FIG. 2.



carrying them, and its screw is represented at T. A portion of the shutter is represented at P R, pinned by K, so that it cannot be withdrawn from the slide.

The camera is made on the American principle—that is to say, the slides do not slide at all but are pressed into position against the back of the camera, which is much the best plan. In the back of the camera of M. Blochous is a projecting pin M, which in the cut looks as if it would be liable to breakage, but the proportions are rather exaggerated in my diagram. This projecting pin pushes back N during the act of putting the slide in its place; N carries back the peg K with it, and the shutter P R is thereby unlocked. By reversal of this action the shutter is automatically locked during the act of removing the slide from the camera. There is nothing in this likely to get out of order. M. Blochous, who is an engineer as well as a photographer, has had this device in use for years. Sometimes he has made the two copper pegs simply by bending a piece of copper wire of the requisite thickness, and attaching it to the end of the steel spring, as represented at Z. By a little ingenuity a plan might be devised for the application of the principle of this invention to ordinary English slides; but the better course would be to abolish the latter and adopt the American system.

BRITISH ASSOCIATION.

The Connection of Sun Spots with Terrestrial Phenomena.

In Section A., on Monday, the 1st instant, the above subject was introduced by

Professor Schuster, who, after introducing his subject in a few humorous remarks, stated that the connection between terrestrial phenomena and sun spots was established beyond doubt; also that the magnetic needle is never stationary. Carrington first observed bright spots on the sun's surface. At the same time magnetic storms were observed simultaneously at Kew and Stonyhurst. There is no doubt as to the connection between terrestrial magnetism and sun spots. From 1810 to 1860 there has been a remarkable coincidence between temperature and sun spots. A strong proof is found on the Rhine, where the good wine years are coincident with the least number of sun spots. The connection between atmospheric pressure and sun spots has not been fully worked out; but observations show that the greatest number of most destructive cyclones occur coincidentally with maximum sun spots. Small comets are most numerous also at the same time.

Professor Archibald said that they could not attempt at present to decide the question at issue by observations taken only over very limited areas. False conclusions by these inadequate means had been reached. He mentioned the trade winds and his work in India, showing that different results had been obtained in different places. He explained the different actions of the winds in India by diagrams on the black board. He referred to a number of observations of his own accounting for the rainfall at various points.

Professor Rowlands showed that the variations in the sun's heat was due more to errors in observation than true change.

Solar and Terrestrial Phenomena.

Professor Balfour Stewart and W. Lant Carpenter followed with a paper *On Certain Short Periods Common to Solar and Terrestrial Phenomena.* Mr. W. Lant Carpenter said the coincidence of maxima and minima of magnetic disturbances, auroral displays, average rainfall, &c., with sun spots, in a period of 11 1·10 years had long been observed, and was admitted generally. The influence on terrestrial phenomena was very great, and the object was at present to discover if there were any close connection between the two sets of phenomena. The magnetic and temperature alterations followed the solar changes very rapidly, magnetic changes taking about 1·6 day to travel to Europe, the temperature changes taking eight days; hence the Kew weather followed the Kew magnetic weather at an interval of from six to seven days.

Rev. S. J. Perry considered it to be an established fact that there existed a decided connection between solar and magnetic phenomena. Along with magnetic disturbances we had great disturbances in our atmosphere, which gave rise to the aurora borealis.

The Measurement of Solar Radiation.

Professor Schuster read the report of the Committee, consisting of Professor Balfour Stewart (Secretary), Professor Stokes, Mr. G. Johnstone Stoney, Professor Roscoe, Professor Schuster, Captain Abney, and Mr. G. J. Symons, appointed for the purpose of considering the best methods of recording the direct intensity of solar radiation.

The Solar Spectrum.

Professor H. A. Rowlands read a very interesting paper on *Recent Progress in Photographing the Solar Spectrum*, and showed a number of photographs taken by him. His paper was the subject of much favourable comment and discussion.

Observations of the Red End of the Spectra of Solar Spots.

Rev. Father Perry read an elaborate paper on this subject, which excited much interest.

ON THINGS IN GENERAL.

A thorough-going aëronaut must be the most enthusiastic man in the world. It has long ago been proved to be impossible to navigate balloons; though it was also proved years ago that railway trains could not travel more than about a dozen miles an hour, and that it would be impossible for a steamship to cross the Atlantic; and, possibly, therefore, this remembrance serves to keep up the spirits of the members of the various aëronautical societies. But whatever the cause, and in the face of all obstacles and of the most disappointing drawbacks—mortal hurts and maimed limbs—still fresh experiments are carried out, and more money is sunk. One's hopes were raised a month or so ago as to what photography might do in the air at some near period by the reports of the experiments at Meudon—performed, though they were, with such secrecy—but, alas, another *fiasco!* The "self-directing" balloon went up, and — had to be brought back on a cart. M. Tissandier gives a full account of the ascent. He went over hedge and ditch, following on the earth the flight of the monster in the air; but it is clear that failure was already discounted. The ascent took place before sunrise. That gentleman's account of the exploit had to be lengthened out by a description of the extraordinary appearance of the rising sun as the "melancholy *cortège*" wended their way to Meudon wiser, yet, I do believe, not sadder men; such is the aëronaut's enthusiasm!

I much fear that photography from balloons—except such as are "captive"—will be nothing but toy hunting, and the heights of tall mountains will still be a much more frequent standpoint for the camera than the edge of the balloon car.

I was interested in reading Mr. C. E. Abney's description to the Derby Photographic Society of his visit to Snowdon and the neighbourhood, to which a melancholy interest just now attaches, owing to a sad accident that occurred a few days ago, a tourist having met his death through the effects of the lightning while sheltering, during a terrific storm, in a hut upon the summit.

Lofty as Snowdon is it can be most easily ascended in one direction; in fact, all but the last few hundred yards, which *are* stiff, may be done seated in one's carriage. If it happen to be fine when you get there, and there should be no mist, and the distance clear, you can see the traditional score or two of counties always shown to visitors by the inhabitants of any rising ground; but, as to their being worth photographing, that I should not like to assert.

Mr. Abney's experience of a smashed camera leads me to the subject that has been discussed in such an instructive manner during the last few weeks in these columns—the construction of tourists' cameras. Though we may be near to the advent of the "camera of the future," I do not think we have yet arrived at it. Now, though there is no one whose opinion about "camera and lens" I should esteem more highly than Mr. G. Smith's, yet I am bound to say I differ from him strongly when I find him stating, as he did in The British Journal of Photography for the 5th inst., when speaking of the makers of cameras, that "every important hint of increased efficiency is eagerly watched for and instantly adopted." How can this be, when a leading manufacturer can tell you, in answer to a query "what have you new?" replies—"nothing; and my orders are six months behind?" The truth is that when a manufacturer of repute has his workshops arranged for turning out a certain class of instruments it is but reasonable to suppose that he would never make money if he were to be constantly altering and re-arranging; or, if he did so alter, &c., that he would have to charge an exorbitant price. Everyone who has dabbled in inventions knows how much he has to pay for a very simple piece of apparatus when made for the first time, though when repeated many times the same thing may be cheap enough; and so I take it to be with cameras. A man must make a number of a definite pattern before he can see a profit. My own experience is that when a manufacturer has once completed a design for a camera, and begun to manufacture it, it is next to impossible to get a similar one with any material alterations within a reasonable time, if at all. I do not blame him; a camera-maker, though he may be fond of his art, still engages in it as a means of livelihood, and not to try experiments; at the same time it is quite possible to be too conservative. I think it probable that Mr. Smith's words cannot have been correctly "set up," for a little farther on in the same article he, apparently contradicting himself, almost entirely adopts my view in saying—"The trade, as I have before said, are very unwilling to adopt any new method of construction involving, as it does in this case, the change of an entire system."

Monotony of any kind is always in danger of palling upon the artistic mind in whatever form presented, and from this cause, no doubt, we are given the reports from the Manchester Photographic Society (which numbers many really artistic workers in its ranks) of April and May in the month of September. It may, however, be a question whether monotony in this instance is not superior to the alternative of staleness.

There have been several discussions lately—notably one at the London and Provincial Photographic Association—*anent* the slowing of the developer by the addition of acid. I should very much like to learn the name of the acid which, upon being added to the ammonio-pyro. developer, would not slow it; for a portion of the ammonia must be neutralised when the addition is made. The effect produced is then equivalent to a diminution of the ammonia *plus* the presence of an ammoniacal salt of the added acid. It is preposterous to imagine that anything but slowing could result; and to talk of the *effect* of certain acids in the pyro. developer is—well—not logical, to say the least.

I notice in the letter of the Philadelphia correspondent the statement that upon a photographic enlargement—"The artistic work is not done here (America) as it is in England with the crayon points." This is an assumption that is not borne out by facts. Some of the best work of the kind I have seen in this country is not done with the point of the crayons at all, but with stump and crayon powder produced in a better manner than the making of a stumping sauce; and, if any of my readers care to try the experiment, I can assure them that a piece of crumb of bread brought to a point will be far better than india-rubber for obtaining their effects. I am quite one, however, in the view taken in the same communication of Mr. Muybridge's experiments. Mr. Muybridge deserves the utmost credit for his perseverance in overcoming difficulties; but I must say I also fail to see what are the results aimed at in producing those highly-unpleasant pictures described.

Free Lance.

WHERE TO GO WITH THE CAMERA.

[It is hoped that this series of articles will be continued at regular and frequent intervals during the vacation months, and we shall be glad to receive contributions to the series from any friends able to treat of new and interesting ground.]

DUNKELD, MELROSE, AND ABBOTSFORD.

It is a "far cry" to Dunkeld, even should you go by the tourist express to Scotland; and especially is this the case if the night be made hideous by two babies who "continually do cry," and resist all the inane blandishments of those who have them in charge. The law of compensation, however, still works, and your sleepless vigil is rewarded by the sight of a sunrise which you might otherwise have lost; for, at the time of which I write (mid-August), the train reaches Berwick about half-past four, just as the pearly-grey in the east marks the advent of the dawn. As you watch, the grey brightens into orange, and the few purple clouds array themselves in gold-edged livery to attend the arrival of the Sun. As he lifts his head out of the waters of the North Sea the hoofs of Aurora's horses

"Beat the twilight into flakes of fire,"

and another day is born. Man goes forth—the photographer with him—to his work and to his labour until the evening.

You are in Scotland now, and reach Edinburgh about eight o'clock. If you please you may break your journey there, and it is well to do so if you have never seen the "Queen of Cities" before. I need not describe the glorious view from Arthur's Seat or the Calton Hill. Is it not written in the guide books? But the photographer may find ample "food" if he be disposed to avail himself of it, although the field has been closely gleaned. The art should thrive there; for, of eleven houses contiguous to one another, I counted six occupied wholly or in part by photographers. May they continue to prosper and increase!

From Edinburgh to Dunkeld is a matter of about two hours' journey, and we will not linger on the way, though Perth and Stirling are in it. Dunkeld is hardly surpassed in Scotland for the beauty of its situation. Seated in a hollow, through which the clear and sparkling Tweed runs under a noble bridge, girdled around with hills topped with firs, you look and admire. Nor is it without a certain sense of awe you learn that to the east of you is Birnam Wood, which, it is said, has never recovered from its forced march to Dunsinane; for the trees are thin and scanty, although planting has made good much of the deficiency. A camera placed on the stone coping of the bridge will embrace a lovely view, including the old cathedral, the "cottage" (as it is modestly called), of the Dowager Duchess of Athole, and many pretty houses peeping from out their emerald surroundings. There is no lack of subjects to photograph—the Rumbling Bridge, and Falls of the Braun (the scene of one of Millais' choicest landscapes), the cathedral, and many "bits" which meet you if you seek them, for they are too modest to obtrude. Best of all, however, are the Hermitage Bridge and Falls, situate in the park. You enter by the door, pay two shillings, and are placed in charge of a guide, who "personally conducts" you over the grounds. But if you are wise you evade his company, and by a mild and forgiven trespass you climb a gate which will be pointed out to you by someone who knows, and walk along a path sheltered by glorious trees till you reach the spot. There is no fear of passing it. The grand old bridge spans your path, and as you unlimber your camera you are lost in admiration of its wondrous beauty. The delicate hues of the grey stone, the trembling ringlets of birch and ash which caress its base and sides, and the boulders on the river bed tinted with moss and lichens—all reflected on your focussing-screen—make you sigh to think how poorly your best results in browns or purples will represent it all. Having exposed your plates (over-exposed, alas! by me), you go forward and upward a space till you are on a level with the top of the bridge, and in front of you is the "roar of waters" rushing madly over the fall—white in the sunlight, as they leap into the black pool beneath. You gaze your fill, put up your traps, and turn again by the way you came. The river runs merrily at your side as if glad of human companionship; quiet in its depths, and now fretting itself into foam and bubbles as it breaks upon some obstructive boulder, fearful it should be left behind. Here and there as you walk some stone, crowned with a mossy cap, tempts you "to rest and be thankful;" and the heart must be sadly wanting in its best feelings, if it be not lifted in grateful praise for existence in such a fair and beautiful world.

Out of Paradise into the common world! The sun beats on your head while you tramp along the white and dusty road, "carrying weight" in the shape of your belongings. As, like Falstaff, you "lard the lean earth" with your dripping perspiration, the never-resting question of lighter cameras comes to your mind. Yours, like mine, may be the best of its kind; a thing of beauty—and of weight. What is to be done? Why does not Mr. A. Cowan give his attention to the subject? He could scarcely increase his well-earned fame for ingenious contrivances; but could he not turn Willesden paper or ferrotype plate to this useful purpose? It would put "siller in his purse," and the blessings of many photographers would brighten the future of his life. It is no use to talk of taking small views and enlarging them. Amateurs like myself, with whom photography is mainly a holiday amusement, have no enlarging cameras or time to use them if they had; nor is our work (I speak for myself and many others) worth the expense and the trouble. We can scarcely look for much saving in the weight of plates. As Mr. George Smith has pointed out, diminished thickness means greatly-increased expense and added risk of breakage. It is to the camera we must look for increased lightness. "More power to the elbow" of those who are working in this direction.

From Dunkeld to Blair Athole is a journey of an hour or so by rail, and the grounds of Blair Castle, the residence of the Duke of Athole, are worth visiting, but offer little to the photographer save the Falls of the Fender, which are very fine and present the usual characteristics. It is from thence you start through Glen Tilt for Braemar, and I must leave those who have passed through this earthly Inferno—which seems never to have emerged from original chaos—to describe it. Not for me is it given to pay half-a-crown a bottle for Bass's pale ale at Braemar! You take the train back to Killiecrankie, and visit the famous pass, whose steep sides seem as if rent asunder by contending giants. They are clothed now with ash, birch, oak, and fir, whose various tints are lovely to look upon. The river which rushes below is shadowed by the heights frowning above it; but some good pictures may be got if one takes the trouble to descend the slippery and awkward path to the water. Here was fought the famous battle in 1689, in which Claverhouse fell; and here, too, is shown the place leaped by a soldier, and called "The Soldier's Leap." Unbelievers looking at it, and measuring the distance by their own powers pronounce it impossible. But to be pursued by a great hairy Scotchman, with a head of flame, intent on splitting your skull with his claymore, might make a very Mercury out of Mr. Wardle's fat boy. Some idea of the value of the district to photographers may be formed from a little circumstance which occurred to me. An old man who sells views and scraps in the pass told me he had paid Wilson, of Aberdeen, £1,500 for photographs. He did not say in how long a time, but it must make a respectable average.

The sun is setting over the hills as the train takes me back to Dunkeld. His level rays find admission to many a wood and copse denied to his noonday efforts, and the straight stems of the firs are transfigured into pillars of fire. As I gaze and wonder the splendour falls, the glory fades, and the sun sinks to his rest.

> "Look! the world's comforter with weary feet
> His day's hot task has ended in the west."

The day is dead—and dinner waits.

I must not linger over the journey back to Edinburgh and on to Melrose Abbey, which you will probably reach in the evening; and if you put up at the Abbey Hotel you look from the windows into the Abbey grounds. The waning light only permits a general view of wonder and admiration, which closer inspection in the morning seems to deepen and increase. Founded in 1136, by David I., it was three times wrecked and destroyed by English hatred, till it finally rose in all its stately grace under King Robert Bruce. But its worst foes were among its own countrymen; for James Douglas actually used part of its sacred stones to build a house for himself, and so closely was his bad example followed that it is said there is not an old house in the town but has in its walls a stone from the Abbey. However, if much has been taken much remains, and it requires no strong imagination to complete "the slender shafts of shapely stone," and fill in the delicate tracery with its coloured glass, till the intervening centuries fall away and its east oriel stands before the mind as when in all its glorious beauty it fronted the morning sun. Permission to photograph is given as a matter of course. The early morning will be selected for the east window, and late in the afternoon for the south side, as otherwise both sides are bathed in sunlight and the needful shadows are wanting. Some beautiful effects may be had from the interior, but a wide-angle lens is needful. The camera, however, is soon placed aside, for you are on classic ground, and every step recals the past. Here is the grave of the wizard, Michael Scott, from whose arms Sir William of Deloraine rifled his Book of Might: dark and empty now. Here rests the heart of the Bruce, in the place and among the people he loved so well, and for whom he did so much. And here, too, on the ground, is a name, and a name alone—"the Douglases." So much, and no more. The long list of mighty warriors who bore that title, whose fame was in many lands, ends in this—"the Douglases."

> "Here lie the great. False marble! where?
> Nothing but mouldering dust lies here."

The spirit of a mightier wizard haunts the spot, although his only weapon was a pen; and the name of Walter Scott will be linked with Melrose Abbey while a stone of it remains.

From the Abbey to Abbotsford is a natural transition, and a pleasant drive takes you thither past the Eildon Hills, which the industrious, familiar spirit of Michael Scott is said to have rent in three in a single night. A fine view of Abbotsford may be had from the entrance gate, with its delicate background of distant hills. I need not describe a place so familiar to every reader. From the home to the burial place of the poet in Dryburgh Abbey is part of the same drive. It is a beautiful ruin; and the teeming brain—which, were it not that we of this later day are so much the richer for it, would seem to have come into existence three centuries too late—rests here in quiet peace. From every land come pilgrims to this shrine; and Scotland may well be proud that she guards such noble dust.

I must end. I am afraid I have said little of photography, but I can scarcely excuse my shortcoming. It is much to take good views; it is more to become, like Ulysses, "a part of that which we have seen"—to recal quiet resting-places, and thoughts that the fever and the fret of business life are too apt to banish from the mind. But if "the meanest flower that blows" could give Wordsworth "thoughts too deep for tears," much more may our truthful pictures of places and people we have seen and met give rise to pleasant memories when summer days are gone. F. H. Carter.

WARWICK, LEAMINGTON, STRATFORD-ON-AVON, AND KENILWORTH.

On Tuesday, August 26th, a friend and myself started by the 3.15 train from Manchester, bound for Leamington, where we proposed to establish our headquarters for a two-days' photographic trip in that neighbourhood. After a pleasant run through Crewe, Nuneaton, and Coventry, we arrived at our destination, the Manor House Hotel, about seven o'clock, just in time for *table d'hôte*, to which we did ample justice, a band playing in the garden during the time.

Wednesday morning was very wet, dull, and disagreeable; but as our time was limited we proceeded to Warwick by tram-car, where we inspected the ancient building, founded by the Earl of Leicester in 1517 for the benefit of twelve army and navy pensioners from the adjoining towns. Although raining in torrents we each exposed two plates—one on the front of the building from the church wall, the other being the master's house. Both on development turned out very fair, although we gave an exposure of forty seconds with the $\frac{f}{}$ stop of Suter's 3B aplanatic.

We next walked to the castle, but, the lodge-keeper refusing us admission with our cameras, we were directed to the house of Major Fosbery, the agent for the property, for permission. Not finding this gentleman at home we were beginning to despair, when we were redirected to the house of the sub-agent, residing near the castle gates, who, on being interviewed, gave us the required permission. To save this trouble and waste of time intending photographers should write beforehand to Major Fosbery. In the castle grounds we exposed eight plates, the best views being obtained from the meadows near the river, comprising the old Castle Mill, ferry boat, and the celebrated cedar trees. Photography finished, we were shown the interior of the castle, which we enjoyed very much, the pictures, inlaid tables, and armour being very fine.

The weather still being very unfavourable, we returned to Leamington, hoping for better luck on the morrow. On Thursday morning we were up at 6.30, and were much pleased to see a change for the better, the day being all that could be desired. After a hearty breakfast we caught the eight o'clock train to Stratford-on-Avon, where we arrived in about thirty minutes. We immediately proceeded to Shakespeare's house, which was, of course, photographed, although from an artistic point of view we were disappointed, and then without loss of time we turned our faces toward the church. The best point of view we found was from the meadows on the other side of the mill. The picture here composed very well—an old lock and the river in the foreground, with the church in the distance. Being pressed for time we hurried down the line to the station, just in time to catch the ten o'clock train to Warwick, intending to finish there what we had not been able to do the day before.

Arrived at the station, we walked to Guy's Cliffe (about one mile), and there photographed the fine avenue of trees, the old mill, and the house. Thence we proceeded by tram to Leamington for lunch, and then by train to Kenilworth, where we arrived about two o'clock. Having ordered tea for five o'clock we strolled up to the castle; but here, also, the gatekeeper refused admission to our cameras, stating that photography was only allowed in the morning. However, by the transfer of some current coins of the realm he allowed us to have half-an-hour, which, it is needless to state, we took upon ourselves to extend. We only exposed two plates in the interior, the walls being much disfigured with placards, but found more scope for the camera outside in the meadows below the castle, which gives a very good idea of the great extent of this ruin. Here we exposed all our plates. My friend, having only three double backs, had, through the kindness of the photographer at Leamington, been enabled to change his plates there.

We then hastened back to the hotel, had tea, and having caught the 6.20 train to Nuneaton, and thence *viâ* Crewe to Manchester, arrived home about ten o'clock after a very pleasant but rather hurried tour.

A Member of the P.P.S.

RECENT PATENTS.

PATENT SEALED, September 16, 1884.

No. 7,678.—"Improvements in Apparatus for Washing Unmounted Photographs." Abel McDonald, Penrith, and Thomas W. Kendall, Cockermouth.—*Dated May* 14, 1884.

Improvements in Photographic Shutters.

By Frederick Woodward Branson, Leeds.

My invention has reference to improvements in photographic shutters, for which letters patent were granted to Richard Reynolds and myself, dated April 2nd, 1883, No. 1,650.

According to my present invention, on the end of the spindle which carries the flap I mount a lever having thereon a suitable adjustable weight. By altering the position of the weight upon the lever the flap may be actuated at different velocities, and the time of exposure be thereby varied.

The lever may be moved and fixed at any desired angle or position on the flap spindle, so that it may be applied in some cases for opening the flap to allow the drop to fall; or, when required, by throwing the lever over to the opposite side of the centre of the flap spindle and fixing it there, to retain the flap closed until it is raised by a movement imparted to the flap spindle by the attendant.

Instead of the weight being placed on the adjustable lever, in some cases it may be found preferable to attach a cord or its equivalent to such lever at any suitable point, such cord or its equivalent being passed over a pulley on the upper part of the shutter, the required weight being suspended to the other end. Other parts of the photographic shutter are similar to those described in the specification of the above-named letters patent.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
September 30 ..	Bolton Club	The Studio, Chancery-lane.
October 1	Benevolent	181, Aldersgate-street.
" 1	North Staffordshire	Town Hall, Hanley.
" 1	Photographic Club	Anderton's Hotel, Fleet-street.
" 1	Edinburgh	Hall, 5, St. Andrew-square.
" 2	London and Provincial	Masons' Hall, Basinghall-street.
" 2	South London	Society of Arts, John-st., Adelphi.
" 2	Bolton	The Baths.
" 2	Leeds	Philosophical Hall.
" 2	Glasgow	177, Buchanan-street.
" 2	Dundee (Annual Meeting)	Lamb's Hotel, Reform-street.
" 2	Coventry	Coventry Dispensary.
" 2	Yorkshire College (Ann. Meeting)	College, Cookridge-street, Leeds.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

At the technical meeting of this Society, held on the 23rd inst., the chair was occupied by Mr. T. Sebastian Davis.

Mr W. England showed a double dark slide for dry plates, fitted with a groove, into which was slid a holder containing two plates back to back, with a stout piece of blackened card between them. For use with this slide was a plate-box furnished with six grooves, each groove containing one of the holders fitted with a pair of plates. It was intended to change the plates from the box to the slide, and *vice versâ*, by working with a black twill bag, furnished with sleeves. The plates were to be changed by feeling merely, and this was much facilitated by their being ready arranged back to back in the holders.

Mr. W. Brooks had found a changing-box to work very satisfactorily, but it was necessary to dust it out carefully each time it was filled, as fragments of glass were apt to be left from the friction of the plates in working. It was also desirable to use only plates that moved very freely in the grooves, and reject others.

The Chairman thought that with plate-carriers, which of necessity must move freely in the dark slide, there would be a certain amount of play that would prevent the focus from being accurately obtained, unless there were some means of bringing the frame always home true to the side of the slide that was to face the lens.

Mr. A. Cowan considered the amount of side play was so small that it might be disregarded.

The Chairman referred to a formula for a developer that had recently been published in The British Journal of Photography, which, when reduced to the proportions for one ounce in order to facilitate comparison with other developers, came out thus:—

Pyro.	4 grains.
Sulphite of soda	4 "
Citric acid	4 "
Washing soda	20 "
Bromide of potassium	¼ grain.
Water	1 ounce.

He said that he found, with this mixture and ordinary exposure, only the highest lights came out, and that, to render it effective, he had to add one minim of liquid ammonia to the ounce of developer. The image then came up with considerable power, but there was green fog, which he attributed to the sulphite of soda. There was also a tendency to frill and blister, which he ascribed to the use of washing soda. He inquired whether there was any satisfactory substratum that would prevent frilling.

Mr. Brooks had never found a plate which soda would not cause to frill. The developing formula that had been mentioned was, he believed, published as a complete one, and yet it required a certain addition of ammonia to render it effective.

Mr. Cowan believed that if the citric acid had been omitted the developer would have worked in as many seconds as it appeared to require minutes.

Mr. W. E. Debenham said that when the use of a citrate in the developer was introduced by Mr. G. Watmough Webster it was as a remedy for over-exposure, and plates many times over-exposed were stated to come out as if normally exposed. The use of a developer containing a large quantity of citrate would, therefore, presumably necessitate greatly-increased exposure of the image. Was there any special good quality in the negative produced by this developer to counterbalance the slowing effect upon the plate?

The Chairman thought not. There was certainly green fog, no doubt due to the sulphite of soda.

Mr. Brooks thought that, in hot weather, sulphite of soda was best omitted from the developer altogether; but it might safely be used in cold weather, and he then liked the effect it produced.

Mr. W. England had discarded the use of sulphite for the last two months.

Mr. F. W. Donkin said that sulphite of soda soon changed into sulphate, and then was a restrainer. This change took place even in closed vessels.

Mr. Cowan had discarded the use of sulphite for a long time past.

Mr. Ashman inquired whether the fog that had been complained of had been positively traced to the use of sulphite of soda.

Mr. England replied that it had. He had cut a plate in two, and, treating the halves in precisely the same manner in other respects, had found that the one developed in presence of sulphite was fogged and the other one clear.

The Chairman said that sulphite kept the developing solution clean, but the plate itself was not so clean as without it.

Mr. Brooks did not think that the discolouring of the developing solution was injurious. On the contrary, he found that he got the brightest results by using the same developing solution over and over again, until it was the colour of bottled stout. It must not, however, be kept, but used for all the plates immediately one after the other—adding a little more ammonia as the development became slower, and a little more pyro as they appeared to require it for density. Working in this way one ounce of pyro. would go as far as ten or fifteen if fresh were used for each plate, and he preferred the negatives resulting from this treatment.

Mr. Arnold Spiller remarked that with this method the developer was continually acquiring more bromide, from the decomposition of the sensitive compound in the film.

The discussion then turned upon frilling, and Mr. Cowan said that he had found that the maximum of chrome alum that could be worked in emulsion was a-quarter of a grain to the ounce. With this proportion the emulsion had to be heated to 150° for coating, but the plates set immediately, even in hot weather, when the coating-room stood at 80°; and emulsion without chrome alum did not set at all, but remained liquid on the plate all day.

The Chairman said that he had used silicate of soda as a substratum, laying a three-per-cent. solution on the plate with a brush. He had found this gave a tendency to prevent frilling and to cause smooth and easy flowing of the emulsion, but the effect could only be called a tendency and was not complete in either direction.

Mr. T. Bolas said that the use of silicate without subsequent washing left an alkaline deposit on the glass which might be injurious to the emulsion. He thought that the best method of using silicate of soda was to employ it mixed with albumen, to allow the coating to dry, then to wash away the alkali with water, and dry again before coating.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society, held on Thursday, the 18th instant, the chair was taken by Mr. William Ackland, F.C.S.

Mr. A. Cowan, referring again to the difference between the results obtained by himself and Mr. Ashman when using Monroe's developer, brought with him some plates that had at the previous meeting been given to him by Mr. Ashman to develope. As in his previous trials, the image came yellow. The only difference that he was aware of between his working and Mr. Ashman's was that the latter gentleman used ordinary washing soda to develope with, whilst he employed the crystallised carbonate from the operative chemist's.

Mr. Ashman showed some negatives on extremely-rapid plates. They had received an exposure after five o'clock, in the studio, of one-third and one-quarter of a second respectively with a lens stopped down to $\frac{f}{16}$. A wet collodion plate had required with similar light an exposure of thirty seconds with the full aperture of the lens.

An extract from a letter was read, in which the writer stated that he had been told that when using dry plates the length of focus of the lens need not be taken into account in calculating the exposure, as they were so sensitive that the difference between the time of acting of long- and short-focus lenses was not noticeable when using them.

Mr. W. E. Debenham remembered seeing an article some years since in which the writer stated that a great difference existed in the ratio of the speed of a long-focus and a short-focus lens in the winter and summer. Notwithstanding that in the winter the long-focus lens required three times or more as long as the *carte* lens, in the summer they worked with nearly equal rapidity. This was, of course, merely an instance of inaccurate observation; but, unfortunately, in photography there were many instances of inaccurate observations put forward as facts.

Mr. W. K. Burton said that formerly there was an idea very prevalent that the ratio of speed between collodion and gelatine was very different in summer and winter, but experience had dissipated that notion.

Mr. H. C. Turner showed some engravings and negatives made from them by printing in contact on albumen paper; also prints from these negatives, some of which were made by the blue or iron printing process, and some on salted paper. The engraving had been rendered translucent in the first place by being coated with a mixture of one part of lard and three parts of turpentine, boiled together. He had formerly used the engravings without this treatment, but the result was not so good. He had been led to try this mixture from reading the account of an inquest after a fire at a tracing-paper factory, when it was mentioned that lard and turpentine were being heated in a pan.

A Member thought that the preparation of such a compound in a private way was very likely to result in an inquest.

Mr. Burton, remarking that there had been inquiries for silver gauze through which to squeeze emulsion, asked whether any member had found injury to accrue to emulsion from the use of copper gauze. He had not found any ill result himself.

Mr. J. B. B. Wellington's experience was similar to that of Mr. Burton.

Mr. H. S. Starnes showed a tray which he used when coating plates. The tray was of the same length as the width of the plate to be coated. The bottom of the tray and one of the vertical sides were not quite in contact, but allowed a stream of emulsion to flow when the tray was tilted with that edge downwards. The plate was laid upon a level table, and the tray tilted and drawn over it. A slip of wood close to the slit, and about half the depth of the tray, kept the emulsion from flowing into the slit when the tray was not being tilted.

Some plates were exhibited having a dense mark along the edge, and then a rather insensitive mark next it. In answer to inquiries, it was elicited that the emulsion had been treated with bichromate of potash and that the drying had been slow.

Mr. Burton suggested that decomposition of the gelatine might account for the peculiarity observable.

Mr. A. Haddon thought it was due to accumulation of the salts imperfectly removed by washing. He remembered seeing similar marks on plates that had been coated with unwashed emulsion.

Correspondence.

EXPOSURES.

To the EDITORS.

GENTLEMEN,—I take the liberty of addressing you a few remarks on the above subject, with the condition that if the ideas herein expressed have already been suggested in your columns you consign this to the waste-paper basket.

In dry-plate work we have the clearest instructions how to produce a picture with one exception—*the exposure*. All the treatises, guides, companions, &c., dismiss the subject with—"*As to exposure, no definite rules can be laid down.*"

Amateurs (as myself) purchase plates labelled 10, 20, and 30 times more rapid than wet collodion; but as the great body of amateurs have had no experience in the wet process it follows that the label is a perfect puzzle, the consequence being over-exposure, under-exposure, and in many cases so much disgust that the *paraphernalia* is got rid of at any price.

But a little perseverance will surmount the difficulties—such is my experience. My *modus operandi* is as follows:—I take a plate (I use $6\frac{1}{2} \times 8\frac{1}{2}$), and in the dark room carefully cut it with a glazier's diamond into six or seven pieces lengthwise. Each piece is placed in a separate dark slide on a bright summer's day. I focus a subject, and then proceed to expose as follows, being careful to keep a record of the number of each slide:—

No. 1. Drop shutter.
,, 2. Uncap and cap as quickly as possible.
,, 3. Uncap and expose one second.
,, 4. ,, ,, two seconds.
,, 5. ,, ,, three ,,
,, 6. ,, ,, four ,, and so on.

I develope the whole at one time, being careful to scratch on each fraction of plate when taken out of the slide the number of the record kept. After development and fixing I can decide which is the proper exposure. This can be repeated as often as there is a modification of light (say during the different seasons), and thus by the loss (?) of *one* plate the amateur is able to arrive at a proper exposure, and save dozens of plates, time, and patience.

There may be nothing original in the above, but the Editors must remember that amateurs—at least, many of them—have not the opportunity of reading up what has been published in years gone by.

In conclusion: I would suggest to amateurs the advisability of learning, by comparison with a clock or watch, the exactness of a *second* of time.—I am, yours, &c., R. H. MURRAY.

Buenos Ayres, August 20, 1884.

THE SODA DEVELOPER.

To the EDITORS.

GENTLEMEN,—Mr. W. M. Ashman thinks I ought to have been aware of the fact that Mr. Munroe's formula has been largely employed since its publication. I am perfectly aware that the soda developer has been in common use; but, whether it is owing to my not being gifted with such a retentive memory as Mr. Ashman, or to my not being within the magic circle of the "profession," that I have failed to recognise the origin of the formula in question I know not.

Mr. Ashman finds fault with me for limiting its use to interiors and copying. I would merely remark that in these cases more especially I found it certain and reliable. I shall, as he suggests, give it a further trial as a universal developer and "report progress."

Mr. Ashman says he can obtain the black image without the alum bath. All I can say is that I get a sickly-looking, yellowish negative if I omit it, while with it I secure a sparkling, blue-black image.

It would be interesting to know whether Mr. Cowan at the last meeting of the London and Provincial Photographic Association used the alum bath when he failed to obtain the black image that Mr. Ashman obtained with Mr. Munroe's formula.—I am, yours, &c., L. MACDONA.

Cheadle Rectory, Cheshire, September 22, 1884.

Notes and Queries.

"CAN you inform me of a brilliant yellow pigment of a slightly orange character, regarding the permanency of which there is no doubt?—SYNTAX."——In reply: *Cadmium yellow* will fulfil this requirement better than any other pigment with which we are acquainted. Had "Syntax" mentioned the use to which he intended putting this pigment we might, perhaps, have been able to advise further.

"ANXIOUS" asks if it be possible to learn to photograph in three lessons.——In reply: We do not see the impossibility of doing so, provided "Anxious" makes use of gelatine plates. If he fall into the hands of a skilful, painstaking Mentor he will acquire, at least, the *elements* of a mastery of making a negative in one lesson. A second lesson would be devoted to printing, and the third to a recapitulation of points overlooked, or cognate to those two branches.

X. and Z. say—"At an early date we purpose sending a photographer to London to take for us a series of negatives representing life in the lowest social stratum of the great metropolis. To what part of the city should his attention be directed in order to secure the class of pictures we require?"——In reply: The "slums" to the immediate west of Lincoln's Inn Fields and east of Drury Lane will furnish everything that can be required or desired in depicting "low life" in London. White Horse-yard and its immediate surroundings north and south should prove a veritable *El Dorado* to any photographer who is quick to see and prompt to act.

"CAN moonlight photographs be taken? I have seen what purported to be a moonlight photograph taken in the Isle of Wight, showing breaking waves, reproduced in the most charming manner.—R. F. SCOTT."——In reply: The photograph referred to was taken by sunlight, but had been printed darkly in order to show a moonlight effect. By employing a sensitive gelatine plate, however, and a quick-working lens, a genuine moonlight view may be obtained by giving a protracted exposure—say an exposure varying from one hour to six hours, according to the nature of the subject.

M. D. inquires—"Are there any means by which I can fix a crayon or chalk drawing so as to render it adhesive to the paper to which the crayon is applied? I have tried floating the drawing upon milk and then drying it, and I have also tried the application of resinous solutions by sponging them upon the back of the drawing, but in both cases the picture is degraded in an appreciable degree. Your kind aid is requested."——In reply: Let our correspondent obtain one of those toilet toys known as a "spray producer" or "atomiser," and apply the spray of a weak alcoholic solution of bleached lac and sugar candy to the drawing. This will fix the picture without discolouration.

GEORGE C. BARKER says:—"I am informed that there exist means by which a tint may be imparted to a silver print on albumenised paper or, at anyrate, to the albumenised surface of the paper, after the print has been toned, fixed, and washed. In other words, that any of the tones peculiar to a print having been produced on tinted albumenised paper may be obtained when plain or untinted paper is employed. If this be the case I will be glad of any information on the subject."——In reply: After washing the print place it in a vessel of water to which has been added a few drops of any liquid aniline dye that may be preferred. Avoid the employment of too strong a solution, as the albumenised surface of the paper is very readily affected by the action of the pigment.

T. inquires—"Is there any similarity between the 'elephantinon' process and the 'Grecian' method of colouring photographs? The former was in use many years ago, but I have not heard of it for a long period. I greatly admired the photographs bearing this designation, and have one framed which is admired by all who see it."——In reply: The term "elephantinon" was applied by a clever colourist, Madame Una Howard (now deceased), to a species of colouring of which she made a speciality. The photograph was rendered transparent in only a slight degree. It was tinted lightly in front and still more strongly behind, a peculiarly-delicate, ivory-like effect being the result. In the "Grecian" process the photograph is made very thin by having the paper rubbed away; it is then rendered as transparent as possible, and the colour is applied entirely from behind.

WE are asked to state whether two photographs of landscapes can be taken by different individuals, at various times, which shall be so like to each other as to defy any point of dissimilarity being discovered by the keenest vision, with the sole difference of dimensions, one being larger than the other. It is contended, we understand, that one of the pictures has been copied from the other.——We are of opinion that two photographs could *not* be taken under the circumstances mentioned which would be similar in the sense referred to, for there would be so many points of difference between them as to be readily distinguished by an expert. Even in such an unchangeable object (in its physical aspects) as the moon, it is quite easy to distinguish between the photographic representation of the satellite by two individuals, although operating with telescopes of similar power. A noted—if not notorious—case in connection with this branch of photography, and one strictly to the point, was brought prominently before the scientific public twenty years ago.

DAVID H. SIMPSON writes expressing his opinion that it is to be regretted the triple achromatic lens has fallen into disuse. It had, he says, so many points of excellence, and the photographs taken by its agency were usually so soft and delicate, that he feels certain of a successful future being in store for it, provided it were again manufactured.——That the triple lens was useful and excellent we readily admit; but, so far as we are able to ascertain from a careful comparison of a good example of this special optical production, it is no better—even in the slightest degree—than more modern objectives which contain fewer lenses and, therefore, fewer reflecting surfaces, and which can be manufactured at a smaller cost. The doublet lenses of the rapid class work in less time and are more generally useful than the triple; hence the latter has been superseded. But we would not advise anyone possessing a good triple lens to part with it on the mere chance of acquiring another which may possess the advantages hinted at, because for groups and copying it is a very useful photographic appliance.

Exchange Column.

I will exchange 143 numbers of THE BRITISH JOURNAL OF PHOTOGRAPHY, gem camera, nine lenses, good as new, and the *Newcastle Weekly Chronicle* from March, 1883. Wanted, whole-plate bellows-body camera.—Address, PHOTO., 121, Carlton-road, Attercliffe.

I will exchange a fifty-inch special express bicycle, with lamp and odometer, cost £8 11s. 6d., for a Victoria camera and lens; also a fifty-two-inch tourist bicycle, cost £7 10s., for a standing head-rest, cameo press, and dies for *cartes*.—Address, W. W. EVERS, Rose Cottage, Wath, near Rotherham.

I have duplicate volumes of many years of the *Photographic News* and some of THE BRITISH JOURNAL OF PHOTOGRAPHY. Wanted, the *News* for 1861-62, 1873-74, and the Journal for 1857-58-59 and 1866, in exchange volume for volume or give or take other useful exchange.—Address, W. E. DEBENHAM, Massingham House, Haverstock-hill, London.

I will exchange a 16 × 12 and a 12 × 10 porcelain dipping-bath, quantity of opal glass, tripod-stand, about two years' numbers of THE BRITISH JOURNAL OF PHOTOGRAPHY for 1883-84 and Hardwich's *Manual of Photographic Chemistry*, for embossing-press with cabinet and *carte* dies, half-plate portable dry-plate camera with dark slides, Bigelow's *Album on Lighting*, or Fallowfield's 10 × 8 new patent burnisher; difference adjusted.—Address, E. HALL, photographer, Malton, Yorkshire.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPHS REGISTERED.—

John Edmund Cracknell, 6, Wightmans-road, Hornsey, London.—*Photograph of Royal Autographs.*

John Owen, Newtown, North Wales.—*Two Photographs of Miss M. C. Phillips and Two Photographs of Miss R. Davies—the Welsh Evangelists.*

The Burnley Photographic Company, 25, Bridge-street, Burnley.—*Photographs of the Barnoldswick 1st Eleven Cricket Club; The Burnley 2nd Eleven Cricket Club; The Burnley 1st Football Team.*

PHOTO. (London).—Received as we were going to press.

JOSEPH J. GRANT.—We do not supply apparatus of any kind. Consult our advertising columns.

H. W.—The tests employed reveal a state of matters that we think will account for the formation of the spots.

R. G. A.—The Photographic Exhibition will be opened to the public on Monday, October 6th. The Health Exhibition will not be closed till the end of October.

S. A. WOLLETT.—If your dark-room window will successfully stand but half the test to which you have subjected it, it will answer quite well for all practical purposes.

A. SEEMAN.—The prints are very good of their kind; but you must bear in mind that the process itself is incapable of yielding results equal to prints on albumenised paper.

E. J. HOLMES.—We believe the light is used by some professional photographers; so are other systems of artificial lighting. If expense be not an object the electric light would, perhaps, answer your requirements best.

I. I. I. I.—It is evident the chemical and actinic focus of the lens does not coincide. From your description of the instrument we strongly suspect one or more of the glasses have been changed since it was issued from the manufacturer.

S. S.—There is no real advantage in using bleached lac instead of the yellow variety, except its freedom from colour. Practically in the thin film, such as exists on the negative, the slight tint conferred by the orange lac is no disadvantage whatever.

B. P.—It is pretty clear that the solution was put into a dirty bottle. As the chemist supplied the bottle you will be quite justified in expecting him to send you a fresh solution. Of course you will return the old one, so that he may recover the gold.

A. BOYES.—The process by which the red pictures referred to were produced is the carbon. By this process it is manifest that pictures of any colour may be produced at will simply by the admixture of a suitable pigment with the gelatine with which the paper is coated in the first instance.

G. M. J. B.—So far as we are aware the apparatus is not an article of commerce. You had better write to the inventor again. Your former letter may have miscarried. The society has been in vacation for some months past. Possibly this may account for your former communication not having received attention.

PATENTEE.—You had better get a copy of the New Patent Act. This you can do for a few pence at the Sale Department, Patent Office, Curzitor-street, Chancery-lane. It will give you the necessary information. To learn if your invention is already patented you will have to search the records of the Patent Office. You can do this, without charge, any time between ten and four o'clock.

AMATEUR (Wilts.).—In all probability the sulphite of soda—or, rather, what you purchased from your local chemist under that name—was not sulphite of soda at all, but the sulphate. If so, it will fully account for your failure. You had better procure a fresh sample from some photographic chemist. Few country druggists keep sulphite of soda that can be relied upon, if they supply it at all.

G. R. FLUDDER.—If you cannot succeed with any of the numerous intensifiers that have from time to time been recommended we are afraid we cannot assist you further. The commercial intensifiers mentioned are highly spoken of by most workers. You should bear in mind that the only "royal road" to success is experience. From what you say, we fear it is this you lack, and not that the different intensifiers you have tried are at fault.

WARWICK.—Your sudden success, after several weeks of failure, is probably due to the change in temperature. You were somewhat unfortunate in commencing experiments at a time when the heat was so excessive. Experienced workers have met with the greatest difficulty in carrying on their operations in collotype printing when the weather was extremely hot, as it was at the time you met with your failures.

Z. Z.—There is no difficulty in obtaining brilliant results by the carbon process on opal glass; but you will have to employ as vigorous negatives as for paper. A strong negative means a thick film of pigmented gelatine in the shadows of the prints, and if this be coloured, and highly "gummed up" in doing so, there is some little risk of the film splitting up should the picture be made abnormally dry. Hence, carbon prints on opal are usually made from rather weak and delicate negatives, so as to avoid the risk.

W. W. EVERS.—1. You will find many good formulæ for dry plates in the ALMANAC for the present and the past two or three years. Commercial plate-makers do not publish the formulæ by which they work.—2. Yes, if you can uncover and cover the lens sufficiently rapid.—3. Use one or other of the numerous clearing solutions.—4. To preserve the solution.—5. There is no harm in using the fixing solution saturated, except that it will not fix so quickly.—6. Better use them separately; there is no advantage in employing them mixed.

RECEIVED.—W. Brooks; W. Coles; J. Harris; S. Fry; Kenneth Bean; Lyons; Hypo.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.—In accordance with a resolution passed at the June meeting of this Society, a special meeting will be held at the House of the Society of Arts on Thursday next, October 2nd, at eight o'clock, to consider the future of the Society, after which Mr. W. Ackland will read a paper *On Furnell's Lens.*

PHOTOGRAPHIC CLUB.—At the forthcoming meeting of this Club, at Anderton's Hotel, Fleet-street, on Wednesday next, October 1, the subject for discussion will be *On Artificial Lighting.* At 9 p.m. the meeting will be resolved into a special general meeting. The Saturday afternoon outing will be at Blackwall—train leaving Liverpool-street Station at 2 p.m.

THE NEW YORK SOCIETY OF PHOTOGRAPHIC AMATEURS.—On the evening of the 9th instant a large body of the New York Photographic Amateurs assembled in the rooms of the Society, 1,260, Broadway, to listen to an address by Mr. A. L. Henderson, of London, on the preparation of gelatine plates by cold emulsification. Knowing the experience of Mr. Henderson in this department of photography, his lecture was heard with great attention. At the close an opportunity was afforded for asking questions, and many of those present availed themselves of this privilege. Numerous experiments were made and demonstrations given during the lecture, at the conclusion of which the thanks of the Society were unanimously awarded to Mr. Henderson.

AËRONAUTIC PHOTOGRAPHY.—From that intrepid aërial navigator, Mr. Cecil V. Shadbolt, we have received a set of his latest balloon photographs, taken from the car of the "Monarch," on the occasion of a special trip on August 13th last. These comprise *Woolwich*, as seen from an altitude of 500 feet over Silvertown; *Royal Albert Dock and Thames*, at an altitude of 600 feet; *The Crystal Palace*, at 1,100 feet; and *Blackheath*, at 2,700 feet. Speak of a "bird's-eye view" of any locality! What can possibly equal in accuracy the view of a scene on *terra firma* depicted by the finger of science when working in upper air? Mr. Shadbolt is to be congratulated on his success.——From Mr. James H. Hare we have also received interesting mementoes of the recently-celebrated "Balloon Centenary," in the form of a series of cabinet views of the balloons "Robin Hood," the "Colonel," and the "Monarch," taken at various stages of their progress—from their inflation to their ascent and disappearance in the distance. The groups present are successfully delineated.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. STEWARD, Optician,
For the Week ending September 24, 1884.
THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

Sep.	Barometer.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max. Shade Tem.	Min. Tem.	Remarks.
18	30·39	NE	69	64	106	81	62	Hazy.
19	30·31	E	59	58	97	69	57	Cloudy.
20	30·14	SE	63	59	100	72	57	Cloudy.
22	29·79	NW	57	54	103	66	54	Cloudy.
23	30·19	W	55	51	90	64	49	Fine.
24	30·24	WSW	58	53	85	59	51	Overcast.

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1274. Vol. XXXI.—OCTOBER 3, 1884.

ANOMALIES IN DEVELOPING FORMULÆ.

We have frequently called attention to the strange anomalies which exist in the developing formulæ issued with the different commercial plates as well as in those frequently published in these columns and in the Almanac, and have pointed out how difficult it is for those operators who do not confine themselves to one make of plate to follow out instructions without having a distinct set of solutions for each separate brand. In view of the numerous fresh departures in the direction of other alkalies than ammonia, and the consequent increase in the number of new formulæ, these difficulties do not promise to be lessened; and as the subject has been once more raised by Mr. G. Watmough Webster in our last issue, and by Mr. W. F. Mayes in the previous one, we may be allowed to call attention to one or two points which have hitherto escaped general notice.

In the first place, referring to Mr. Mayes's carefully-compiled table for the reduction of different formulæ to common terms, we must point out the fact that it fails in complete accuracy from the neglect of one important element in the working out of the formulæ. We allude to the necessary increase or decrease in the volume of the solutions consequent on the solution of certain solids or the mixture of water and ammonia. Thus, if one ounce of potassium bromide be dissolved in two ounces of water the volume of solution formed will not be so low as two ounces nor so high as three, but will be between the two, the exact bulk being beyond the powers of calculation of the ordinary operator to discover *on paper*. On the other hand, when water and ammonia are mixed at normal temperatures a decrease in the combined volume ensues, so that it will be evident that to attempt accurately to calculate the respective proportions or quantities of material included in different formulæ is impossible without actually working out the formula and noting carefully the bulk of solution which results.

The amount of error thus caused in the generality of formulæ is probably not great, though in those which contain a large proportion of bromide—as, for instance, Swan's—it may be sufficient to cause trouble. But if our readers will take the trouble to practically compare a few of the better-known formulæ with the figures in Mr. Mayes's table they will find that, with the exception of, perhaps, one—of which more anon—none of them agree.

Taking three haphazard we have made them up carefully, using an analytical test mixer to accurately determine the volume. We find Swan's formula—to which allusion has been made, and which consists of strong ammonia and bromide of each one ounce, and water half-an-ounce—makes up to 840 minims or one ounce and three-quarters. In order then to estimate the equivalent of one minim of ammonia we are compelled to measure by some method or other one and three-quarter minims—a rather difficult job; or if we desire to proceed on the standard of a grain of bromide we are reduced to the still more difficult computation of 1·92 of a minim. In like manner Wratten's formula for their instantaneous plates contains one minim of strong ammonia in each three and three-quarter minims of solution, and one grain of bromide in each half-drachm; and Nelson's one minim of ammonia in about 1⅝ minims of solution, and a grain of bromide in a little under seven.

As we have remarked, the discrepancies are, perhaps, not particularly vital, but are sufficiently bewildering to puzzle those who desire to compound their developing solutions from separate standard solutions; and, as the remedy for such extremely awkward figures is so simple, it seems a pity it should not be generally adopted. Referring to the one solitary case in which it is, perhaps, possible to calculate with accuracy, the solutions are not made by mixing together certain definite quantities of the ingredients, but by taking definite quantities of the important constituents and making a definite bulk of solution. In other words, as the dispensing chemist would say, "Liquor ammonia one ounce, bromide of potassium one ounce, water *ad* two ounces"—that is to say, water *to make up* two ounces. If the formula quoted were compounded in that way, each two minims would represent one of strong ammonia; and, if troy weight were substituted for avoirdupois, the same quantity of solution would also contain one grain of bromide.

In the case of the soda developer, in which a far larger proportion of solid matter is contained, the importance of care in the direction suggested is still greater; and it is eminently desirable, if only for the sake of facilitating calculations, that some exactitude should be observed with regard to the constituent parts of the developer.

As regards the suggestion of Mr. Webster—that manufacturers should frame their formulæ in such a manner as to permit a ready comparison of the proportion of pyro. to ammonia or of bromide to ammonia—we quite agree that there is ample room for reform; but if they would first carry out the proposal we have made the user of the plates would at least be able to perform his calculations without the necessity for making a quantity of solution which he may probably never use.

And now a word upon another subject intimately connected with development, and possessing most decidedly the character of an anomaly, though, in this case, it is the operator and not the manufacturer who is at fault. We find most photographers exercise considerable care in the purchase of pyro. of good reputation, of bromide and sulphite of soda of acknowledged quality, and if anything go wrong the pyro., the sulphite, and the bromide generally suffer the odium. But is it not somewhat anomalous that the ammonia, which plays at least as important a part in the function of development and which is quite as difficult to preserve in proper condition as the other three put together, is accepted, without guarantee or warranty, as being *liquor ammoniæ fortis* of s. g. ·880? We venture to say that not one in twenty samples taken haphazard from commercial sources will be found, upon trial, to come up to that description. It is true the majority may not vary to a very great extent, though we had submitted to us a short time since a sample obtained from a first-class chemist as "s. g. ·880," but which on testing we found to be between ·940 and ·950, and contained *less than one-half the percentage of real ammonia*. The result of its employment had been the spoiling of a batch of important negatives from sheer ignorance of its deficiency in strength; but had that circumstance been known and allowed for the faulty sample would have answered as well as the best.

We would therefore counsel all users of dry plates to either have their ammonia guaranteed of a certain strength—not necessarily ·880—or preferably to test its specific gravity for themselves. A specific gravity bottle will cost but two or three shillings, and will pay for itself in a short time. The *modus operandi* is simple enough, and a method we described some years ago will secure all the accuracy the photographer requires. It consists in filling the specific gravity bottle with the liquid to be tested, plunging it for a quarter of an hour (without its stopper) in a basin of cold distilled or rain water. It is then stoppered, wiped and weighed, emptied, washed out, refilled with water from the basin, again weighed, and the weight of its contents on the first weighing divided by the weight of the weight of water on the second. Reference to the table at page 254 of this year's ALMANAC will show its percentage value in real ammonia, and a simple calculation will enable the operator to adjust its strength to suit any formula written in terms of ·880 ammonia.

DENSITY IN COLLODION IMAGES.

IN making copies of engravings the negative must, of course, be of as intense a character as possible. We lately tried a very old sample of collodion originally prepared for engravings, and which, when nearly new, or at most only a few months' old, gave negatives having a degree of intensity greater than we remember to have seen before or since. After remaining untouched for a few years we had the curiosity to try this once-excellent engraving collodion for the same purpose as that for which it had been originally prepared. Its virtue had, however, departed. While it yielded negatives that were clean, they possessed scarcely any density. A change, too, had taken place in the solubility of the film; for, whereas in its palmy days it resisted the strongest alcohol, it now succumbed to all alcoholic varnishes, even when their strength had been reduced by the addition of water.

For the benefit of those whose collodion may have become disintegrated in a manner similar to that to which we have referred, we shall describe by what means it may be rendered serviceable.

First of all, it will be necessary to add a small proportion of an iodide, such as that of ammonium. To strengthen the negative: make use of an admixture of solutions of nitrate of uranium and ferridcyanide of potassium, the proportions being nearly equal parts, although this does not appear to be of much consequence. When this solution is applied to the thin negative it immediately acquires a dark brown colour, and the intensity goes on gradually increasing in force, until eventually what was at first a thin, feeble negative becomes one possessing great vigour, which is still further increased upon drying.

If the operation terminated here all would be well; but it is unfortunate that the application of varnish quite destroys the intensity, leaving the image thin and poor. In cases where a solvent action is exercised on the film itself, this may be prevented by the substitution of a benzole varnish for one in which the solvent is alcohol; but in this case the reduction of the strength of the image takes place in quite as great a degree as before.

To prevent this it is only necessary to make a thin solution of gum arabic and apply it as a varnish to the negative. This does not act in a deleterious manner as regards reducing the intensity. The strength should be such as to fill up the interstices of the collodion film, which is now spongy and porous to a very considerable extent. When dried, any varnish, whether alcoholic or benzole, may be applied for the final protection of the film, and without the slightest reduction of intensity being experienced.

VIGNETTING.

AMONGST the various fashions in photography, some of which come and go, the practice of printing portraits in what is known as the vignette style is one that has held its ground from the period of its first introduction, and is at the present time at least as popular as ever. This general and enduring consensus of opinion shows that there is an inherent attractiveness in the results of the process that render it independent of the fickleness of mere fashion or fancy. The clearness with which the outline of the head is delineated against the light ground, and the absence of anything to distract the attention in the picture, are no doubt the main causes of the popularity of the vignette style.

It is, however, not of the advantages of vignetting that we wish now to speak, but of the different methods by which the effects have been, and are, produced. The softening of the edge has been effected in two distinct ways, and perhaps more generally by methods in which these two plans are united. One distinctive method of softening is to place in contact with the negative a mask of some kind, the inner edge of which is graduated to give the intermediate or softening tones. The best-known example of this method is the vignetting glass of silver-flashed orange, the vignetting colour in the centre of which is ground or dissolved away. The other distinctive method is that in which distance is employed to produce the gradations required, and may be exemplified by a card with a hole in it supported at a certain distance in front of the negative. This latter method is so simple, and lends itself so easily to variations both of form and of degree of softening away, that it has come into very general use. There are also plans of vignetting in which both principles come into play. Of these methods we may instance the use of several layers of tissue paper, each a little larger than the next one. This combined set of papers is held between two glasses, and laid either directly upon the negative or kept at a certain distance if it be desired to make the vignetting more gradual.

One objection to the use of the simple opening in the vignetting form, and to the dependence upon distance for the effect of softening a gradation, is that, unless suitable precautions be taken, the light may strike under the "form" more in one direction than another, and so cause the shade on the background to show more on one side than upon the other; or may cause the top of the head either to be lightened itself, or, on the other hand, to have too much dark shade over it.

To overcome this difficulty some printers use a revolving table, kept in motion by a roasting jack; but this motor is scarcely powerful enough for a large board capable of holding many pressure-frames. In one establishment that we have visited, where the printing for several branches is carried on, a large circular table or board is suspended by three cords joined together at the top like the strings of a scale-pan, and an occasional twist by the person who has to examine the presses, in order to decide when the printing is deep enough, keeps the whole in motion. In another establishment we have seen the printing of vignettes conducted under a sash glazed with ground glass, and it is a rule each time that a press is looked at to give it a quarter turn in one direction. Both these plans are found to work well in practice, and to give a print with the head and figure in the part of the general printed image where it was desired to be, when placed in the frame.

A manner of fitting up and arranging printing-frames which we have seen employed with good effect may be new to some of our readers. We will, therefore, briefly describe it. At the establishment where we saw it in action the size known as half-plate was in use for both cabinet and *carte* negatives, and it will suffice to explain how the method referred to is carried into effect for these two popular sizes. Taking the *carte* size first: Two pieces of millboard are cut to be of the dimensions of the frame itself. In these millboards are cut two holes of about three inches long and two and a-quarter broad, side by side, like the prints in a stereoscopic picture. One of these millboards is glued on to the front of the frame, and then strips of thinner card of about half-an-inch wide are glued on to the surface of the millboard round three of the sides—two of the short and one long side. The second sheet of millboard is now glued on to these strips, and a few tacks for additional security are driven in through the two thicknesses of millboard and the one of card into the woodwork of the frame itself. There is thus a double thickness of millboard with holes in them corresponding to the two *carte* portraits upon the half-plate. The two folds forming this double thickness are separated by the card round three sides sufficiently to allow a card to lie between them, and close enough to keep this card without shifting unless it be intentionally done with the fingers.

To complete the vignetting "form" a number of cards are provided all of the same size, and about half-an-inch longer and broader than the openings that have been described in the millboards. These cards have openings of various sizes, and in order that the same negative may always have the same-sized opening, and for convenience of reference, the movable cards are numbered. The system of numbering adopted is by eighths of an inch. Thus, an opening one inch long is numbered 8, one of an inch and a-quarter is numbered 10, and so on. There are also some with openings of extra width and some with extra narrow openings proportionate to the length, and these are lettered W or N, in addition to the number specifying the length. When the negative is placed in the frame, one of these loose cards is slipped between the two thicknesses of millboard through the space which has been left along the side, where they are not attached by means of the intermediate strips of card running along the other three sides. The card is adjusted to the right place over the negative by the fingers, and it is found that it does not slip, but will remain in place, kept there by the pressure of the millboard on both sides.

In the case of *carte* vignettes of ordinary size it is found that the thickness of the wood composing the front of the frame keeps the vignetting card at a sufficient distance to ensure the necessary softness. With portraits of larger size—those of the cabinet, for instance—it is considered better that the softening round the head should be diffused over a larger surface, and that towards the lower portion of the figure the vignetting should be still more gradual. In order to effect this, strips of wood are attached to the front of the frame before the millboards are glued on. These strips are arranged in the following manner:—On one end of the frame there is a strip of about three-eighths of an inch in thickness, and on two of the sides are strips, one end of which meets and is of equal thickness with the end strip, whilst the other ends of these side strips are flush with the surface of the frame itself. One end of the millboards, and, consequently, of the card enclosed between them, is thus raised higher from the negative than the other end, and the negative is placed so that the lower part of the figure comes where this end is raised to the greater distance.

Concerning a variation on the plan just described, especially contrived for carbon printing and suitable for that purpose, as well as for the production of vignettes with tinted margins by any method of printing, we may speak upon another occasion.

NEGATIVE EVIDENCE REGARDING THE DETERIORATION OF GELATINE PLATES.

Having observed in one of the foreign journals that the deterioration of gelatine plates which have been packed with a thin slip of cardboard placed round their margins (so as to effect their separation) is owing to the presence of hyposulphite of soda in the cardboard of which these slips, or separating masks, are formed, we have subjected some of these masks to sensitive tests for the hyposulphite without being able to perceive the slightest indication of its presence.

It is well known that when the material of which paper is formed is subjected to the bleaching action of chlorine a subsequent treatment with hyposulphite of soda ensues, this salt being the recognised "antichlor" of the paper mill. But in one case, in which marginal deterioration of gelatine plates was well marked, the separating masks were formed of a rather thin, brown cardboard. The materials of which this was formed bore no appearance of having been bleached by chlorine or any other bleaching agent, and, therefore, concerning this it was reasoned, *à priori*, that no hyposulphite of soda would have been employed as an antichlor. Certainly with these slips, or masks, the iodine test, although most carefully employed, failed to indicate the presence of the antichlor, and yet the plates which were packed up in contact with them gave the indications of deterioration to which we have referred as a characteristic, not always present, of this mode of packing gelatine plates.

From this it appears evident that there are other agents than hyposulphite of soda which act in a deleterious manner upon the surface of the plate. We shall be glad to receive samples of paper or cardboard which are known to produce the deterioration mentioned, in order that we may have them properly tested.

THE QUALITY OF RECENT PRINTS.

In another page Mr. E. Dunmore asks a series of pertinent questions as to the character of the prints obtained or obtainable from gelatine negatives, and we draw attention to his communication as being one of considerable importance at the present moment, trusting that it may elicit such replies as will lead to a thorough knowledge of the views of practical men. The tenour of the replies to some parts of the queries will have been foreshadowed in previous articles we have written dealing with cognate topics; but a wide subject bearing upon many branches is herein opened, and we hope it may be thoroughly ventilated.

That a distinct difference — not necessarily indicating either superiority or inferiority—exists in the quality of the prints now produced may be fairly anticipated to be a portion of the verdict. What the character of that quality is, and to what extent it has been governed by the advent of gelatine, will be the question to be handled. Whether an artist works in water-colours, oils, fresco, enamel, or even mosaic, he obtains results beautiful according to his skill rather than the medium he works with; and though some may prefer one and some another mode, yet there are few critics who would venture to assert that one medium possessed greater actual excellence than another, different though may be the modes adopted and the vehicles employed for appealing to the mind through the eye. Similarly, though in a more modest degree, does photography speak with different voices, not one of which is necessarily more melodious than another. Since the days of Adam-Salomon—whose prints were forcible, brilliant, and powerful, yet not lacking in delicacy, and refined in the highest degree—down to the present time when negatives are printed from which, from their thinness, would have been rejected without further thought twenty years ago, every shade of quality has been represented and every style has had its votaries. It is not for us to say which is the best, though it is undoubtedly true that a better average has continually been arrived at from year to year. The public, too, are, as it needs no argument to prove, far better educated in art, and, as a matter of course, have become more exacting in their requirements in consequence. This also reacts upon the quality of the prints to their advantage. That photography has had a considerable share in aiding the cultivation of this taste there can be little doubt, and almost every year there may be perceived a distinct advance in the character of the work—more, perhaps, in the average of merit than in individual merit.

We thus see that Mr. Dunmore's questions will be complicated by considerations almost too powerful to be termed side issues; yet we may say that, notwithstanding the ever-recurring warning, *de gustibus non est disputandum*, there will always be certain standards —varying in nature, not in degree—which may be decided upon for comparison. They may include the two extremes of brilliancy combined with delicacy—typified, perhaps, by the work of some of the leading American portraitists on the one hand, and on the other the combination of fulness of detail and softness, with as much richness as can be obtained, such as is seen in the work of one or two of the leading London photographers. Between these two extremes there will be found every grade.

Without making any positive assertion, we incline to the belief that the former class of picture will be produced in the highest excellence from collodion negatives, while those from gelatine will be greatly superior for the latter. In the early days of gelatine the common cry was—"Insufficient density;" and there is no doubt that the plates then made were less amenable to intensification than such as are now procurable. On this account, probably, a mode of printing was adopted which was calculated to get the best effect out of thin negatives, and the influence of the plan thus drifted into may be still felt at the present moment. All practical printers know that they cannot get equally good results from every kind of negative upon a single brand of paper, nor even on one kind of paper by a similar mode of treatment.

Then, as to landscape *versus* portrait results: it must not be forgotten that there are many thousands of amateur landscapists who, though possessed of much talent, are yet but beginners, and it would not be fair to take an average of these tyros as against the few wet-plate veterans, who have brought their hard-gained experience in that direction into their working with gelatine. A poor wet-plate negative gives but sorry results; but from a poor dry plate only the most wretched prints imaginable can be obtained.

The character of prints from dry plates is governed by two most important factors—the colour, and the amount and character of the fog present. This latter quality is intimately connected with the composition of the developer, or perhaps we might say the proportion of ammonia it contains. For a long time plates were developed with such a predominant amount of ammonia present that almost every plate suffered more or less from a suspicion of fog. But that a reaction is setting in cannot be doubted; it is shown in the printed instructions of manufacturers, and the general tendency of the authorities of the day is in a similar direction. This we take to be a most important matter, and a factor of great importance in arriving at a satisfactory response to Mr. Dunmore's queries. The wonderful rapidity placed in our hands by gelatine ought not to warp us from the endeavour to attain the highest excellence. "Quality first and rapidity next" should be the motto of all photographers.

When everyone has fallen into a way of using a small quantity of ammonia in his developer we shall get still better results—more like wet plates through possessing the highest brilliancy, yet having all that delicate softness which we are inclined to attribute specially to gelatine work.

There is, however, fog and fog. As we write we have before us two prints—one really good, and the other poor and quite deficient in richness. On referring to the negatives we are almost astonished; the brilliant picture is from a negative that is completely fogged, while the negative from which the other was printed seems perfect—the shadows apparently quite clear, and the negative thoroughly exposed. Readers of photographic literature well know that more than one well-known artist has stated that green fog is not in any way injurious, while at least one has stated it to be an advantage. This particular subject is too wide, however, to treat at the end of an article, and we will refer to it fully on a future occasion.

Little need be said as to the colour of a negative, seeing that any objectionable yellowness can be removed by the acid alum bath at any time, if desired. There are printers, however, who assert that the yellow tone of a negative is of decided assistance in the production of good tones. It is upon such points that we hope to have the opinion of correspondents.

In conclusion: we may say that if Mr. Dunmore's queries meet with a hearty response matter of great interest will be elicited, and a thorough discussion, though opening sufficiently wide ground to lead to diffuseness, may show the way to a real improvement in results and to a forward movement in our art.

OUR contemporary, *La Nature*, gives an interesting description of the Simonoff photometer—a sort of telescope on a stand, with a series of diaphragms of graduated apertures inserted at the field end, with the purpose of diminishing the light till certain figures become invisible, the particular diaphragm required with the lighting under examination telling directly the necessary exposure without calculation. The instrument is merely a toy so far as photographers are concerned. The veriest tyro knows that the apparent illumination of an object affords of itself but a poor criterion of its photographic power, and the new photometer is really no more use than Crookes's beautiful instrument, the radiometer.

IN *Nature* is a description of a radiation measurer of another kind—a huge congeries of reflectors laid upon a frame shaped like a saucer with its centre cut away. These mirrors reflect the rays from the sun to a central heater of conical form acted upon by the reflected radiation in such a manner that each point of its surface receives an equal amount of radiant heat in a given time. Professor Langley has shown the extent to which the atmosphere absorbs the sun's rays, which but for the layer of air round the earth would present a blue appearance to the eyes; and Captain Ericsson, correcting his results by calculations founded upon such absorption, estimates by means of this new instrument the temperature of the sun's surface to be far above any degree hitherto put forward—that is, 3,060,727° F.—and this he terms "an under-rated computation."

BY calling in the aid of photography Dr. Norris asserted the discovery of a third kind of corpuscle in the blood of mammals, and Mr. G. S. Clair, F.G.S., lately communicated to the Birmingham Philosophical Society a note on a possible error in photographing blood corpuscles, in which he attempts to explain Dr. Norris's discovery as being due to an optical illusion. He suggests that the alleged bodies are due to an exactly similar cause to that of "flare" produced by the diaphragm of a landscape lens, for instance, when not suitably placed—a very distinct circular image being often found under such conditions. We fail to grasp the meaning of *Nature* when it says "if he had attempted to focus these ghosts and the real images at the same time, we venture to say the note would never have been written." The fact is, the definition of a possible ghost would alter according to the length of the telescope, the effect being more particularly one of reflection than refraction.

WE apprehend that our readers will be too busy enjoying the pleasures of the feast intellectual at the *conversazione* in Pall Mall, on Saturday evening next, to pay much attention to the eclipse of the moon. Nevertheless, to those so inclined the obtaining of a photograph of one stage of the phenomenon should present no considerable difficulties to the possessor of very ordinary optical appliances in these days of gelatino-bromide. The eclipse will be a total one, commencing at sixteen minutes past nine, and ending at twelve minutes to eleven. The middle of the eclipse will be at two minutes after ten. It will thus be seen that the duration of obscuration continues for a remarkable length of time.

A NEW bright comet has been discovered. The fortunate astronomer whose name, we suppose, will be handed down to posterity in connection with this "find" was Herr Wolf. Several observers also saw it, but priority belongs to the above-named gentleman. At the Earl of Crawford's observatory, at Dun Echt, it was independently discovered, examined by the spectroscope, and pronounced as a gaseous body, early on the morning of Tuesday, the 23rd ult.

IN a recent letter to *The Times* on "The Influence of Civilization upon the Eyesight," Dr. Brudenell Carter, F.R.C.S., has some remarks very interesting to photographers. Explaining the optical structure of the eye he shows how its adjustments are influenced by the kind, the extent, and the duration of the work they are subjected to, and proves that civilisation results in eyesight inferior to that of savage races. There is no doubt of the increased prevalence of near-sightedness at the present day; and with regard to it we may quote what he says as having a direct interest for all photographers, especially those who have much dark-room work. The term myopia is used by the occulists to define this condition of "short" or "near" sight. "The original cause" he says, "of myopia, on the other hand, seems to be the application of the eyes to near objects; in other words, the poring over books and handicrafts. When the eyes are directed to a near object they are turned in, or rendered convergent, so that the axis of vision meet upon it; and this position is maintained by a muscular effort which, if continued, alters the shape of the eye in the direction of elongation. Manifestly, the alteration will be most easily produced during youth, when the tissues of the body, including those of the eye, are comparatively lax and distensible; and it will also be most easily effected amongst those young people whose tissues are exceptionally weak by reason of inadequate food or of unhealthy descent or surroundings. Badly lighted schools are the great manufacture of myopia, the bad light compelling approximation of the books or other materials of study." Retouchers and dark-room workers should lay these remarks to heart, and much trouble will be avoided by reading them in conjunction with previous remarks by ourselves on a similar question.

TOURISTS' AND OTHER CAMERAS, &c.

SOME good should result from the discussion which has been lately going on in the columns of the Journal on this subject, and it might be advisable to let it embrace photographic apparatus generally. In the matter of tourists' cameras—that is, those carried merely to give additional interest to a trip—I think the tendency is to try and get rather more into them than is practicable; but where a few ounces more or less do not make much difference we might reasonably ask for things to be a little more perfect.

Taking, first, the camera front: how many are there which admit of more than a very little movement of the lens, either up or down? Yet it is sometimes requisite to use a lens raised nearly to the top of the camera or dropped down almost about level with the bottom. I had occasion not long ago to use a whole-plate camera (made by a firm of some repute living not many miles from Holborn), the maximum rise of the front of which provided for by the makers was about one inch. No arrangement at all was made for lowering it, and to do so would necessitate cutting the woodwork away. Yet I required it for a street view taken from a third-storey window. The only way out of the difficulty was to turn it on its side and make the horizontal movement do duty for the falling front; but it being made square, with a reversing frame, there was no means when on its side of fastening it to anything. It had a folding tailboard, but when this was let down there was nothing except its own weight to keep it from folding up again; so that when turned on its side, after focussing, the bellows had to be kept from collapsing by propping open with a piece of wood. It may be thought that this was an antiquated piece of apparatus, but it was nearly new, and, I daresay, cost £8 or £9 a few months ago.

Some time ago I bought a second-hand pocket camera by noted makers which had only conical bellows, and, consequently, no provision for altering the position of the lens. This I took to an apparatus dealer to get square bellows and front put on, impressing upon him that the front was to fall as well as rise. "Why! whenever do you want to lower the lens?" was his query; and this was from one who considered himself in the van of photographic progress! I pointed out to him that nowadays it is not unusual to take street views from a greater height than the level of the road.

Studio cameras also are not always perfection. One which I use has the focussing-screen hinged at the top, the camera drawing out by means of a screw placed just below the screen. The makers did not notice when constructing this that the handle of the screw, as often as not, comes above the level of the lower part of the screen, so that, to raise the glass and push the dark slide along, the screw has to be turned round a little and then put back by guess, thus running a risk of displacing the focus.

The fronts of studio cameras should likewise be made to drop a little below the centre. They are usually made so that the lens is central or raised; but, when taking a full-length portrait of a child standing or sitting on the floor, unless the camera stand be very low it is well to lower the lens a little, or the image will not occupy its proper position on the screen without a great deal of tilting, which, while throwing the feet much out of focus in a standing figure, would, in a sitting one, dwarf the neck down to nothing.

Many people prefer using one large camera for studio work, and employ carriers for plates smaller than the largest size they are in the habit of using. When the wet process was in vogue it was a necessity that the plates should be supported only by the corners; but now that gelatine has almost ousted collodion there is no reason why slides and carriers should not be made so as to support the plate all round the edge.

If anyone will take the trouble to put (say) a 10 × 8 piece of stout plate glass in a dark slide and test it for correct register with the focussing-screen, and then substitute for plate glass a thin glass taken at random from the negative shelf and compare the register again, he will, if the spring of the dark slide be at all strong, probably find a considerable difference. If the thin glass happen to be at all curved inwards the difference will be still more noticeable. By making carriers with a rebate all round bending of the plate would be to a great extent prevented.

Large cameras might with advantage have slides pushed in at the back instead of sliding in from the top or side, though for convenience the shutters should pull out sideways and fold over. I recollect a 15 × 12 apparatus I formerly worked with in which the shutter pulled out, and when the camera was raised a good height for taking a half-length picture of a tall sitter, a short operator I knew had almost to get on tiptoe to draw the shutter properly. This brings up the question of folding-back or pulling-out shutters for outdoor work. It appears to me a matter more for individual preference than any hard-and-fast rule. In a small size I have used both, and for convenience and ease of working prefer the shutters which fold back; though I always feel safer with the solid slides, with which there is no fear of the slide itself opening accidentally. It takes me longer to replace the loose shutter than to push in the folding one, and for larger sizes one would certainly require the special pockets suggested by Mr. A. Pringle. I fancy an operator with a 12 × 10 piece of board between his knees waiting for a gleam of sunshine would not present a very dignified appearance to a crowd of small boys either in a London street or on the almost extinct village green. It must, however, be admitted that markings on the plates have been produced by something in the leather used to form the hinges of the folding shutters—the pull-out ones, of course, being free from this defect.

Frequently an expensive, elaborately-made piece of apparatus is rendered imperfect through some little detail not being properly looked after. I saw the other day two new 12 × 10 double slides just received from the makers, costing somewhere about 30s. each, much of the workmanship being all that could be desired. When in use, however, the greatest care has to be taken not to touch the little buttons which keep the shutters from opening; in fact, they sometimes slip out of their place even with careful handling. Surely it would not be difficult to devise some fastening which will keep in its place till moved intentionally.

Referring for a moment to the remarks of the Editors in the Journal for the 19th ultimo: I do not see how the tail-board can well be dispensed with in outdoor cameras. If the base-board be placed in front it cuts off a portion of the field when a wide-angle lens is used; and even with a longer-focus lens, unless this come quite to the end of the base-board a drop-shutter cannot be used or, at anyrate, one with a long opening. Whether the base-board be in front or behind it is generally hinged once so as to fold up, and, if hinged again a short distance from the hinges, as they generally exist, but in the reverse way so as to fall down when not required, I imagine the desired end might be attained. I experienced only the other day, when taking an interior, the inconvenience, alluded to by the Editors, of a long tail-board, it being difficult to get near enough to the focussing-screen to see well.

It would be a good thing if manufacturers made the different parts of various-sized cameras interchangeable. Screws for rising fronts, tripods, &c., need not vary for ½, 10 × 8, and 12 × 10 apparatus; and the front for a ½ size might be made to slide into an adapter for a 12 × 10 camera without having a separate flange cut. For studio work, too, it is often requisite to quickly change a cabinet for *carte* lens, or *vice versâ*. With some of our modern universal cameras it is now the custom to have the lenses screwed on to square pieces of wood which slip up under a strip of brass on the camera front, and are kept in place by a tongue at the bottom. Makers might well agree among themselves on a standard size for these square blocks.

I do not know that I have seen the American camera alluded to by the Editors in the Journal of last week, in which the rackwork can be thrown out of gear when it is desired to extend or shorten the bellows; but, if I have, I forget what the pattern is. In my opinion the ordinary arrangement in front of the camera, in which two upright rods pass from the base-board up the front, and are tightened by screw nuts, would answer better if the front could always be bept square to the ground glass. When working quickly there is a risk of fixing it a little out of the square unless lines are ruled on the board.

WILLIAM COLES.

PHOSPHORESCENT TABLETS FOR SENSITOMETER PURPOSES.

A LETTER in our correspondence column is a sample of many similar queries that reach us from time to time; and, as a general feeling of the necessity in modern work for the possession of a sensitometer of some kind seems to be growing, we propose to give simple directions for the manufacture of the light tablet, which, all things considered, appears to be the most suitable form of illumination for general purposes.

We may say, first of all, that the phosphorescent tablet is not a reliable guide under all conditions, as has been fully shown in these columns. The different ratios of sensitiveness of the several haloids to its influence render its readings valueless when a plain bromide plate has to be compared with a bromo-iodide film, though it is sufficiently reliable when one kind of plate only is used. Further than this: the preparation of the violet phosphorescent sulphide is so uncertain an operation that no two batches can be guaranteed of the same actinic value; hence for standard reference purposes—except in the case of the Warnerke instrument, in the manufacture of which special care is employed to secure a sulphide of uniform value—it is hopeless for the amateur or others to attempt to form a standard.

But to proceed to the description of the manufacture of the tablet. The graduated screen we have nothing to do with, since each individual must adopt whatever form that may to him be most convenient. The phosphorescent sulphide of calcium is obtainable from most of the leading operative chemists of tolerably, though not of absolutely, uniform character, the price being about four shillings per ounce. The only other material required for the phosphorescent surface is paraffine wax, and, of course, the necessary glass. Failing other sources of supply a paraffine candle will afford the necessary vehicle for carrying the powder. One ounce of the sulphide and a similar quantity of paraffine will suffice for eight tablets of quarter-plate size, so that, although the price of the sulphide may appear high, the tablet is really not a costly article.

One plan of procedure is to weigh out the requisite quantity of sulphide and of paraffine for a quarter-plate—one drachm of each—and, having melted the paraffine over a Bunsen burner or, preferably, the water bath, the powder is stirred in so as to form a homogeneous mixture. Having previously cleaned a plate and made arrangements for laying it in a perfectly horizontal position, it is warmed and the melted mixture poured on to it. It will be noticed that the sulphide exhibits a strong tendency to subside—so much so that the mixture must be stirred up to the instant of transferring it to the glass plate, where it will again prove somewhat refractory. With a spirit lamp or Bunsen burner at hand, however, it may be coaxed over the plate by means of a warm glass rod, and when spread pretty evenly up to the corners an even layer may be produced by taking the plate in the fingers and holding it in as nearly level a position as possible over the source of heat, when a sharp, lateral movement or shake will gradually bring about the desired end. This secured, the plate is placed once more on the level and allowed to set.

A better plan—easier in execution, though not so economical unless more than a single tablet is to be prepared—is to mix the sulphide and paraffine as thickly as possible, and in larger quantity than is immediately required; the solidified mixture will keep far better in this state than will the powder. Taking a plate larger than the tablet requires a thick coating of the melted mixture is poured, the larger quantity of material rendering the coating operation far easier. The wax having been allowed to harden thoroughly the surplus may be scraped or planed off with a piece of glass, a very thin film being all that is requisite. The plate is then cut to size with a diamond, and the edges trimmed.

To finish off the tablet a piece of opal glass of the same size as the tablet is heated to a sufficient temperature to cause the wax to melt. This is pressed in contact with the layer of wax and sulphide, and the tablet then laid down on a cold, level surface. No attempt should be made to warm the tablet itself, or the wax will run in irregular lines. If the opal glass be heated to about 170° Fahr., placed in contact with the wax surface, and the whole then laid, as described, upon a cold surface, opal glass upwards, the latter will adhere to the wax without causing it to melt. All that is now required is to bind the two glasses together in the same manner as a lantern slide with strips of paper or ribbon.

Such a tablet will be found a very useful adjunct to the amateur's, or, indeed, to the professional's, laboratory. Though not forming a standard for comparison with other operators, it will be found a reliable guide for private use—at least in comparing plates of the same make one with another. It will be an easy matter, where plates of various makes are used, to establish a standard for each.

PRINTS FROM GELATINE NEGATIVES.

It would be interesting to know, now that gelatine negatives are almost universally in use, the average *quality* of prints therefrom. If every commercial printer would reply to the following queries, a good estimate might be obtained of the improvement or deterioration in the general work:—

Given (say) one hundred average negatives, is the average of good prints greater, or less, than with wet plates?

If better, in what does the improvement consist?

If worse, where is the falling off?

Can as great a number of good impressions be obtained in a specified time from gelatine negatives as from wet-plate negatives?

Do the averages differ with portrait and landscape work?

I think if the above questions are fairly answered by a number of persons representing the printing interest, the direction to which we are to look for improvement in our work would be clearly indicated.

EDWD. DUNMORE.

PHOTOGRAPHERS AND PHOTOGRAPHY IN AMERICA.

No. II.

When in Chicago I visited Mr. C. Gentilé, editor of the photographic *Eye*, also Mr. F. H. Davies, editor of the lately-defunct journal *Photography*, and underwent that much-dreaded ordeal of being interviewed. I then visited the veteran photographer, Mr. A. Hesler, 96, State-street, where I saw a fine collection of daguerreotypes, taken in 1851. Mr. Hesler, it would appear, took a number of instantaneous drop-shutter daguerreotypes half-plate size with a Harrison lens, about that period, from the deck of a steamer on the Mississippi between Galena and St. Paul. He found that by electrolysing the plates by friction he could reduce the exposures to one-fifteenth, and by further keeping the plates prepared a still greater increase in sensitiveness was attained. They were taken for *Harper's Illustrated Guide*.

My next visit was to Mr. C. D. Mosher, 125, State Street. This gentleman has a magnificently-appointed studio. He has conceived and is carrying out a grand idea of presenting a memorial offering to Chicago, consisting of cabinet photographs of great men of all countries. These are to be hermetically sealed and placed in fire-proof safes to be opened in 1976. Although the portraits are to be printed in silver, Mr. Mosher is sanguine that with the precautions named they will be in good condition in that year. Mr. Mosher has a very clever artist in his employment (Louis Marxsen) who is working on gold—that is, engraving portraits on watch domes. The gold is rendered matt, and then with a pointer he polishes the surface, which, when viewed in certain lights, looks darker than the matt portion, and in appearance very much like a daguerreotype. I suggested that the gold might be coated with platinum, nickel, or aluminium, and when engraved on the surface cut would give greater contrast.

Chicago has also a firm of stock-dealers, Messrs. Douglass and Thompson, in whose rooms the Chicago Association of Photography hold their meetings. A studio, dark room, and other conveniences are at the service of the members without charge, and I have no doubt that such liberality tends greatly to increase the popularity and business of the firm. Their stock of photographic requisites certainly are second to none in the States.

I had the pleasure of spending a very happy day and evening with Mr. and Mrs. Joshua Smith, of Chicago (of baby renown), accompanied by Mr. and Mrs. Armstrong, of Milwaukee, and Mr. Gentilé. They kindly drove us over the stock-yards; and after visiting the pigs we visited the "lions," and they are not a few. Chicago, considering it was in ruins a few years since, is the most marvellous city I have seen.

I attended a meeting of the Chicago Photographic Association, over which Dr. Garrison presides, and demonstrated a method of making emulsion. An animated discussion took place, which I have no doubt will be fully published.

My next resting-place was Rochester (the market and home of dry-plate workers), on the earnest invitation of Mr. James Inglis, who not only insisted on my being his guest while there, but allowed me to visit his factory for the production of the "insoluble dry plates." I may mention that that gentleman, like myself, has no secrets. I have carefully taken measurements and plans of his works, and these will be a subject for future publication. Suffice it to say that the arrangements are as perfect as human skill can make them. For example: several batches of ten gallons of emulsion are made at a time in the morning, coated, and in a little over two hours the plates are in the packers' hands.

I called on several other plate-makers in Rochester—notably Eastman, and my old friend, Peter Mawdsley, who is now a maker on his own account. Mr. Eastman seemed somewhat stiff with me at first, which led me to think he imagined me to be either a spy or a process-monger. I cautioned him that whatever he said would be taken down in writing, &c. He told me he would show me over all his premises except one room. Of course I immediately came to the conclusion that the room in question would be the coating-room, but this illusion was dispelled when I witnessed three girls coating somewhat slowly with the "teapot" coater. This, above all, astonished me, seeing that Mr. Eastman was the inventor of the roller coating machine. By-the-bye, rumour says that Mr. Eastman returned the £400 paid to him by an English firm for the patent coater in consideration of his being allowed to inspect the said English plate-makers' works. What the aforesaid room contains must remain a mystery to me. One thing I did learn, namely, that Mr. Eastman is very anxious to get a method of coating paper for negatives and positives. I had presented to me an interesting picture showing an exposure through a cardboard shutter, and printed on the sky of the landscape was the word "exposed." This is printed in large type on the shutter, so that when the exposures are made the shutter is reversed. Mr. Eastman is having copies of this picture sent to all the stock-dealers, to show that this form of dark slide is useless.

Rochester has also its Optical Company and Camera Manufactory (W. F. Carlton, proprietor). From floor to ceiling are piled cameras and printing-frames, but where they are all to go is the question. Every man, woman, and child will soon be their own photographers, and then where are to be the professionals? This company have in their service a very clever engineer, who showed me a coating machine, certainly a little complicated, but when finished may answer admirably. Here ended an enjoyable visit.

My next trip was to Niagara Falls. I feel certain that of all places in the world no place has been more photographed than the Falls. There are good, bad, and indifferent photographs, each representing peculiar phases. There is no doubt that the photographers on the spot have the best chance. I was not so fortunate as I would have desired. The light was hazy; yet with a very rapid shutter and plates giving 20 on Warnerke's sensitometer, lens stopped to $\frac{f}{8}$, I have secured some well-exposed views.

I was fortunate enough to drop in on a wayside photographer, Mr. Norris, who not only allowed me to change my plates, but insisted on supplying me with the materials to develope, &c. Mr. Norris makes all his own dry plates, and I saw some of fine quality, but too rapid to put into the hands of Tom, Dick, and Harry. Mr. Norris thinks of going into plate-making commercially. My advice to him was "don't!"—to let well alone and stick to a certainty, notwithstanding the extraordinary reports that Cramer, of St. Louis, had netted $650,000 (£130,000) last year at plate-making; on which, when I heard it, I remarked that we had "cram-mers" in England also.

The finest views I have seen were taken by Mr. Neilson, of the size 20×17 inches. This gentleman, although not a very good photo.-chemist, has done some grand work. He has noticed a peculiarity regarding the permanence of gelatine negatives; that is, that after printing some time they lose their sparkle—so much so, that the varnish has to be removed and intensification resorted to. I closely questioned him with the view of eliciting an explanation, but I have failed. As a matter of course I presumed intensification; but—No! Then I suggested that the negatives were yellow and that the light had bleached them. The answer to this was—that they were not yellow at first. He puts all his negatives in alum before fixing. Does the liberation of sulphur from gelatine tend to destroy the keeping quality of gelatine plates? The matter to me seems so extraordinary that I have promised to bring the subject before a London society.

My next halting-place was Toronto, Canada. There I called upon Mr. Notman's successor, Mr. Fraser. This gentleman produces fine work and has a very large studio, which I very much envied. He does not make his own plates, and those I saw developed could not be very rapid, as the light in the dark room slightly fogged some of my plates. I believe the maker of the plates used by Mr. Fraser is a townsman (Mr. Hunter). I nearly missed a gentleman—Mr. Dixon, an Englishman—who "spotted" me from his buggy, he having met me at the convention at Cincinnati.

Mr. Dixon seems to be "setting the lake on fire" (Ontario) by the amount of business he is doing, reminding me of my own heydays. The plates he uses are English make—"Britannias." Some lovely "bits" might be secured between Toronto and Montreal, through the Thousand Isles and the St. Lawrence. I fully intended exposing a dozen or two plates, but the ship was so crowded that I had no room to walk; and, moreover, the thermometer was at 95°, with a light wind blowing astern.

In Montreal I "made tracks" for my namesake, Mr. Alexander Henderson, but he was enjoying a holiday at the seaside. Mr. Notman (whom I found at home), whose name is intimately associated with composition photography, showed me some of his pictures of the Ice Palace, tobogganing, &c., which are wonderfully fine. He makes all his own dry plates, and seems to prefer slow cooking. He has presented me with several examples of his work, which I will exhibit at a meeting of the London and Provincial Photographic Association.

At Montreal I met, by appointment, Mr. and Mrs. F. York, of London. They were of the party who came out by the steamer "Parisian" to attend the meetings of the British Association. His photographs of the members and their wives, taken in mid-Atlantic, are certainly very good, and should be historical pictures. I was told that the success of the groups is largely due to the indefatigable amateur, Mr. H. Trueman Wood, Secretary of the Society of Arts, who arranged the figures.

A few "shots" at the icebergs were successes also, and I daresay Mr. York will exhibit all of them when he returns to England. He intends to stay about a year in the States, and is going to the far west to take negatives for lantern transparencies.

I have not said anything about the meetings of the British Association, as nothing of interest to photographers took place.

My next halting-places were Saratoga, Albany, and New York. At the latter city I saw Mr. Sarony. He seems to have lost some of his vivacity. "Old Father Time" is also beginning to leave his mark on him as well as on the writer. I did not notice any falling off in the quality of his work. He is a great advertiser. At nearly all the hotels I visited large, handsomely-bound albums containing photographs by Sarony are placed on the tables.

The Americans are much more pushing than the English. At Mr. Rockwood's, of Union-square, I saw a number of *souvenir* photographs being finished to distribute gratuitously to all the ladies who might witness the one hundred and fiftieth representation of a certain play. Mr. Rockwood had an order for 1,500 of these *souvenirs*, and only about ten days in which to finish the whole. They are two cabinet photographs bound together. A large number of photographs of the steamship "America" were being finished, also, which were originally got up on speculation, and which have turned out successes. Mr. Rockwood has more than "one string to his bow;" he is a publisher of views and a commercial plate-maker.

I did not call upon any other photographers in New York.

The heat was so excessive (98° in the shade) that it was with difficulty I managed to exist. In spite of this state of things I attended a meeting of the New York Society of Amateurs, where I had the pleasure of meeting a great many gentlemen whom I had often heard and read of, and who gave me a hearty welcome, electing me an honorary member of the Association. A very animated discussion took place on cold emulsification (precipitated). Thus ended a most enjoyable tour. If I have omitted to give credit to whom credit is due it must be taken as a "sin of omission," for I have got dreadfully "mixed."

A. L. HENDERSON.

TOURISTS' CAMERAS.

I HAVE read with much interest the series of articles on this subject which have appeared in the Journal during the last few weeks.

Mr. W. H. Harrison begins by complaining of the time the camera takes to put up. On this point I surprised myself the other day by the shortness of the time between two exposures. We were walking up the River Almond from the small village of Cramond at its foot, and I find entered on my camera:—"Old Spade Mill, $\frac{f}{33}$, 11.30, light B, 17 seconds;" and next—"Old Iron Works, $\frac{f}{44}$, 11.45, light B, 25 seconds."* That is to say, a quarter of an hour—or, speaking loosely, twenty minutes—from exposure to exposure.

Now considering that I was not timing myself, that I had to cross the river (which ended in wading), and that the Spade Mill and Ironworks, as I find from referring to the map, are about a quarter of a mile apart, I think this shows pretty good time. In fact, I remember mentioning it as sharp work to my friend when I noticed it after exposing the second plate.

The camera which I was using was a 9×7, of French make, having a plate-box underneath. It exends to nineteen inches, and when closed measures $5 \times 17'' \times 11''$—plate-box, holding one dozen plates, included.

I use a light case similar to that which Mr. Andrew Pringle described in one of his articles. My stand is one of the folding pattern, which I simply strap together, and find very useful as a walking-stick or alpenstock. I use the lens mount which Mr. Pringle described in his first article, and find that it works admirably—no loss of either temper or time, and, above all, no fear of letting the lens drop out of your fingers while trying to catch the thread of the screw.

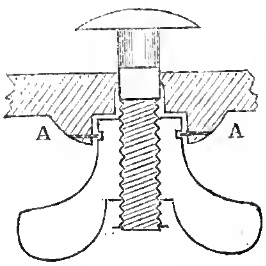
With regard to this I see that Mr. George Smith suggests that there should be three studs instead of two. I thought of that in designing it, but deemed the advantage gained was out-balanced by the increased difficulty in fitting.

The only difficulty I find in rigging up the camera is the screw for fixing it on the head. I always put an extra one in my pocket since the spring, when I lost one and was left high and dry. It sometimes comes in useful. I know I worked away with one and could not get it to catch. Of course I lost my temper with it, and at every trial was less likely to succeed than the one before; so

* We believe that Mr. Gifford means by "light B" a good diffused light, but not of the very best quality, which would be represented by "A."—EDS.

I took it out and tried the other, and hit it at the first trial. I imagined that I had cooled down in getting it out of my pocket. I should say that that screw was responsible for a "power" of language!

I think this screw should be banished as soon as possible, and I should propose to put in its place something of this description:—



On the foot of the camera a brass plate is screwed with a slot cut in it, similar to the slot cut in a soldier's "button-stick." On the head is fixed something of this description:—A brass button having a shank rounded for about a-quarter of an inch, then square for about the same distance, and below that a screw having about three-eighths of an inch pitch. This passes through a square hole in the head (fitting the square part on the shank), which widens out so as to embrace a thumb-nut. This thumb-nut has a groove cut round it near the top, so that small pins, A A, may be inserted in the head to prevent it from falling down. A pin is passed through the button shank on the lower side of the nut, which prevents the nut from getting unscrewed too far.

The camera is placed on the head with a motion similar to that by which buttons are put on a "button-stick," which brings the button head behind the brass plate. Then, when you get your camera pointing in the proper direction, give the thumb-nut a turn, and the whole thing is clamped and fast. H. J. GIFFORD.

P.S.—I notice that in your last issue (26th ult.) Mr. Smith proposes this contrivance for fixing the camera on the stand.—H. J. G.

BLEACHING OF RUBY PAPER.

AT the present time, when manufacturers of dry plates are competing with each other in the production of films of the utmost sensitiveness and capable of reproducing the most instantaneous effects, fog on development is still a common complaint, in spite of every care in manipulation, and notwithstanding the apparent safety of the double thickness of ruby paper which protects the windows of the dark room.

Certain observations have lately led me to believe that in some cases the ruby paper, although perfectly non-actinic in the first instance, may in course of time undergo sufficient change to render it doubtful whether it can any longer be considered safe. Colours of all kinds are extremely susceptible of change under the influence of light and air, and bleaching is almost certain to take place in proportion to the intensity of the light to which the colouring matter may be exposed.

I have tested the permanency of the colouring matter of ruby paper by exposing a small quantity for two years in a window, and comparing it afterwards with a portion which had previously been cut from it, and kept in darkness during the whole time. Scarcely any appreciable difference could be detected, and the inference might be drawn that ruby paper, in a dry state, is *per se* unacted upon by light to any serious extent.

It must be remembered, however, that it is the usual custom to make the ruby paper more transparent by oiling it. It is also not uncommon to find that either gum, starch, or some other adhesive substance is used for pasting the paper on to the window. Lastly, windows are liable to be not perfectly free from damp, especially if wind and rain have free access to the imperfectly-fitting joints. Usually, therefore, there are present all the conditions necessary for promoting rapid alteration of the colouring matter, namely, light, moisture, and the presence of decomposing organic matter. Oils are especially liable to oxidation and change, and the presence of this agent, in intimate contact with the particles of colouring matter, may exert a powerful influence in its decomposition.

Whether or not the above agencies do promote bleaching of the ruby colour, I have lately had occasion to examine a window which, two years ago, was safely covered with the usual ruby paper of commerce. This paper has now scarcely a particle of its original colour remaining, the whole having been changed to a light canary-yellow, with the exception of small portions which happened to be screened somewhat from the light.

Fortunately for the success of the photographic operations in this room a second thickness of paper had been placed loosely over the window, and the defect beneath was only noticed by the accidental removal of this second covering. Had it not been for this precaution there would, doubtless, have been a time (the bleaching of the paper being perhaps as yet only in an incipient stage, not to be detected by the eye) when the quality of the light transmitted would be no longer safe, and a most mysterious source of fogging would ensue. Those, therefore, who have not examined the condition of their windows for some considerable time would do well to see if the colour of their paper has faded to any extent, in order that the necessary steps may be taken before any serious mischief results. It is, of course, chiefly to workers with plates of the highest degree of sensitiveness that these remarks apply; but many of these avoid this source of failure through developing only by artificial light—a far safer plan than the most perfectly-constructed window. But, if a window must be used, probably the stained glass will prove a more satisfactory material to deal with than oiled paper; for, although most specimens of glass are influenced by light, the result is in most cases an acquisition of colour rather than bleaching. J. VINCENT ELSDEN, B.Sc.

THE CAMERA OF THE FUTURE.

ANY philosophical apparatus maker or other adept in the manufacture of instruments of precision who may carefully read the utterances made in these pages during the last two months or thereabouts, since I started the discussion, will find ample materials in the shape of ideas to aid him in designing the tourists' camera of the future. The following are a few of the leading points which demand attention.

The primary fault at present is the excessive waste of the time of the users of the existing cameras in unpacking, fixing, and adjusting them; then in unfixing and packing them away again over each view. Whenever I read in the journals of new tourists' cameras I feel no interest whatever in the descriptions except where they relate to the saving of the time of the user over mere mechanical operations, for that is the chief thing lacking. It would be a good thing if every camera-maker who presents himself before a photographic society with a new instrument were to be invited to go through the following operations with it himself there and then, subject to being timed by the watches of the observers:—

CAMERA-MAKERS' DRILL.

1. To stand at "attention," with his camera in one hand and the legs in the other, carried packed in their cases or straps as when travelling. [*Time taken by observers.*]
2. To unlimber and fix camera on stand in position for taking a view.
3. To extend camera to its full length.
4. To get two lenses in succession in position on the camera front.
5. To take apparatus, lenses, and stand down again, pack them up in their straps or cases, and stand again at "attention" as when prepared for travelling. [*Time again taken by observers.*]

Probably very few makers with their own instruments in their hands, if asked to perform these operations before a photographic society, will get through the drill in less than seven or ten minutes, and in some cases the time may be longer, representing a dead loss of an hour or an hour and a-half over the exposure of but six plates; and all this time consumed in connection with mere mechanical operations of not the slightest educational or other benefit to the user of the camera.

Two points will present themselves to the camera-maker of the future, by attention to which time can chiefly be economised. Firstly, that the camera shall be ready for use inside its case, with one lens already in position, so that all is as nearly as possible ready for work when it is fixed on the stand. Secondly, that some device is necessary for rapidly changing the lenses. Mr. Pringle's plan seems to be very valuable in this respect; also the plan of having the lenses on a rotating disc, as described some months ago by the Editors. Attention to the merits of these two points only will go far towards solving the whole difficulty of the present waste of time, incurred chiefly in fixing and adjusting the camera, unfixing the same, and fixing and changing the lenses. A man might make it a special branch of business to adapt Mr. Pringle's apparatus to cameras of the past sent for the purpose; for the box cameras of the future, the rotating disc front seems to be best for bringing the lenses into position with expedition.

Next to the question of time, that of the nature of the case of the camera is of importance to the tourist. Most makers, perhaps, now sell their cameras without cases, and the purchaser at once finds that he must either put them in some kind of bag or thin satchel, or in a proper case possessing more rigidity, and that to get the latter specially made adds considerably to the cost of the camera. The latter and more expensive plan is necessary to the practical tourist who carries his apparatus about for many months at a stretch. The friction and strain upon the parts of a camera carried in a loose bag may not be of practical importance to a photographic dweller in towns who uses his apparatus out of doors only once a week, or less frequently. With a tourist on regular travel the conditions are different; and he also has the aggravation of knowing that, with more intelligently-made apparatus, portions of the case might have been made to serve the purpose of portions of the camera, thereby economising weight. The camera-maker who sells his apparatus in a case will always have a great advantage over the one who does not, because he will be able to point out to the purchaser that he is relieved from the expense of having a rigid case specially constructed. Home-made devices of cardboard, as sometimes recommended for cheapness and lightness, are useless for prolonged work and real travel; the outside of the case must in such instance be of good leather, or some thoroughly serviceable stuff which will stand long wear and tear, and keep out rain and dust. A lock is also absolutely necessary to keep out unauthorised fingers; otherwise the tourist is never happy in mind after the apparatus has been out of his care for half-an-hour, and consequently he clings to it for the whole day as tenaciously as the grand old man of the sea clung to Sinbad the sailor.

At Zurich I had a special case made of the best white leather, with compartments inside lined with soft material; thus each slide, the camera, the stand-head, and so on has a special compartment, in which it is gently held without friction when travelling. To get stiffness without much weight the skeleton of the case was built up of pasteboard by a bookbinder, and was lined by him; the leather work as well as a good lock was then added by a saddler. The cost of this case was thirty shillings. Those who understand leather work tell me it would have cost at least two pounds in England, which is a difference to be expected considering the relative ruling prices.

The minor objection on the score of dust to the use of a tied or strapped bag rather than a case tells with greater force during tourists' work abroad than during work in the exceptionally humid climate of England. Captain Abney spoke of this in relation to certain roads in Switzerland, and named an excellent and simple palliative, namely, to rub glycerine over the grooves and movable parts of the slides, let it soak in a little, and then wipe it off superficially with a cloth. The grooves afterwards trap the fine, penetrating dust, which would otherwise reach the plates. Another palliative is due to the fact that in those parts the people have an extraordinary superstition that Switzerland belongs to the Swiss, so will not allow private individuals to fence off portions of land to any great extent. As a general rule, the tourist can leave the dusty roads, when they do not border a precipice, and can go right ahead through field and fen and forest, and over mountain and moor, without any let or hindrance being in that case made and provided. Notwithstanding, moreover and nevertheless, the understanding is that on cultivated lands the traveller must not walk over growing crops, but keep to the footpaths; if he damage the crops he is liable to a fine. To save delay and trouble over litigation in a country in which judges on circuit are paid a few shillings a day for their services, the amount of the fine is sometimes painted upon a board on a post at the entrance to the field. For instance, in the Alpine valley of Andermat are notices in some of the fields that anyone trespassing is liable to a fine of sevenpence-halfpenny, or whatever the amount may be. If a Briton choose, nevertheless, to walk on the owner's crops he can pay the latter sevenpence-halfpenny on the spot, and the matter is amicably settled without adjournment to a police court. This freedom of traversing the land in all directions is a great boon to the photographic tourist. Strange people are these Swiss! If a photographer build a studio on another man's land, under a lease from the latter, the Swiss actually think that the studio belongs to the photographer who built and paid for it, and he is allowed to take it away at the end of his lease, just as if he had a moral right to its possession. Photographic studios and temporary builders' sheds are sometimes erected on land held under a few years' tenancy; but a substantial dwelling is never erected on another man's land—at least in those parts of Switzerland I have traversed. If a man did build a house in that way, the pitying populace would probably touch their foreheads significantly as he passed, and recommend his friends to look after him; but then, it must be remembered, the Swiss are such an eccentric people! More English photographers should go there to get these notions out of their heads, and to teach them the blessings of a greater freedom and a higher civilisation. The natives would probably feel interested in being shown photographs of streets of jerry buildings in the act of falling down at the end of a lease. Such pictures would, no doubt, make them open their eyes. The amateur British missionary might also take out with him some beads, paints, bits of looking-glass, and remnants of coloured cloth to barter with the simple aborigines.

To return from this digression: has anyone ever considered whether in tourists' cameras metal cannot be in some parts substituted for wood with advantage? The claim is already sometimes made that metallic slides are better than wooden ones, more especially in the matter of economising space. What are the merits of such slides as compared with those made of paper across the Atlantic? and where in London can the American paper slides be seen? When engineers want strength and lightness they use angle or tubular iron and lattice work. What would be the merits and demerits of a camera case with its skeleton built up of angle-bars of steel more rigid than those of umbrellas, and of uniting the longer bars by means of light steel lattice work, then covering the skeleton framework with thin cork, like that used for hats, with a final outer coating of good leather? To what extent can aluminium be advantageously used in tourists' cameras, now that an easier method of soldering it has been discovered? These questions are merely put to elicit information upon a subject on which I possess none, and a philosophical instrument maker would be the person to answer them. A saddler would argue that there is nothing like leather, and a cabinet-maker that there is nothing like wood; a maker of scientific instruments of precision might be allowed to have his say in the matter. It is to be hoped that those manufacturers, of whatever class, who intend to do anything to meet the public want, will make a close study of every suggestion made by writers within the last two months, to see how nearly they can incorporate in one camera everything that is really good. Attention to little points, small in themselves, may prove a great boon in the aggregate. A few fractions of an ounce saved here and there in the weights of parts, without sacrificing efficiency, might as a whole prove a substantial benefit.

Sooner or later, though the time may not be yet, the parts of model cameras will be turned out in great part by machinery, and then fitted together by hand. The most successful men of commerce in England and America are those who have spent much in thought and in money in the erection of machinery before commencing the actual manufacture of their goods. This principle can be acted upon also by makers in a small way. I know one ingenious man who, when orders are slack, employs his men in making new labour-saving tools devised by himself to expedite the future manufacture of his goods, so that when a run of new orders comes in the speed with which he executes them astonishes his competitors. His profits are also necessarily higher.

To steady a tourist's camera in a high wind, a mackintosh bag to hold some stones should have one of those spring links which fasten chains to dogs' collars fixed at the end of its string, so that it can be sprung in an instant into the hole in the camera screw. This will save time and trouble in tying and untying, and the annoyance sometimes caused by bad knots. An exceedingly large piece of mackintosh will fold into remarkably small space; it is also light-tight, and so is the best stuff in the world for a focussing-cloth. It also serves as a temporary table-cloth at hotels, where it is not desirable to damage the furniture with spilt chemicals. In Scotland it is considered partisanship to have much to do with mackintosh. Who has not heard of the photographer who returned to his compartment in a train on the Highland railway, saying "Did I leave a black mackintosh here?" The reply from the assembled "chiels" was—"Nae. We're a' Red Macgregors!"

Mr. George Smith, in his article some weeks ago, misquoted me several times, and then proceeded to overthrow the statements he had put into my mouth. Among the instances I remember are that he stated, either in substance or by implication, that I had said that my camera took ten minutes and upwards to fix; that I recommended that a camera which would extend to three times the length of its plate should have a gigantic case, inside which to carry it while so extended; and that I had said that the use of a spirit level on the camera was desirable when the straight line of a building was in sight in a mountainous landscape.

W. H. Harrison.

REDUCING THE DENSITY OF NEGATIVES, AND THEIR IMPROVEMENT.

There have been a very great many methods put forward for the reduction of intensity in gelatine negatives since their introduction; but, so far as I can learn, I don't think any of them have been of much use, being too risky, especially with negatives of any great value. In the most experienced hands, at times, a negative will, when finished, prove a little too intense, and when this does occur it is a good thing to be able to reduce the density, without having a shadow of a doubt in one's mind as to the spoiling of it.

It will be remembered that some twelve months since I wrote an article in these pages upon the intensification of gelatine negatives, and by the numerous letters that I have received it has been of great service to many—at any rate it has to myself. If I had been able to put this part of the question forward with the intensification portion it would have been complete as a whole, and not in parts like the franchise bill and redistribution; but in scientific matters inventions follow one another, and we must be content to take them in that way, and read them together whenever they do come. Not only is it very convenient to have a reliable method of reducing negatives, but it is also good to have a method of improving them in certain parts—not on the retouching system, which has been overdone in portraiture. For myself I would sooner have a lithographic portrait than many of the photographic portraits of the present day. I am well aware that photography pure and simple, in many instances, is not true to nature by any means, especially in rendering gradations of colour. I hold it to be perfectly legitimate to make up for such shortcoming, *and no more*, so as to get as near to nature as possible without being untruthful, and I fully believe that artists will agree with me on this point. In landscape photography there is very little retouching done, for in this instance the subject never finds fault.

It will be remembered that some long time since Holmes's ozone bleach was introduced for reducing the intensity of negatives. In my hands it was of service with certain emulsions made from moderately-soft gelatines, but with harder samples it was of no use whatever. Then, again, the risk was great; but I have seen some good effects produced by its use, and, on the other hand, I have seen negatives utterly spoiled by it. Another method was reduction by means of a dilute solution of hydrochloric acid, and another with iodine in solution, followed by either hyposulphite of soda solution or weak cyanide, or cyanide solution alone. Chloride of copper has also been used, followed by hypo., &c.

All these, as will be seen, acted generally over the whole image except the Holmes's ozone bleach, which could be applied locally. I have given up these for a considerable period, and have contented myself with altering the colour of the negative as much as possible, making it of a grey colour by using a strong solution of alum and citric acid, and leaving the negative in the solution for hours sometimes.

Some months since there was published in these pages a small paragraph on the use of methylated spirit for the reduction of negatives. As I have not heard any comments upon it I suppose it was too small to be noticed, so it was overlooked. When reading it it brought to my mind that a few months before I had some negatives lying on the table, and was pouring some methylated spirit from one bottle to another, when the bottle slipped and sent some splashes of spirit over the negatives. I instantly took up one of the negatives and rubbed it over with a clean duster until it was dry; but I spoiled the negative by making it thin in the part where the spirit had been.

Not wanting the negative it was put on one side, and I never thought any more about it until I saw the small paragraph before alluded to. I then at once set to work on some old and useless negatives to see what could be done with methylated spirit (?) and if it was of any value, when I soon found it was of very great service. I discovered that I could with ease reduce the intensity all over the negative, if required, without the slightest risk.

I went to work in this way:—I took an old worn-out cambric pocket handkerchief, wetted it with strong methylated spirit, and began rubbing it all over the negatives, rubbing briskly. I found there was not the slightest fear of damaging the film, unless there was any grit on the rubber. After a little time I found the white cambric was covered with black, like fine blacklead, and as this gradually came away the intensity became reduced, and by continuing I found the image could be rubbed nearly all away. I then tried reducing the intense parts of a negative and experienced no difficulty whatever, and the beauty of it was that I found it came away so gradually that there was no risk of spoiling a good negative. As these experiments proved so successful I now use methylated spirit, whenever I require it, with perfect confidence.

In using the spirit I need not say that the negative should be perfectly dry, and the spirit must be strong. The strength of methylated spirit, as sold, is about ·825 or ·830 sp.gr.

In portraiture this method has its uses. Very often the lighting may not be quite perfect, the light being rather too strong on one side of the face, which throws the other side too much in shadow; but by reducing the intensity matters are greatly improved. As regards the backgrounds a very great deal may be done. A plain background that prints too light can be reduced by the same means, and not only reduced but graduated to suit the subject, which very much enhances the picture.

In many figure studies certain parts of the picture are roughly masked, while other parts are exposed to the light. Instead of having this to do with every print, there is no reason why it should not be done on the negative once and for all, as it can be done with such certainty. There are also other classes of subjects worth mentioning, namely, ladies in white or very light dress, in either satin or silk. These materials, when properly photographed, are very beautiful; but at times the development has to be carried on to such an extent as to entirely bury the beautiful details and gradations, on account of the face, which makes the dress print too high in tone, and makes the face appear dirty. All this is remediable in the way described. Another defect is the drawing in collars, &c., of white lace, which can also be reduced by rubbing with the spirit. The dress can also be manipulated to secure a truthful effect.

All this I own to be perfectly legitimate, if truth is to be aimed at, and we have a perfect right to use any means in our power to give the correct rendering of any subject. Photographs, as we all know, are pictures or representations in monochrome, the shadows and half-tones forming by far the greatest part of the picture, and the high lights (or the parts rendered by the pure white of the paper) a very small part indeed. If we take, for comparison, a water-colour drawing, place it beside a good photograph, and examine them both closely we shall find that the paper on which the picture has been painted has, before commencing, been toned down to cover the white paper, and the extreme high lights, which are probably just small points, have been scraped out with the knife, or sometimes (but very seldom) they are made of pure white pigment. In the photograph we find much more white paper in comparison than we have in the water-colour drawing. This white does not exist in nature to such an extent, and with skill can be modified to represent nature better.

Again we go to nature. Take (say) a landscape, and we find little of pure white. If we wish to represent nature truthfully it is only the *extreme* high lights must be pure, and if this be done the lights are like diamonds of the first water in a rich setting, and give great brilliancy to the whole. In a photographic landscape, say, for sake of illustration: with some broken ground there is some yellow sand, or nearly white, showing when photographed. This will show dead white, and no one could say, taking gradation of tone, that if left so it would be true to nature—not only true, but would spoil the picture. Such a blemish can be overcome and made more perfect by the means that I have here named. I have seen hundreds and thousands of photographs that would have been greatly improved, and in some cases made works of art, if a little knowledge, skill, and taste had been brought to bear on them in their production. But with many—and it always will be so—the camera is only a machine, and will only produce crude, mechanical representations perfectly meaningless in themselves, and painful to a cultured mind and taste to look upon; therefore nothing should be left undone to get the most faithful representation of nature.

Wm. Brooks.

ON THE TREATMENT OF HUSNIK'S PHOTOLITHOGRAPHIC TRANSFER PAPER.*

Blackening of the Print.

For this may be used a fatty transfer ink which I prepare commercially, dissolved in oil of turpentine; or anyone may prepare such an ink for himself from ordinary lithographic transfer ink by adding to eight parts of that ink one part of wax, melting them by heat, mixing them well, and then thinning with rectified oil of turpentine until a cold sample is of the consistency of syrup. This solution is then poured into stoppered bottles and closed. It must, however, be borne in mind that such dissolved ink changes with keeping, and must be well stirred with a brush each time before being used (the brush being left sticking in a bottle during the time it is in use, and having been inserted when the bottle was opened), because, though the fatty ink remains perfectly dissolved in the turpentine, the wax is insoluble; so that if the upper part of the solution be always poured off there would at last remain nothing but wax at the bottom, and then the colour would become so hard that it would no longer allow itself to be transferred to either zinc or stone. In such a case add five to ten drops of olive oil to the residue of the ink; that should make it work well again.

It is necessary to use as solid an ink as possible; hence the addition of wax to harden it, as the harder the ink the sharper the impression. Too fatty and soft an ink becomes squeezed out under pressure and gives thick lines and black shadows; but if there be too little of the grease then the colour is not transferred at all, but remains on the print.

Stone requires a much greasier ink than zinc, because, though an ink may allow itself to be transferred to stone, yet if it be not fatty enough the stone cannot absorb any fat from it and the transfer cannot bear to be etched. A very fatty ink must therefore be used for stone, and it is obtained by the addition of more olive oil. We have to do with a different state of matters when zinc is used. Here nothing sinks into the metal, and, therefore, wax or varnish is sufficient of itself to protect the metal from the action of acid, so that a harder, waxier ink may be used. The print to be transferred is laid flat upon a zinc or glass plate and coated with ink, the drops of ink lifted out of the bottle and placed by the brush on the print being spread by means of a tuft of cotton wool—first by equal strokes in all directions, and smoothed down until there is only a mere film of the ink remaining over the print. The ink so distributed is left exposed to the air for a

* Concluded from page 585.

few minutes to allow the turpentine to evaporate. The print is next laid in a zinc trough partly filled with cold water. In half-an-hour the picture may be developed, but the development can be postponed, if so desired, by leaving the print lying in the water for a few days.

The development of the picture depends most upon the proper exposures of the print. After the print has soaked about half-an-hour—completely covered on both sides and at all parts by water, yet free from air-bubbles—then the colour may be wiped off the whites by gentle rubbing with a sponge, so that the design alone retains the ink. The developing tray is then placed so that one end is canted up until the bottom of the upper end is no longer covered with water, and the print laid upon this raised end. The surface of the raised end is then rubbed with a sponge with a circular motion, until the whites are quite freed from all dirtiness and the shadows appear quite open.

If the print be over-exposed the shadows remain closed, all the lines appear broader, and the background will not easily part with the colour. The last-mentioned behaviour also occurs with weak negatives. If the paper had been sensitised for three or four days, or if light had had access to it, the colour would in these cases also not readily leave the whites. If the paper was under-exposed the colour would be more easily removed, but the finest lines and dots would also be washed off along with it.

Only prints that have been pretty correctly exposed can be perfectly and faultlessly developed; still the limits lie pretty far asunder, especially in the case of good negatives, which may be considerably over-printed without the picture becoming too black. The kind of tissue used also makes a difference both to the development and the printing. Too soft a gelatine or a thicker film requires long printing; too hard a gelatine or a thin film requires a short exposure. It has been proposed to add a little alum to the gelatine to render the tissue harder and less sticky; but I found that this addition gave rise to many difficulties in the development, and that the print was more injured by the greater pressure which had to be exerted on the sponge to remove the colour than when the latter could be wiped off without any particular pressure. As the swollen-up print forms a relief, so that the design appears sunk (in intaglio), each line and all the five dots are better protected than when one has to rub hard until the ground of each line is reached. Care should be taken to use cold water always, even in summer, as warm water not only dissolves the gelatine but renders the ink also soluble and smeary. Almost any water may be used if it do not contain too much iron.

Prints so developed should be well rinsed with clean water in order to remove all fatty ink that may be merely adherent, and then they should be laid upon clean blotting-paper. One print after another is placed alongside of each other and covered with clean blotting-paper. Then the paper is all smoothed and pressed out in every part by the palm of the hand in order to bring it in contact everywhere with the print, and so dry up all adherent water. The prints are then placed near a stove, which must be heated all day, so that the drying may be thoroughly completed.

If one, however, desire to transfer at once and cannot spare time to let the print dry thoroughly, it must be previously laid for two or three minutes in a solution of one part of alum to fifty parts of water. This bath hardens the gelatine, so that it cannot adhere so firmly to the gelatine, and is not so easily crushed when being transferred. Yet the gelatine should not be too hard; otherwise it will not stick to the zinc, which causes the impression to appear double.

It is best, however, to allow the prints to become quite dry, as then they are simply laid against any window and exposed for half-an-hour or longer to the light, which also causes the gelatine to harden. In spite of the washing there still remains a trace of chrome salt, which is only just sufficient to produce the necessary hardness in the light parts of the picture. If there be no longer any light at one's disposal the print must be placed in the above alum bath, and then, after being sufficiently dried with blotting-paper, transferred.

The dried prints only keep about two days, after which the ink dries in and can no longer be transferred. If it be desired to keep the print longer in a state fit for transference it must be allowed to lie in water, or the ink must be adapted to that purpose by adding from six to ten drops of olive oil to a bottleful of ink. This is very often useful, especially when the prints have to be sent to another place to be transferred. To send them: place a sheet of tissue paper upon each print, then roll all the prints together and place them in a cylinder made of strong pasteboard.

I used to prepare a tissue, to the gelatine of which alum was already added, so doing away with the subsequent alum bath or exposure to light of the print after development. But, as the results obtained with the more adhesive gelatine were much better, and as they were also much more easily developed, the tissue is now only prepared with the purest extra-white gelatine and the hardening only takes place when the print is ready to be transferred to zinc.

The Transference.

If the print is to be transferred to stone it then requires to be hardened neither by alum nor by exposure, as it must be sticky, otherwise it will not adhere to the stone. The stone is moist, and a hard gelatine will not adhere to it. Except in this particular case the transference to stone and to zinc are alike, and the same lithographic press may be used for both, or an autographic roller press may be used for the zinc plate.

The print is laid, with the picture side down, upon clean paper, and the back of it moistened and smoothed with the sponge until the tissue has become soft and supple and the front appears somewhat sticky. The print is then laid upon the zinc or stone and a sheet of paper laid over it, after which they are passed through the press under a slight pressure, which is gradually increased, the plate or stone bearing the print and its protecting paper being passed through it after each increase of pressure. Then the back of the print is moistened again, and one recommences passing it through the press—with a slight pressure at first and gradually increasing the pressure. Then the print is again moistened and drawn off from the support, when all the ink should have been transferred from the paper to the zinc plate or stone, so that the drawing appears perfect upon the latter. The design is then strengthened and gummed as usual—an operation which is generally left to a professional.

If the pressure be much too great then the gelatine would be crushed, and it is on that account that some practical men prefer but slightly gelatinised tissue. Others, again, favour that containing a great deal of gelatine, because it has a flatter surface and should give finer results. A medium thickness of film is, however, best, as the surface may be made as smooth as one can wish by burnishing before printing.

Every new process or method requires experience before one can obtain perfect results, and the short step from what is good to what is best is often more difficult than the long road that leads to mediocrity. Here I have collected the result of all the experience I have gained during a ten-years' use of photolithographic paper, so that anyone may use it with confidence, and work so as to obtain the best results.

—*Notizen.* J. Husnik.

WHERE TO GO WITH THE CAMERA.

[It is hoped that this series of articles will be continued at regular and frequent intervals during the vacation months, and we shall be glad to receive contributions to the series from any friends able to treat of new and interesting ground.]

CYCLING AND PHOTOGRAPHY IN CHESHIRE.

As we are now approaching the end of the summer, and have only a few remaining days to air our favourite hobby, a short description of a "wheel run" in search of autumn "bits," taken about this time last year, may be of some guidance to other photographic "wheelmen," or the photographic pedestrian (the latter, of course, would be unable to cover the distance the day's run embraces).

Leaving Chester about eight in the morning on our tricycles, with bags well stocked with camera slides and portable tripod, we made our way through Hoole to Tarvin, where a couple of plates were exposed, including the main street of the village and the church—an old edifice dedicated to St. Andrew. Tarvin was the scene of numerous skirmishes during the civil wars between the royalists and parliamentary troops.

Our next halt was at Delamere Forest, where, leaving our machines at a cottage, we enjoyed a quiet ramble through the woods, here and there transferring to our slides many a gnarled trunk and "bit" of underwood. How we longed for photography in colours! The varied tints of russet brown, yellow, and purple, contrasted with the dark green shades among the trees, the long vista down the open pads, with rabbits skipping about in the sunshine—all combined to make us long for an entire day for this beautiful spot at least.

Remounting our "steeds" we ran on to Tabley, where we dined at a wayside inn. We called at Holford Hall, the ancient seat of the Cholmondeley's, now a farm house—a specimen in fair preservation of a timber and plaster house. One side projects over the courtyard and rests on wooden pillars. This house is a favourite with artists from Manchester, as we were informed by the farmer's good lady. The hall is a short distance to the right of the high road, almost level with Plumley Station. At Tabley we paid a visit to the old hall, the remains of another timbered mansion, situated on an island on the Mere. It contains some ancient oak furniture, wainscotting, pictures, &c.

Leaving Tabley Park, and being directed on our way by a friendly gamekeeper, we reached the gates of Tatton Park, the seat of Lord Egerton. Turning sharp to the left ran through Rostherne village to the church gates. Here, leaving our machines, we went down a steep incline to the margin of the Mere—a beautiful sheet of water. Just below the church is the fisherman's boat-house. Looking to the left is a beautiful view. In the foreground are rushes and reeds, with a row of pailings running out into the water and overhanging trees; in the middle distance a boat-house thatched with rushes, a small landing jetty of piles driven into the bed of the lake, and a few yards from this is a sailing boat moored to a buoy. In the distance the rising ground on the far bank is well wooded and almost gives an impression of distant hills. Occasionally there are a pair of swans sailing about, and the fisherman setting his nets from a broad, flat-bottomed punt. Turning round and facing up the brae is the venerable church surrounded with lofty trees, the *beau-idéal* of a sequestered country church. Ascending from the lake and mounting a few steps, we are in the churchyard. To our right is a genuine old Lychgate—a picture in itself. The best view of this is obtained by passing through the gate, down the steps leading into the lane, and facing about with the church in the background. Of the church itself, the best view, in our opinion, was from the east end outside the churchyard on the rising ground. The interior is plain and old-fashioned, the only object of interest being an ancient stone coffin, carved on the lid of which is a knight recumbent with crossed arms, sword at his side, and his feet resting on a dog. The Egerton chapel at the south side of the chancel contains a monument, by Westmacott, to Charlotte Beatrix Egerton, who died at the early age of twenty-one years. The inscription was as follows:—

"Softly she slept in that last hour;
God's angel hovered nigh;
He raised with love that fragile flower
To wake in bliss on high."

There was nothing of further interest in the village; so leaving this we pushed on to the Tatton Gates again, turning to the left to Ashley Mill—another spot favoured by painters, &c., situate on the banks of the river Bollin, and now in ruins, the business of the mill having been removed to Broadheath. The bridge across the river, with the overhanging trees and moss-grown roof, form a pleasing picture. We noticed, just at about a-quarter of a mile before reaching the mill, a timbered barn covered with a Virginian creeper. The brown and red leaves, with the moss-and-lichen covered woodwork, would be well worthy of a plate.

The day being now well advanced we "made tracks" for Broadheath Station and took train to Liverpool, after passing some of the most picturesque localities in Cheshire. We had intended a visit to Dunham Park, with its haunted mill and beautiful lake, but our time was limited, and having covered about forty odd miles and exposed nearly two dozen plates we were fain to say "enough!" KENNETH BEAN.

HERNE BAY.

It will be generally conceded that all the old frowning castles (and it will be interesting to learn at what stage of their development the "frown" was evolved), all the old bridges which span the still older rivers, all the old cathedrals, stately mansions, and village churches have been duly photographed from every point of view by every conceivable lens by amateur and professional talent all over the country, so that the question "Where to Go with the Camera," if new views are the object, becomes almost as much of a puzzle as the *pons asinorum* was to the baronet of B.K. when he suggested its possible location in the island of the saints. Most of us, even when we take a photographic holiday, would prefer a slight *honorarium* as the reward of merit, and Windsor from the Clewer Meadows, Tintern Abbey, or Conway Castle are not likely to possess the claim of novelty; so suppose we go out of the beaten track, and try Herne Bay.

There comes another question—Why do the Kentish maidens invariably designate this place as "*the Bay?*" Is it because its conformation so slightly resembles a bay, or is it that their travels are so little extended they know no other bay save that of Herne? Anyhow we are in search of the picturesque, and so turn our back sharply on the stormy beach and the soft ooze which does duty for "sands," where the same nurse girls sit poring over the pages of the same cheap novels day after day, while the same bare-legged children paddle at the water's edge, and the same young men in the same light tweeds smoke the same cheap cigars, and the same fathers of families lounge through the hours engaged in the intellectual pastime of throwing pebbles in the sea.

There are no noted public buildings in "the Bay." Its architecture is at an extremely low ebb, best described as local,—*n'importe*. Ramble along the main Canterbury road, and a few yards past the cemetery on the right is a small wicket gate which, passed through, only requires a suitable figure or figures to tell its story. The trees, either at the fall of the leaf or in early spring, and the rich undergrowth are all at hand to make a perfect picture. On the other side of the main road, and opposite this gate, is a shady pool, with a background of fine old trees—the very spot where a thirsty soul would lie on the ground and slake his thirst, or where the village children after school would swim their tiny craft.

We take the road once more. Still on the left, opposite Prescott Park, is a stile leading to a footway across the meadow. This footway literally teems with "bits"— the overhanging branches, the gnarled trunks in all manner of fantastic shapes, wanting only the returning cows from milking, or the boys birdnesting, or the waggoner's team to make subjects tempting indeed to him imbued with the true art feeling.

Out again on the road, through the village of Herne-street, past the old church—which, however venerable and however much surrounded by tombstones, is not a subject for high art—on past the workhouse, where the paupers tending the inside grounds seem afraid to lift their heads lest they commit a breach of discipline, and bearing with the track to the left we come sharply, on the left again, to a wood, which small in extent, makes up in richness of undergrowth and moss-covered banks for any shortcomings as to size. There the artist may positively revel while the glades re-echo the spirit he inspires in his models.

Back to the Canterbury Road, and beyond the "Halfway House" on the left, are two magnificent old oaks, where the wayfarer might stretch his weary limbs or where the village festival might be held; where the lassie might keep her tryst or the gleaner rest from her labour. Many memories of the past could these knotted trees unfold; many aspirations of the future may be sheltered beneath their spreading branches, while author and artist drink their fill of inspiration from the beautiful around.

Continuing the ramble to within a short distance of Sturry, studies without number may be made in a dense mass of foliage and hill and dale on the right. It is here at every point that a fresh beauty meets the cultured eye, and a constant succession of change may be made by a simple turn of the instrument and a variation of the models. It would be presumption to suggest the titles when the field is so rich, and when the inception that would be the creation of one mind would be out of harmony with the aspirations of another. These tangled thickets are so many settings for pictures, and by their beauty they invite us to make them speak—to tell to others the varied emotions they have instilled in ourselves; and it is in scenes such as these lies the great future of our art.

The mere delineation of tracts of country—however beautiful, however romantic they may be—call forth but slight creative power. The selection of the best point of view, the introduction of figures, the arrangement of certain details, and the choice of light will distinguish the artist from the mere slipshod worker; and when all is done, the combined whole will be a pleasing effect—a harmonious reproduction of nature. But there is no great *creation*. There is no theme originated and developed to a point which strikes the beholder as a story most effectively told; but, when the models form the picture and the tangled bushes become only a suitable background against which they are taken, it is then that the *same* creative power is called forth from the artist with the camera as from the artist with the brush. The expression and the pose of each model must be a study beforehand, so that when the moment arrives the result must be perfect in composition, in spirit, and in *technique*. JOSEPH HARRIS.

FOREIGN NOTES AND NEWS.

DR. LOHSE'S ISOCHROMATIC GELATINE PLATES.—A NEW USE FOR ALBUMENISED PAPER.—A VARIATION IN CRYSTOLEUM PAINTING.—HINTS FOR THE ASPHALTE PROCESS.—DR. VOGEL ON CHRYSANILINE AND ISOCHROMATIC PLATES.

IN the *Archiv* Dr. O. Lohse writes, regarding isochromatic gelatine plates, that he has made a further series of experiments on the modification of the sensitiveness of bromide of silver to colour, and used as sensitisers the following yellow dyes:—Orthonitrophenol, orthonitraniline, paranitraniline, metanitraniline, thymokinone, phenatrenkinone, chrysophanacid, tropæolin, quercitrin, aloes, diamidoazobenzol, diamidoazobenzol hydrochlorate, amidoazobenzol, amidoazobenzol hydrochlorate, nitrosodimethylaniline, nitrosodimethylanilin aniline, picraminic acid, phosphin, aurantia, chrysoidin, Martin's yellow, diamond yellow, chrysanilin, nitric chrysaniline, and tropæoline iodide. Each of these dyes was treated in the same way, namely, 0·02 of a gramme of the dye was dissolved in 100 c.c. of water containing ten per cent. of ammonia, and filtered. If requisite the substance was dissolved in a little absolute alcohol before being added to the water. All the plates used in the experiment were Nelsons' "extra-rapid" plates, which were soaked for two minutes in the above staining fluid and then dried. Without entering into details of the series of experiments it may be remarked that, amongst all the substances used, there were two that distinguished themselves, namely, diamidoazo benzol hydrochlorate and nitric chrysaniline; while of the others some seemed to affect the sensitiveness injuriously, others to exercise no action at all, and others again to produce a slight effect. The diamidoazo benzol hydrochlorate increased the sensitiveness of bromide of silver to green and yellow considerably, so that when the sun's spectrum was photographed a second maximum appeared between the Fraunhöfer lines D and *b*. In the neighbourhood of F, a little towards G, there was a spot of diminished action like that which occurs in the case of eosine. Nitric chrysaniline in combination with ammonia increased the general sensitiveness of bromide of silver, in consequence of which the sensitiveness to colour also appeared to be raised. With a normal exposure of twenty-five seconds the photographed spectrum extended upon the experimental plates from the ultra-violet on the one side to well beyond D on the other side. An accelerating action also occurred, after which both the chrysaniline contents of the solution and the addition of ammonia were diminished. He then prepared a solution containing only 0·004 of a gramme of nitric chrysaniline and two c.c. of liquid ammonia to 100 c.c. of water, and exposed a plate prepared with this stain along with an unstained one to suitable light, under a paper scale of sixteen graduated folds. The result showed that the stained plate was considerably the more sensitive, as upon it No. 9 of the scale could be distinguished, while the unstained plate only went as far as No. 4. Dr. Lohse, therefore, thinks himself justified in recommending the addition of a slight trace of nitric chrysaniline along with ammonia to bromide of silver emulsion, in order to increase the sensitiveness of the latter.

A new use for albumenised paper has been spoken of in French papers. It is said that butter rolled in albumenised paper will keep fresh for months. This sounds all very well, but we should be very unwilling to roll good butter in some of the samples of albumenised paper that have passed through our hands lately, since it is well known that butter, like all sorts of fat and grease, absorbs with great readiness the *perfume* of anything that may be placed near it, though not necessarily in contact with it. This danger may, however, be avoided by preparing the albumenised paper for one's self, since, as perfect equality and smoothness of surface are not indispensable to the butter-preserving housekeeper as they are to the photographer, the former may turn amateur albumeniser. She will add from one to two grammes of saltpetre to the white of one egg and apply to her paper. The butter is to be provided with an inner covering of linen, and the albumenised paper placed outermost.

The *Archiv* informs us that a Mrs. Nelson Decker has discovered a way of dispensing with the second convex glass for coloured photographs —presumably those coloured by the crystoleum process. This discovery consists simply in dipping the print at different stages of its colouration into the wax and paraffine solution.

The same journal supplies some short hints for working the asphalte process:—A solution of asphalte in oil of lavender or oil of turpentine is spread, by means of a leather roller, upon metal plates and dried in the dark. Old asphalte films furnish much firmer prints than new ones, which separate from each other; even some months after preparation the films are still quite useable. The film should not be too thick, as that would cause the development to be too prolonged, and there would also be a danger of some parts not being sufficiently washed at development. For contact copies of engravings it is advisable to soften the engraving in a mixture of glycerine and water and then to apply it with the squeegee to the dry asphalte film. In this way extraordinary sharpness is obtained. The exposure may last a quarter of an hour in the sunlight and about an hour in diffused daylight! It is better to expose too long than too short a time, as over-exposure may be avoided by the use of stronger solvents. If the plate be exposed in sunlight it should be allowed to become cold before being developed. Oil of turpentine, or a mixture of oil of turpentine and olive oil, are used as developers. Benzine alone has too energetic an action; it is better when asphalte is dissolved in it. Petroleum makes the unexposed parts soft and swollen. Before being etched the film is washed with water, dried, and exposed to sunlight or daylight in order to harden it. Steel may be very beautifully etched with a golden-yellow (not orange-yellow) solution of iodine, renewed every ten minutes; or, if it be preferred, an asphalte solution, consisting of 30 grammes of asphalte dissolved in a mixture of 10 c.c. oil of citron and 600 c.c. benzine, may be used. Quite lately, instead of asphalte, marine glue has been employed, which resists the etching to a very great extent and requires all the longer exposure.

With regard to Dr. O. Lohse's experiments with chrysaniline and other dyes, Dr. H. W. Vogel writes in the *Mittheilungen* that, according to his book on practical spectral analysis, chrysaniline absorbs the blue side of the spectrum and shows a weak streak of absorption from F to F 2/3 *b* in the blue-green. Accordingly, going upon the principle of optical sensitisation, an increase of the sensitiveness to blue and blue-green was to be expected. Dr. Lohse's experiments on the colour scale with plates stained with chrysaniline quite confirmed this view, as they actually showed a considerable increase in the sensitiveness to ultramarine blue and pale green, which not only reflect blue but also blue-green. An increase of sensitiveness to Naples yellow and chromic yellow, on the other hand, was not observed. Azaline plates laid in a bath of chrysaniline and exposed behind a yellow glass reproduced ultramarine considerably more brightly than pure azaline plates; indeed, almost as distinctly as chrome yellow. On the other hand, their sensitiveness to yellow and orange was distinctly less than that of the latter. It was the same with their general sensitiveness, for they appeared in the developer more slowly than the azaline plates. This does not contradict Dr. Lohse's results, since the increase of sensitiveness observed by him only took place in the blue light, which, in Dr. Vogel's experiments with chrysaniline plates, was to a great extent absorbed by the yellow glass. Chrysaniline, then, Dr. Vogel thinks is valuable for increasing the sensitiveness of *common* gelatine plates; but, on the other hand, it is valueless for plates sensitised for colour, in so far as that the increase of sensitiveness produced by it takes place principally in the case of the most strongly-absorbed blue, while the sensitiveness to yellow remains far behind. (Another substance, the optical properties of which were examined by Dr. Vogel, and the action of which he considers to equal or even to exceed that of chrysaniline, is the substance discovered by Witt, and which he called "chrysoidin." Dr. Vogel, has, however, only tested it optically, not yet photographically.) With plates stained for colours, he has obtained great sensitiveness to yellow and a slighter one for blue. The task of colour photography is not to produce a so-called isochromatic plate—that is, a plate equally sensitive to all colours—but a plate the sensitiveness of which shall approach as nearly as possible to that of the human eye. "That, however, is far from being isochromatic, being most sensitive to yellow, next to green-yellow, less so to the dark blue, and least of all to violet. Dr. Vogel would, therefore, wholly reject the word 'isochromatic'" as applied to plates, this use of the word being of French origin.

PHOTOGRAPHY IN COURT.

USING THE ROYAL ARMS WITHOUT AUTHORITY.

Messrs. A. and G. Taylor were summoned before Mr. Newton, at the Marlborough-street Police Court, on Tuesday last, the 30th ult., "for unlawfully and without authority of her Majesty using, in connection with their trade, the royal arms, or arms so nearly resembling them as to be calculated to deceive or mislead persons to believe they were carrying on the business or profession under such authority." Mr. Bateson appeared for the prosecution, and Mr. St. John Wontner for the defence.

Evidence from the Lord Chamberlain's office was adduced, showing that the names of the defendants were not among those who were empowered to make use of the royal arms as photograpers to the Queen; and a canvasser lately in their employment put in papers as evidence which bore the royal arms, and which had been entrusted to him to use for the purposes of canvassing for the defendants' club portraits. Evidence was also given to show that the royal arms were publicly displayed at the defendants' places of business. The prosecution, it was stated, had been undertaken in the interests of the photographic profession. In defence, it was urged that when the defendants commenced business as photographers in 1866 one of them, who had previously been employed at Balmoral in another capacity, returned there and took some photographs, among which were portraits of certain members of the royal family; that in consequence of this he applied for permission to use the royal arms; and that he had subsequently used them, although without written permission.

The Judge said that, while on the evidence adduced it was shown that the firm of A. and G. Taylor made use of the royal arms without legal right to do so, he would adjourn the case for a week in order to afford the defendants an opportunity of bringing proof that they had authority for making use of the royal arms. The further hearing of the case was, therefore, adjourned until Tuesday next, the 7th instant.

[From inquiry it appears that there are only three photographic firms in London who have a legal right to use the royal arms as photographers to the Queen.]

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 12,772.—"Increasing the Usefulness of Photographic Cameras." F. Shew.—*Dated September* 24, 1884.

No. 12,855.—"Camera Tripods or Supports." W. Watts.—*Dated September* 27, 1884.

PATENT SEALED, September 23, 1884.

No. 8,643.—"Improved Apparatus for Coating Photographic Plates or Paper with Gelatine Emulsion." B. J. Edwards.—*Dated June* 5, 1884.

SPECIFICATION PUBLISHED DURING THE WEEK.

No. 10,950.—"Certain Improvements in Photographic Cameras."

This invention is a communication from Calvin Rae Smith, of New York, artist. It relates to a method of transferring plates from a receptacle to the camera, which we think would not prove of sufficient interest to our readers to warrant us in printing it.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
October 6	West Riding of Yorkshire	Godwin-street, Bradford.
" 7	Sheffield (Annual Meeting)	Freemasons' Hall, Surrey-street.
" 7	Halifax (Annual Meeting)	*Courier* Office, Regent-street.
" 8	Bury	Temperance Hall.
" 8	Photographic Club	Anderton's Hotel, Fleet-street.
" 9	London and Provincial	Masons' Hall, Basinghall-street.
" 9	Manchester (Annual Meeting)	Manchester Technical School.
" 9	Bolton Club	The Studio, Chancery-lane.
" 9	Glossop Dale	Glossop Coffee Palace, High-street.
" 10	Ireland	Royal College of Science, Dublin.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society, held on Thursday, the 25th ult., the chair was taken by Mr. A. Haddon.

Mr. A. L. Henderson described some of his experiences during his recent visit to Canada and the United States, but more particularly as to the results of his observations at some of the dry-plate manufactories he had visited, and notably that of the Inglis insoluble plate factory, which he had been most courteously allowed to inspect throughout. He showed a machine for packing plates in use at this establishment, and demonstrated the method of using it. The machine consisted of a board and frame for holding firmly the box into which the plates were to be packed, and a traversing bar through holes in which string passed. The string was by this bar drawn backwards and forwards as each fresh plate or pair of plates was placed in the box. It was necessary that the plates should fit into the box with very little play, or the string might not be retained between the plates. When the box was filled it was covered with a deep lid, and this, again, by another lid put on as though the intermediate lid were a box. This effectually prevented light from being reflected on to the edges of the plates. At the Inglis factory the plates were dried by a blast fan driven by steam power. The air as it entered the drying-room was filtered from dust by a canvas bag which was tied over the air inlet, and the drying was complete in about two hours. The emulsion was made at six o'clock in the morning, and the dried plates were in the hands of the packers by one o'clock in the afternoon. The glass was cleaned very rapidly by being held between the ends of two revolving cylinders composed of blotting-paper wound round. As the paper became worn away with use the cylinders were approached so as still to press against the surfaces of the glass held between them.

The CHAIRMAN showed some negatives from an emulsion giving green fog. One of these plates had been left in the hypo. all night, and the fog which in the other plates had been red by transmitted light was thereby changed to a bright indigo-blue colour. Another plate from the same batch treated with the Monroe developer came out without fog.

Mr. HENDERSON said that the less gelatine employed to emulsify with the less green fog there would be.

A MEMBER inquired what was the state of photography in America, as shown in the exhibition of the Convention at Cincinatti.

Mr. HENDERSON thought that, whether owing to the superiority of the light or not, the Americans were ahead of the English in instantaneous photography in the studio, and instanced a photograph of large size of a child riding on his father's foot.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE ordinary meeting of the above Association was held on Thursday, the 25th ult., at the Free Library,—Mr. J. H. Day, Vice-President, in the chair.

The minutes of the June, July, and August meetings having been read and confirmed, Mr. J. Eaglesfield was elected a member of the Association.

Mr. W. H. KIRKBY introduced a resolution on the subject of the July and August outdoor meetings, and said that he thought it would better conduce to the welfare of the Association if these meetings were held, as usual, in the city.

Mr. O. R. GREEN suggested that notice of these outdoor meetings should be given annually in the ALMANAC. He had wished to attend the last meeting, and found to his disappointment that there was no assembly at the Free Library.

The Rev. H. J. PALMER reminded Mr. Kirkby that his resolution amounted to a new rule, and could only be introduced after due notice had been given. He (Mr. Palmer) had gone through the minutes of the last ten years and found that in nine of the ten no meetings of the Association had been held in Liverpool in July and August.

Mr. J. H. T. ELLERBECK said that if Mr. Kirkby would give notice now the matter could be discussed at the next meeting.

Mr. KIRKBY adopted Mr. Ellerbeck's suggestion, and said he would propose a new rule at the next meeting, and after this the subject dropped.

The CHAIRMAN announced donations to the print collection of the Society, by Messrs. Watts, Williams, Hartley, and Wharmby.

Mr. H. N. ATKINS gave some account of his success in the production of paper enlargements, and passed round some very fine specimens of his work. [Mr. Atkins's views were fully described in the Journal of last week, p. 615].

Mr. J. H. DAY said he had obtained good results with Morgan's paper, and showed a print from a waxed negative, which was perfectly sharp, and could not be distinguished from an ordinary glass negative.

A MEMBER exhibited an excellent enlargement, 16 × 12, made in this way on gelatino-bromide paper from a quarter-plate.

The Rev. H. J. PALMER read an important resolution passed at the last meeting of the Executive Committee of the Associated *Soirée*:—"That a certificate of merit be awarded by the *Soirée* Executive Committee to the best series of six photographs, taken by an amateur, of subjects within a radius of ten miles from Liverpool," and urged the members of the Association to join in this useful competition. Mr. Palmer further reminded those present of the number of interesting negatives of subjects connected with the Liverpool of the past which had been taken by members of the Society. He hoped that these would all be printed afresh, that members would produce numerous other pictures of scenes which were now fast disappearing, and thus that a really useful and valuable collection of views connected with Liverpool might be available for exhibition at the coming *soirée*.

Mr. J. A. FORREST remarked that one wall of the old slave market of Liverpool was still standing.

The CHAIRMAN spoke in cordial approval of the competition and of its objects, and thought that the Association should assist the project by giving a prize.

Mr. R. CROWE proposed that the Association assign two of its presentation prints, properly mounted and framed, as a first prize for the best series of six prints of Liverpool, &c., and one such print, also mounted and framed, as a second prize.

Mr. ELLERBECK seconded the resolution, and it was carried unanimously.

Mr. H. A. WHARMBY gave notice that he should, at the next meeting, move the following addition to the rules:—"Each member shall send in to the Secretary, at or before the meeting following his election, his *carte* portrait for insertion in the Society's album."

Mr. O. R. GREEN gave an interesting account of his mode of collodionising and developing plates 24 × 18, and remarked that negatives taken by him with his large camera at Melrose, Furness, Conway, and other places, and varnished twenty-five years ago, were now just as bright and good as ever.

Mr. Forrest exhibited three views taken at Rivington, two at Tal-y-Cafn and one at Bidston at the last excursion; Mr. Baker, a clever instantaneous picture of *A Cat in the Act of Springing on a Bird;* Mr. Day, some very fine negatives of Carnarvon and Amlwch Coast, with prints; Mr Wharmby, views at Sefton, Walton, and Bidston; and Messrs. Hartley Watts, and Haworth, some prints from their negatives taken at Condover Pitchford, and Wenlock.

The meeting was then adjourned.

BRISTOL AND WEST OF ENGLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE usual monthly summer excursion of this Society took place on Friday the 29th August. Amongst those present were Mr. T. Davey (President), Colonel Playfair (Vice-President), and Mr. H. A. H. Daniel (Hon. Secretary). The locality fixed upon comprised the very romantic districts of Moorend and Glen Froom, and that portion of the latter beautiful scenery enclosed in the grounds of Mr. Vassall the Association was permitted access to by the courteous permission of the proprietor.

Leaving Clifton Down Station and St. Philip's by Midland trains about eleven o'clock, the party found on arrival at Fishponds that the thoughtful care of the worthy Secretary had provided ample accommodation in the shape of horseflesh and carriages, and a short drive landed them at the new country residence of Mr. Daniel, who, though having moved thereto but a very short time previously, had evidently managed to get "fixed up," to use an Americanism, as though he had been settled there for years.

After an inspection of the house and grounds, at which admiration was expressed, a very substantial and delicious luncheon was sat down to, and very ample justice done to it. Then followed the start for work; and, as a matter of course, the weather, which for many weeks had been unintermittingly fine, at once began to storm at the little party. Nothing daunted, however, and with the shelter afforded by focussing-cloths and other impromptu devices, the Old Mill at Moorend was reached without mishap, unless the minor accident of the Vice-President having nearly swallowed a live wasp, and the Secretary finding himself minus a vital part of his camera stand, might be considered to be mishaps.

At the Old Mill a rush was made to the blacksmith's forge for shelter, which, fortunately, was not required for long.

Here a long and patient halt was made, for the wind it blew and the leaves they shivered. However, at last a few "shots" were made despite the movement of the foliage, and a move made for Frenchay and Glen Froom, distant about two miles. Near the entrance to Oldbury Court Park, but on the wrong side of the river, stood a very enchanting-looking cottage. All agreed that it might make a good picture, so a formal request was made to the lady in charge that we might be permitted to carry away her house, photographically speaking. The seductive wiles and insinuating arts of our Vice-President overcame any scruples which the lady in question might have had to allowing so many strangers to enter her garden gates, and a descent was made. Disappointment, however, was the result, as, in trying to secure a point of vantage for fixing the cameras, it was found an impossibility to get a view without standing up to one's waistcoat in the middle of the river. Fathers of families being in a majority, it was not felt desirable to incur the obvious risks of such a proceeding.

From thence the members proceeded to the private grounds of Mr. Vassall, than which nothing can be prettier in their way. Here in fine weather, and with better light than favoured the party, there is ample store for a good day's work; but time was passing and light was waning, so the word was given to march onwards. Still further down the beautiful dingle, replete with pretty bits, old mills, rustic bridges, weirs, and little attenuated waterfalls, foliage of a most luxuriant nature, and all those little scenes which gladden the eye of the artist, on and on they wandered, hastening to meet the carriages which were to convey the party once more to our hospitable Secretary's tea table.

Then ensued the usual and very acceptable wind-up of these and similar delightful excursions—tea and coffee, and the other solids, and the other fluids, such as teetotallers would never think of mentioning—no, never (the fluids, we mean)! And then—great climax of all, and which so materially added to the universal pleasure—was the fact of the amiable and charming wife of our Secretary herself presiding at the table. Never was there a pleasanter gathering, even if the result in pictures was, perhaps, not quite so good as upon some previous occasions.

Correspondence.

ENLARGEMENT FOR AMATEURS.

To the EDITORS.

GENTLEMEN,—I should much like to compare notes with the writer in last week's Journal of an article entitled *Enlargement for Amateurs.*

I am one of (I dare say) a large number of amateurs who failed to realise the splendid results forecast by the inventor of gelatino-bromide paper. I gave it, as I thought, a patient and fair trial, but did not get any satisfactory results. Of course this was, to a large extent, my own fault.

The whole question has again been brought before my attention in the article written by your correspondent, Mr. H. N. Atkins; and as it is my

serious intention, during the present season, to give it another patient trial, I will at once ask his assistance to help me to solve those technical difficulties which seem to have so effectively disappeared under his skilful and patient manipulations.—I am, yours, &c.,
Cheadle Hulme, September 27, 1884. H. Victor Macdona, M.A.

SENSITOMETERS AND PHOSPHORESCENT TABLETS.

To the Editors.

Gentlemen,—Will you kindly inform me if the sulphide of calcium phosphorescent tablet is a reliable source of illumination for sensitometer purposes? I know it is used by Mr. Warnerke, but I wish to employ it with a form of sensitometer of my own construction, and simply for my own purposes—not as a standard.

Would you also please tell me how the tablets are made—that is to say, how the phosphorescent powder is spread evenly upon glass?—I am, yours, &c., C. Saunders.
September 30, 1884.

[See an article in another column.—Eds.]

THE ROYAL ARMS.

To the Editors.

Gentlemen,—There was an explosion at Bow on September 20th, and Colonel Majendie, Her Majesty's Chief Inspector of Explosives, from the Home Office, sent for me, and requested me to take a photograph of the house damaged by the explosion. I did so, and supplied him with four copies, 12×10. He forbade me selling a copy except through him.

Now, gentlemen, my question is this—Can I in future use the royal arms in my photographic business?—I am, yours, &c., Royal Arms.
September 29, 1884.

EXHIBITION OF THE PHOTOGRAPHIC SOCIETY OF IRELAND.

To the Editors.

Gentlemen,—Permit me, through the medium of your columns, to remind those who purpose sending pictures, &c., for exhibition, and who have not already intimated their intention of so doing, that the last day for receiving will be Friday, the 31st instant.

The form of entry, of which I will be happy to supply copies, should be returned to me *here*, and the packing-cases addressed to care of Royal Hibernian Academy, Abbey-street, Dublin.

I may also mention that there is no charge for space. Carriage of all parcels for exhibition will be defrayed by the Society, consignees paying that on return.—I am, yours, &c., Greenwood Pim,
Monkstown, County Dublin, *Hon. Sec., Exhibition Committee.*
October 1, 1884.

A CORRECTION.

To the Editors.

Gentlemen,—I find that in describing (last week) the process of making negatives for enlargements on argentic bromide paper, I have inadvertently used the word "negative" instead of "*transparency*" in two or three places. Kindly permit me to point out the inaccuracy, which may have puzzled anyone interested in the matter.—I am, yours, &c.,
Liverpool, October 1, 1884. H. Norwood Atkins.

"EDWARDS'S MACHINE FOR COATING PLATES."

To the Editors.

Gentlemen,—Mr. B. J. Edwards has now had the opportunity in two issues of your Journal of refuting the charge brought against him by me, that he had taken out a patent for machinery already in general use, and intended to secure remuneration by granting licenses for the same. He has utterly failed Only one excuse finds utterance from him. The machine had not been used for coating dry plates, but its existence and daily use he does not attempt to deny. It is worse than childish to assert that a man can patent existing machinery if he find a use to which it has not hitherto been put.

My original statements have been fully confirmed by independent evidence, and the conclusion stands thus:—*a.* Mr. Edwards's patent is of doubtful validity *b.* It is scarcely likely that large sums will be paid for its use. *c.* This is not his first offence; *vide* "Edwards's patent grooved box."

May I be permitted to assure Mr. Edwards that no attempts to divert attention from the above sole points at issue will be successful. He will find me perfectly pachydermatous as to any endeavours to injure my business by remarks about imperfections of what I manufacture. All such words will be recognised at once as the result of the total defeat he has so needlessly brought on himself.—I am, yours, &c., Samuel Fry.
September 23, 1884.

Notes and Queries.

J. B. asks—"What is a good formula for developing tannin dry plates for transparencies?"——We reply: The following will answer well:—Pyrogallic acid, four grains; citric acid, three grains; water, two ounces. Add to an ounce of this about two drops of a fifteen-grain solution of nitrate of silver just previous to pouring the developer upon the plate.

Inquirer asks—"Can you inform me if Sprague's ink-photo. process is protected by patent?"——In reply: It is worked as a secret process, and hence no patent exists.

We have received certain inquiries from "Lens" respecting lenses, the rapidity of various classes, and their adaptability for certain purposes. We must decline answering the questions of our correspondent, as it would be very invidious to do so; but we feel quite at liberty to say that there is not a great deal of difference between the whole group of the rapid *genus* of lenses named by him, and it might probably be a long time ere he could discover any difference at all.

Edgardo writes:—"In your issue of September 19th Mr. E. H. Farmer contributes an ably-written article on *Tourists' Cameras, &c.*, and gives his idea of a portable stand. It may interest him and others to know that a stand somewhat similar to the one he describes, with the advantage of freedom of rust, may be obtained from Messrs. Newton and Co., of Liverpool, who, I understand, hold a patent for the same. It packs into a small leather case, and is supported like an opera-glass by a strap from the shoulders."

Felix writes:—"I am making cabinet-size photographs on ferrotype plates. Would you kindly inform me in your *Notes and Queries* if there are any means of obtaining another tint than the greyish one?"——In reply: There are no means known by which a purer white can be obtained than by the employment of a developer containing nitrate of iron. This may be secured by the mixture of nitrate of lead and protosulphate of iron, the precipitated sulphate of lead being filtered out. Nitrate of potash added to the protosulphate of iron will produce a good white, especially if a small proportion of nitric acid be added.

"Can you furnish me with formulæ for photolithographic transfers? I have prepared several but find a difficulty in getting the gelatine to leave the paper. My process and *modus operandi* have been as follow:—

Nelson's gelatine	30 grains.
Bichromate of potassium	25 ,,
Water	1 ounce.

I use strongly-sized paper, which I float on the above solution, dry, and print for the image; then ink with usual transfer ink, float face upward on hot water (say 180° F.), and with a sponge rub lightly to remove unaltered gelatine. I find the friction necessary to do this breaks away the fine lines, while the constant rubbing about of the ink blocks up closely-shaded parts. Any hints which may help me out of my difficulty will be most thankfully received by—Antipodean."——In reply:—It seems probable that the transfer ink employed is unsuitable. If it were made thinner it would possibly answer better. Let our correspondent try the following by way of a change:—Coat the paper with bichromatised albumen, and, after exposure, ink by pressing it in contact with an inked stone. Now develope in cold water by aid of a soft camel's-hair brush. We have taken it for granted that a proper negative, absolutely opaque in the lights, has been employed.

Exchange Column.

No charge is made for inserting these announcements; but in no case do we insert any article merely offered for sale, *that being done at a small cost in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a* nom de plume *be thought desirable), otherwise the notice will not appear.*

Wanted, a portable half-plate camera and stand, in exchange for a first-class fifty-two-inch bicycle.—Address, W. Kenyon, 39, Mersey-street, Liverpool.

I will exchange a mahogany 5 × 4 camera, two single slides, for good accessories or background (interior).—Address, Malins, Crosswood, Aberystwith.

I will exchange a pony carriage, in good condition, for the electric light, or any other light suitable for photographing by night.—Address, F. Cole, 378, Euston-road, London.

I will exchange two gas bags, 30×24×12 and 22×17×15 (new), safety jet, pressure boards, and tubing. What offers?—Address, J. Brown, 44, Melville-place, Myrtle-street, Liverpool.

I will exchange Letts's *Popular Atlas*, value 42s., for photographic apparatus suitable for dry-plate work.—Address, Atlas, care of Mr. Fulver, stationer, &c., East-street, Chichester.

I will exchange an excellent half-plate French lens, nearly new, cost £5, for backgrounds in good condition and of equal value.—Address, Manager, Midland Studio, Harborne, Staffordshire.

Wanted, a good cabinet lens in exchange for a 10 × 8 burnisher and No. 1 *carte* lens, Dallmeyer's *carte* cameo press, background, &c., or cash.—Address, P. Bermingham, 151, Dale-street, Liverpool.

I will exchange a long-focus cabinet, a whole-plate lens, and a quarter-plate camera, for a short-focus whole-plate portrait lens and whole-plate bellows-body camera; difference adjusted.—Address, John Roper, 16, Hawk-street, Burnley.

I will exchange (all good) Squire's half-plate portrait lens, Grubb's half-plate view lens, Germaine's quick-acting quarter-plate portrait lens, Rouch's 10 × 8 folding camera, and half-plate camera, for anything useful in photography, or gold chain.—Address, Fritz Camera, photographer, 41, High-street, Sydenham.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

Photographs Registered.—

John Edmund Cracknell, 6, Wightman's-terrace, Hornsey.—*Photograph of Autographs.*

John Henry Smelt, 16, Arwenack-street, Falmouth. — *Photograph of Yacht, Mignon's Boat, taken at Falmouth.*

S. Sidey.—Received. Thanks.

Canary Medium. — Apply to Messrs. G. D. Scorah and Co., Leeds-road, Bradford.

M. Morelli.—Apply to MM. Attout-Tailfer and Clayton, 18, Rue des Cordelieres, Paris.

Arctic.—We have heard repeatedly of the bleaching of yellow glass by exposure to light, but cannot say much with respect to it from personal experience.

T. C. K.—The defects do not appear to be due to any faults in camera or slides, but rather to faulty plates. Without more data it would be impossible to hazard any further guess as to the cause.

W. G. M.—The yellow precipitate is not, as you suggest, ferrous oxalate, for whence could the oxalic acid be derived? It consists of a basic ferric sulphate, and from our own experience we fear you cannot mend matters much.

J. I. A.—Avoid acid gum or acid paste for mounting the prints, as it will hopelessly ruin them. Acetic acid is an admirable thing to mix with gum for many purposes, but not for the mounting of silver prints. Make use of freshly-prepared starch.

Distemper.—1. If grey prove too light, probably a light sage green or similar colour would suit you.—2. The portraits have appeared monthly since the commencement of the present year. The numbers are all obtainable, but not the pictures separately.

L. W. J.—1. It is now too late to make application for space in connection with the Photographic Exhibition, which is to be opened to the members tomorrow, and to the public on Monday.—2. Willesden paper will answer quite well for dishes and trays for the purpose mentioned.

Geo. Henston.—The camera is patented, but it does not follow that the mere payment of patent fees will establish patent rights. In this case, however, we should be sorry to counsel you to throw money away in contesting the rights. There *are*, as you say, "patents *and* patents."

W. B. S.—The negatives sent are not by any means perfect. Certain thin portions towards the margins indicate that the developer has not been applied equally, but apart from this the focussing has been very badly done. Again, it does not look well to see the horizon of a view brought up to nearly the top of the plate.

George Ross.—Your pictures have not been fixed properly. An immersion in hyposulphite of soda solution for two minutes is totally inadequate to effect the removal of all the soluble salts of silver. It is quite impossible that you can have paid any attention to the instructions given in the manual you profess to have studied.

J. T. Anderton.—The blisters you complain of are really an incipient form of frilling, and are frequently caused by using the fixing-bath of too great strength. Use one part of saturated hypo. to three parts of water. When the blisters do appear they may be got rid of by flooding the plate, while still wet, with methylated alcohol.

Alpha.—1. The formula explicitly gives all the constituents in *parts*; if, therefore, you take 200 ounces of ether and alcohol the cotton and iodides must also be in ounces.—2. The stain should be sufficient to produce a moderately-tinted film.—3. We presume the collodion will work with the acid bath, but are not aware of its having been tried.

W. H. Wilson.—The prolongation of boiling appears to have comparatively little influence in producing a high degree of sensitiveness if the emulsion be not properly mixed. The mixing of the ingredients should be performed at as high a temperature as possible—at boiling heat if that can be managed; then but a few minutes' subsequent cooking will suffice.

P. H.—The illustration did not appear in this Journal nor, we believe, in any existing English publication. The name you mention is a strange one to us, and the paper must be either one long dead or else has a glorious future before it as an unattempted project. In either case you have been misinformed, as the picture really appeared in a second-class American publication.

S. F. Jones.—It is not wise in you to arrive at an inimical conclusion respecting any process because vile productions are the result of its practice by some individual who, for all we know, is not competent to secure such good features as may intrinsically belong to that process. We all know very well that some of the most charming photographs the world has seen have been made by wet collodion; and well indeed do we and every one else know that negatives which are truly execrable have also resulted from the same process.

Raven.—The yellow deposit is ferrous oxalate, formed in consequence of there being an insufficient quantity of potassic oxalate to hold it in solution. The separate solutions are of proper strength; but if, as we understand from your letter, you employ one part of oxalate of potash to three parts of iron your trouble is easily explained. The proportions should be reversed, namely, three parts of oxalate to one of iron solution; indeed it is better, in a general way, to use four parts of oxalate to one of iron. If you observe these proportions and pour the iron solution into the oxalate, instead of *vice versâ*, you will have no deposit and no necessity for filtration.

Argal.—1. The exact quantity of silver nitrate required would be a fraction over 236 grains, but a little less than this quantity should be employed—say 230 grains.—2. In the dark room.—3. Whichever is most convenient.—4. Like the rest of the operations—in the dark room, of course.—5. If formed separately the chloride and citrate should certainly be washed separately.—6. The plates will keep for a few weeks, but not indefinitely.—7. The plates may be developed with a well-restrained developing solution, but do not behave well with the ordinary developer.—8. Thanks for pointing out the error in punctuation, which had hitherto escaped our notice. The position of the stop is obviously after "suffices."

Received.—Edward Dunmore; J. T. Robinson; "Hypo.;" "S. E. K." In our next.

Photographic Club.—At the forthcoming meeting of this Club, at Anderton's Hotel, Fleet-street, on Wednesday next, the 8th inst., the subject for discussion will be *On Artificial Lighting.*

The Cundall Phototintographs.—Under this designation Mr. James A. Cundall, of New Brighton, near Birkenhead, has devised a system of colouring photographs, examples of which he has submitted for our examination. The style is bold, yet effective, and photographs tinted in this manner will not fail to please many.

A New Photographic Association.—A Photographic Section has been formed within the Literary Club, Blackburn, Lancashire, open to all members of the Club, many of whom revel in the "dark deeds" of photography. During the winter four meetings will be held at the Club for discussion of subjects connected with the art as follow:—October 20, at 8.30 p.m., *Lantern Slides;* November 24, *Plate Making;* January 19, 1885, *Development;* February 23, *Intensification and Reduction, &c, of Negatives.* Two entertainments will also be given in the lecture room to members and their friends—one an exhibition of lantern slides on the 19th of December, and the other an exhibition of prints on the 17th of April next. During the summer it is intended to have a series of monthly excursions with cameras, due notice of which will be given. The Hon. Secretary would be glad to arrange, if possible, to meet other societies in the district on some of these excursions. All communications should be addressed to the Hon. Secretary, Photographic Section of the Literary Club, Blackburn.

Astronomical Photography.—M. Mouchez, the Director of the Observatory of Paris, has communicated to the Academy of Sciences a brief account of some experimental attempts to photograph very small stars, which have been lately made at that establishment. The ecliptical star-charts, commenced by Chacornac, but interrupted in their formation by his decease, were taken up by MM. Paul and Prosper Henry in 1872. These charts include all stars to the thirteenth magnitude. Thirty-six of the entire number of seventy-two required for the whole ecliptical zone were completed by Chacornac. These contain 60,000 stars; while sixteen more, containing 36,000 stars, have been constructed by MM. Henry, who will shortly finish four others, with 15,000 stars. But they now find themselves in face of a difficulty which can hardly be overcome by the ordinary process of charting. The condensation of stars in those regions where the Galaxy traverses the ecliptic is so great as apparently to defy an accurate and complete representation of their stellar contents, on the methods adopted for the greater part of the zone, notwithstanding all the experience and well-known skill of the observers. They have accordingly had recourse to photography, and their first attempts with a provisional apparatus have succeeded so well that there is every reason to expect by this means a solution of the difficulty in question. On plates covering an extent of 3° in right ascension and 2° in declination, obtained with an objective of 0·16 m. diameter and 2·10 m. focal distance, achromatised for the chemical rays—which M. Mouchez exhibited to the Academy—there are shown some 1,500 stars from the sixth to the twelfth magnitude; that is, to the limit of visibility of an objective of that size. The images of the stars have diameters nearly proportional to their brightness, except in the case of the yellow stars, which come out somewhat fainter. These encouraging results have led MM. Henry to commence the construction of a large objective of 0·34 m. diameter, which will be mounted by M. Gautier, and it is anticipated that with this instrument, in the course of an hour, a chart of the stars, to the twelfth magnitude at least, and probably to the thirteenth or fourteenth, of the same dimensions as one of the published charts will be obtained—a work which would otherwise require many months of assiduous labour.—*Nature.*

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1275. Vol. XXXI.—OCTOBER 10, 1884.

OUR FORTHCOMING ALMANAC.

The time has arrived when it becomes our duty to remind our readers that the ALMANAC for 1885 is in course of preparation, and that we shall be glad to receive contributions from the numerous friends who have assisted us in former years, as well as from any volunteers who may join the ranks.

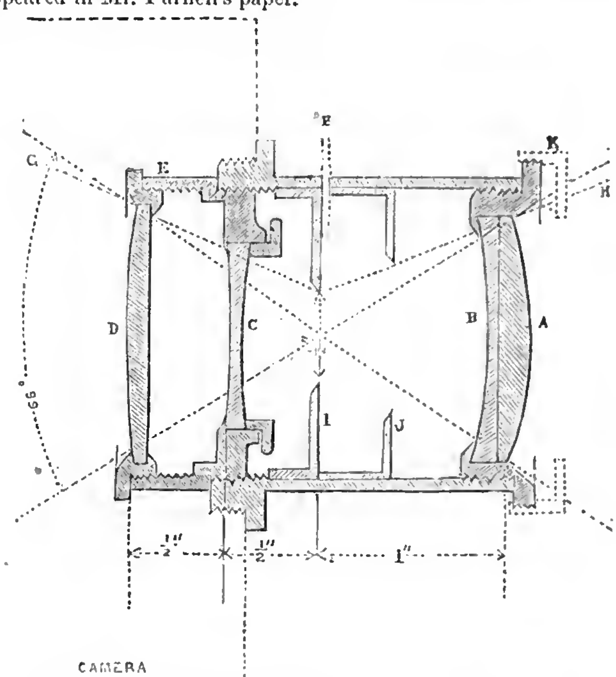
The year has been one of considerable activity from a working point of view, and much has been done and published in connection with the experimental phases of photography. But there must remain a vast amount of unpublished experience which the ALMANAC forms a convenient medium for placing before photographers in all parts of the world. We trust, therefore, that all who may have gained any new knowledge, either in the direction of improved modes of working or of difficulties overcome, will assist us in rendering the forthcoming volume a thoroughly useful one.

In order to enable us to issue the ALMANAC, as in previous years, before Christmas, it is necessary that all matter be in our hands as early as possible. We shall, therefore, esteem it a further favour if contributors will add to the obligations under which they place us by sending in their communications during the present and the early portion of next month.

HOME-MADE LENSES.

The paper which was read by Mr. William Ackland before the South London Photographic Society at its last meeting, and the side issues which arose out of it in the course of the discussion, cannot fail of proving exceedingly useful. Photographers who would not hesitate to set at immediate defiance every recognised canon of chemistry in the hope of improving their emulsions, or just seeing to what their experiments would lead, or what effect would be produced by such experiments, entertain a species of superstitious horror at touching their lenses, the makers of which have issued strong injunctions against their being "tampered" with.

Mr. Ackland's paper was on the lens introduced and advocated by Mr. Thomas Furnell in an article communicated to THE BRITISH JOURNAL OF PHOTOGRAPHY of April 27th, 1883, and the invention (if such a term be allowed) has, it appears, been lying almost *perdu* up to the present time. In order that our observations may be the better understood we here insert the drawing and description which appeared in Mr. Furnell's paper.



A, crown glass, plano-convex, 1·82-inch radius. B, Flint glass, plano-concave, 2·75-inch radius. C, Flint glass, double-concave, 30 and 30 inches radius. D, Crown glass, plano-convex, 7·80-inch radius, or equal to 15 inches focal length. E, Separate portion of mount. F, Slot for loose diaphragms. I, Fixed stop. J, A second fixed stop or diaphragm simply slipped into the tube, and arranged to cut the line G H. K, Hood, with a rectangular opening in front of 1¼ × 1¼ inch, to admit only sufficient light to cover the plate.

In what we have now to say of the Furnell lens it will only be an act of justice to other workers who have gone before to state that in employing this distinctive appellation we do so as a mere matter of convenience, because, as we shall show, combinations bearing remarkable similarity to it have been known previous to the publication of Mr. Furnell's paper.

When a meniscus, or plano-concave, achromatic lens is employed as a landscape objective in the usual way, two things will be observed:—Architectural subjects, in which the lines are straight, have these represented in a slightly-curved manner, the curvature increasing according to the distance from the centre of the picture; and, secondly, that in proportion as the external curvatures of a meniscus lens are deep, so does its power of sharply covering a large field increase—at the expense, however, of a smaller stop being employed and in a position nearer to the lens than if it were a plano-convex.

In the Furnell lens the front achromatic may be said to be the element by which the image is formed, the two back lenses—that is, the concave and the plano-convex, situated at the inner end of the tube—having for their functions the flattening of the field and curing the distortion, without necessarily possessing magnifying power in themselves as a whole, thus leaving the focus of the achromatic front lens nearly undisturbed.

The idea of effecting a cure of the distortion produced through a single combination by the addition of an extra lens, or pair of lenses, without alteration of the focus is a happy one; but it has also occurred to other opticians. So long ago as 1858 the late Mr. James T. Goddard, *apropos* of having observed the aberration of the rays from the flame of a candle a little way out from the axis of the lens, inquires:—"Can we not devise a back lens that, without altering the mean focus, shall yet be able to rectify all this confusion out of the axis?" He then proceeds to describe the means he employed for effecting this rectification:—

"For this purpose I worked a plano-convex plate glass lens on the six-inch tool, and a plano-concave lens of plate glass on the six-inch concave, so that their effect, when the curved pieces of glass were together, was exactly similar to a plain glass; but when the convex side was placed towards the ground glass screen and the concave side of the plano-concave was towards its flat side, and this pair of lenses was held a little behind the achromatic meniscus, the effect was to remedy to a considerable extent the confusion of the oblique image without altering the mean focus, merely leaving, however, a good deal of uncorrected aberration. Further: it was shown that separating the back pair from the front cemented achromatic considerably flattens the field."

In the course of subsequent experiments the forms of both these correcting lenses were altered to a considerable extent. For example, the plano-concave lens was made double concave, and the plano-convex lens was replaced by others—both of a meniscus and also of a bi-convex form. By the law of evolution a non-distorting triple lens was eventually produced out of these experiments. It will be seen that both the added elements of correction were formed of crown or plate glass.

As bearing somewhat intimately upon one of the advantages inherent in the Furnell lens—that of permitting its focus to be altered by the substitution of one element for another—we may here state that this, too, was provided for by Goddard, who, allowing the back lenses to remain undisturbed, had several front lenses of similar diameter, but different foci, adapted to work harmoniously with the back lenses.

Several years ago Mr. Howard Grubb suggested an addition of a similar character to the single achromatic lens. His corrector differed from that of Goddard to this extent—that he retained the achromatic lens in the position usually assigned to it, and placed the correcting lenses in the front of the tube in close proximity to the diaphragm. Mr. Grubb's correctors, also, were formed of plate or crown glass, being respectively plano-convex and plano-concave, the radii of curvature being also alike; hence there was no alteration of the focus of the principal lens. This additional front combination proves very convenient; because it not only corrects the distortion produced by the lens for which it may have been specially constructed, but it also effects the same end with others of different foci. Those who desire to try experiments in this direction may do so without incurring much expense, seeing that spectacle glasses of the requisite form and focus can be procured everywhere.

Attention is directed by Mr. Ackland to the fact that considerable latitude is permissible in the selection of additional lenses, the substitution of one for another effecting no sensible difference in the achromatic correction of the combination. This is a fact to which we have directed attention on several previous occasions. If the front lens of a combination be an achromatic of deep curvature, the back component of the objective may be either achromatised or simple without affecting its power of working sharply to focus. This property is exceedingly useful in all cases in which a variety of back lenses are to be employed in order to provide difference in the focus. We have one combination of this class to which we have adapted three back lenses of different foci, all single menisci of the simple form to which we have already alluded; and, while variety of focus is imparted to the objective in proportion to that of the individual back lens employed, in every instance the visual and chemical foci still coincide. When the lenses are flat this coincidence is not experienced in the same degree. We here refer to the employment of a meniscus lens for the purpose of forming a wide-angle doublet.

It is reassuring to hear from an optician of Mr. Ackland's skill that ordinary spectacle lenses will answer for both the concave and convex lenses in the Furnell objective, provided they are properly centered. This centering may be effected by cementing the lens with pitch to a wooden chuck in a small turning lathe and moving it a little from side to side while the pitch is still soft, until the image of a candle flame reflected from the lens ceases to "wobble" during rotation. Emery powder mixed with water, and applied by means of a piece of soft iron or copper plate, will speedily grind the edges true.

We are much pleased to see this subject brought prominently before the world by one who, like Mr. Ackland, has for so many years occupied a prominent position among the professional opticians of the metropolis, and we trust that it will not be allowed to drop.

ASTRONOMICAL PHOTOGRAPHY.

The merits of photography for astronomical purposes is being rather severely handled by the American astronomers, Professors S. P. Langley and C. A. Young having lately been writing in very desponding terms as to its use and capabilities. The former gentleman (who, as our readers are well aware, has devoted more time and made greater sacrifices of personal comfort than any living astronomer in carrying out observations, having in view the elucidation of the physical structure of the sun), had made his observations in almost inaccessible regions, and at heights where continual existence was almost impossible, and the mere attainment of which, apart from any observational work, was in the case of some of his assistants dangerous to life. His words must, therefore, be received as those of high authority, and will have a tendency to cause some disappointment in the minds of ardent disciples of our science, though a calm review of the situation will tend to show a brighter-coloured picture than he appears to give.

In the *Century* for September this gentleman began a series of articles on the "New Astronomy" of a highly interesting character, which may be read by all photographers who are versed in the higher scientific aspect of the art. In his contribution Professor Langley, while giving a fair meed of praise to the work done by photography, fails to allow it as extended a sphere of usefulness as might be hoped to belong to it. At the same time when we find him speaking, as he does in the October chapters, in such language as the following, there is, perhaps, not much need to fear for the future of photography in connection with exact science. He says, in describing his work in Spain, in 1870, and the preparation for it—"The camera can see far less of the corona (of the sun) than the man, *but it has no nerves* and what it sets down we may rely on." The very facts which he details may be used as an argument in favour of photographic observations; for his experience, founded on the remarkably and unsurpassably favourable atmospheric conditions that are obtained at his station in the Alleghanies, leads him to state that five minutes in twelve hours is about the average period during which correct observations can be made of the sun's surface, and that attempts made at other times to magnify the image would only lead to blurring.

His method of observation is very interesting. A piece of paper ruled into squares is placed like the ground glass of a camera to receive the image of the thirteen-inch equatorial, and the clock-work is then stopped. The time taken for the image of the sun to pass through one of the squares gives the scale of the drawing to be made. The clock is again set in motion, the telescope following the sun and keeping the image stationary upon the paper; then a tracing of the disc and any spots can be made, the finer details being, of course, invisible. The eyepiece is then removed and a polarising eyepiece substituted, thus diminishing the light sufficiently to enable the eye to examine the solar surface for hours together without injury, and so enable the details of the spots to be examined and the outline sketch to be filled in. Then comes the disparagement of photography. At this stage, the Professor says, the photograph will not show these details. It serves to give an outline of the markings, and places them accurately in their relative positions on the disc; but to see the intricate forms with which the black neutral space shown by the photograph is filled we must have recourse to the polarising eyepiece. Yet, notwithstanding the failures of photography, he has to observe that there is a tendency to exaggeration in drawing sun spots.

Professor Young adverts to a similar subject in his address to the American Association for the Advancement of Science. His name also carries great weight. For a moment he rouses expectations as to the good opinion he has of photographic aid; but he quickly ends by being more uncompromising than Professor Langley. He says:—"Photography comes continually more and more to the front, and the idea sometimes suggests itself that by-and-by the human eye will hardly be trusted any longer for observations of precision, but will be superseded by an honest, unprejudiced, and imaginative plate and camera. The time is not yet, however, most certainly. Indeed, it can never come at all as relates to certain observations, since the human eye and mind together integrate, so to speak, the impressions of many separate and selected moments into one general view, while the camera can only give a brutal copy of an unselected state of things with all its atmospheric and other imperfections."

Now, while admitting the weight of any dictum of Professor Young's, we would suggest that there is nothing in his remarks that logically supports his statements. If an artist were to depict a little-frequented street by painting in his one picture all the figures that passed down in a whole day, we apprehend that no one would perceive it as a truthful copy of the scene. Similarly with the sun and its changing surface: it can scarcely be right to place in one view a representation of a series of changes that may have occupied a day. But even were this a fair mode of representation there can scarcely be found in his remarks any indication that a series of photographs could not be taken so as to contain details of all the phenomena the telescope showed.

We may except the remark about atmospheric disturbances. A photograph occupying any appreciable length of time in its production is necessarily subject to imperfect definition, owing to the shifting of the image by the continual change in the atmospheric refraction brought about by heat. The extent to which these quiverings of the air must influence results may be judged of when, as we have learned from Professor Langley, the delicate features of the sun's surface are only distinctly visible during about the hundredth part of the time devoted to its observation, entirely owing to this tremulous effect of the air.

When, however, we have before us the wonderful photographs of the nebulæ in Orion taken by Mr. A. A. Common, and the various star pictures lately alluded to by us, and we see the extent that photography has been made use of by the astronomers in the very place where its fair merits are detracted from in the manner we have described, the photographer may take heart of grace and rest assured that real triumphs await the science in the future, and that its aid will be of the utmost value in scientific research.

We only venture to express a hope that this attempt to pull down photography from its high pedestal will not encourage those pseudo-prettinesses—the namby-pamby engravings of delicate effects founded on photographs which do not contain a tithe of what is represented as being produced by its aid. If we are to have engravings let us have engravings, and if photographs let us have photographs — not those absurdities by the side of which the smoothest and most vapid retouched photographs are pregnant with character and individuality.

THE PHOTOGRAPHIC EXHIBITION.

[First Notice.]

The annual Exhibition of the Photographic Society of Great Britain was inaugurated by the usual *conversazione* on Saturday evening last the 4th inst., and was opened to the general public on Monday morning. The *soirée* was, as usual, well attended, amongst the visitors being the Lord Mayor elect (Mr. Alderman Nottage) and his lady.

The judges this year were Messrs. William Bedford, W. F. Donkin, M.A., F.C.S., F.I.C., William England, J. E. Mayall, F.C.S., F.R.M.S., William Mayland, and Andrew Pringle; and the awards, which were made on Friday, are as follow:—Swiss Views (No. 23), Vittoria Sella; *Instantaneous Sea Studies*, (No. 43), W. P. Marsh; *The Mill Door* (No. 67—composition picture), H. P. Robinson; Platinotype Prints (Nos. 219-20-21), H. B. Berkeley; Interiors (Nos. 234-5), Alf. Tagliaferro; *Mother's Love* (No. 282), J. Hubbard; *Yachts* (No. 309), G. West and Son; *Portraits* (No. 387), Lafayette; Photo-engravings (Nos. 466 and 474), T. and R. Annan; Photomicrographs (No. 483), J. R. Dunlop; *Photographs of Lightning* (No. 485), M. Auty.

The Exhibition is a fairly good one, the average being perhaps higher than usual; but there is a noticeable absence of any specially good work. There are also surprisingly few specimens of so-called instantaneous pictures, the *furore* for that class of exhibit having apparently abated.

Commencing our annual "round" of the catalogue, we find first Mr. J. P. Gibson's frames of landscapes (Nos. 4-7), of which it is difficult to select the best. *On the Tyne at Bywell* and the *Blasted Oak Tree on the Allen* are equally deserving of praise.

Herr Hartmann Koch exhibits several landscapes and architectural subjects of large size, the landscapes being the best. A very curious effect is noticeable in *The Sea Alp* (No. 114): the reflections of the mountains and surrounding objects are well rendered in the lake, but in the immediate foreground it is difficult to decide whether the peculiar markings are supposed to be reflected clouds or merely stones and vegetation at the bottom of the shallow water.

The School of Military Engineering are fully up to their ordinary standard, if they do not pass it. Their Devonshire views—at Lynmouth and in the Lyn Valley—are amongst the best work we have seen of theirs in recent exhibitions, a view on the beach at Lynmouth being especially good.

Mr. Malcolm H. Clerk shows several very clever pieces of composition grouping, which remind us much of similar work by another

No. 13—*The Last Bit of Scandal*. By Malcolm H. Clerk

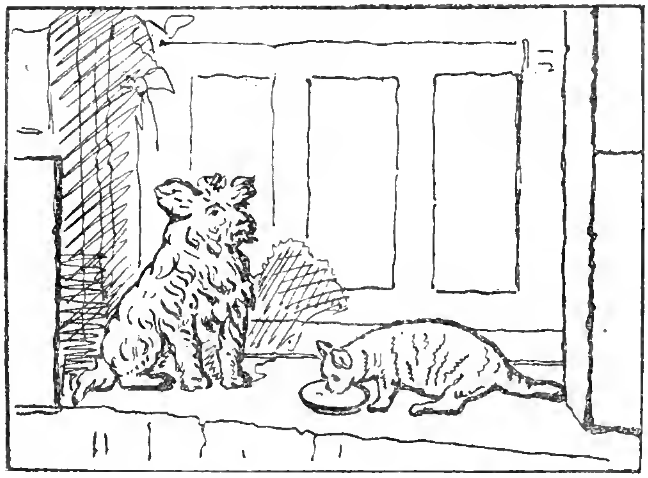
amateur, the late Mr. H. Cooper. One of these—*The Last Bit of Scandal* (No. 13)—we have selected for illustration.

The next exhibitor on the list is Mr. W. Cotesworth, whose *Awkward Lead* and *The Revoke* (No. 15) we hope to illustrate in a later issue. These are two of the cleverest compositions we have ever seen produced by photography; the conception and execution—to say nothing of the humour of these little pictures—are beyond praise. Mr. Cotesworth has also a *Last Bit of Scandal* (No. 441), which is worthy of equal commendation.

Mr. J. Harris Stone shows several pictures of large size—whether enlargements or direct is not stated. Whatever interest these may have for the archæologist they are scarcely up to the needful standard of a photographic exhibition. Most of them are hung so high that it is impossible to examine them minutely; they are, however, easily judged from a distance.

In frame No. 23 we have a fine collection of Swiss views, by Sig. Vittoria Sella, to which the judges have awarded a medal. These are bold and vigorous without hardness or excessive contrast, while, at the same time, there is all that could be desired in the matter of detail and softness.

Dog and Cat (No. 25), an enlargement from a negative, by Miss



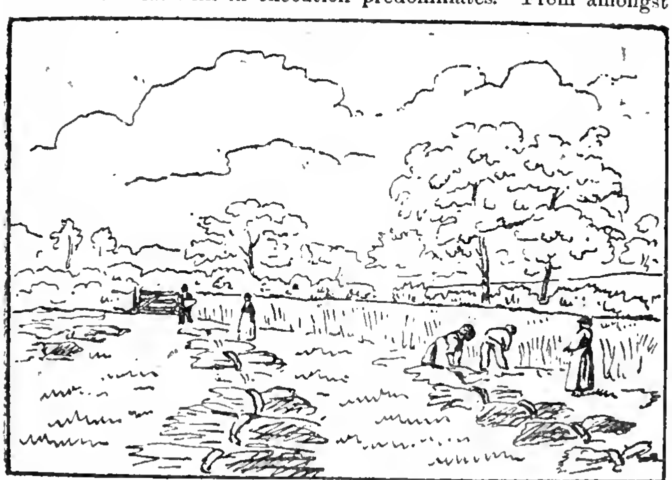
No. 25—*Dog and Cat.* By Miss E. M. ESWORTH

E. M. Cotesworth (a daughter, by the way, of Mr. W. Cotesworth, whose pictures we have just noticed), is a clever animal study, and a fine composition. We have selected it for illustration; but it is impossible in our sketch to convey the expression on the little terrier's face as he watches the disappearance of his food.

Mr. H. S. Mendelssohn is, as usual, well represented—this year n a somewhat new style of picture. Whatever may be the process by which his prints are made—platinotype or bromide paper, we have not examined them closely—the cold black tone in many cases is very pleasing; but in others it must be confessed the result is not so favourable. As regards the pose—all the exhibits being portraits—there is little else but praise to be given, though, in one or two instances, perhaps rather as a matter of taste, a modification might be suggested. We have chosen a portrait of *Mrs. Duppa* (No. 26) as an illustration of an elegant and happy pose.

No. 26—*Mrs. Duppa.* By H. S. Mendelssohn.

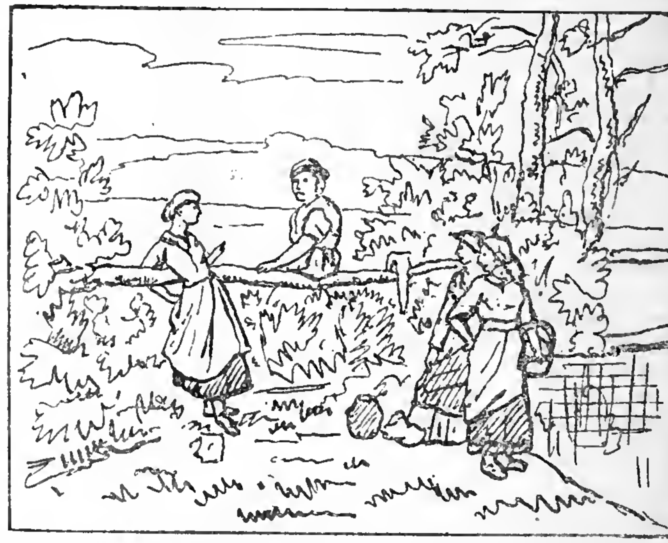
Mr. S. Norman shows several pictures in his well-known style—a style in which it is difficult to say whether artistic taste in selection or technical skill in execution predominates. From amongst



No. 44—*Studies of Corn Fields near Burgess Hill.* By S. Norman.

his *Studies of Corn Fields near Burgess Hill* (No. 44) we have selected one as a sample of composition.

Mr. H. P. Robinson receives again a well-deserved medal. His work this year is, we think, as a whole, better than in former years. *The Mill Door* (No. 67), to which the medal label is attached, is a very fine rendering of a subject which in itself possesses little pictorial interest. As presented to view by Mr. Robinson's camera we have, however, an unmistakably pictorial result. *The Cuckoo* (No. 64), *He Loves Me, He Loves Me Not* (No. 53), and *A Chat with the Miller* (No. 68), are also worthy of careful study; but we prefer, for general excellence, *He Never Told His Love* (No. 66), which is



No. 66—*He Never Told His Love.* By H. P. Robinson

selected for illustration. In this the grouping of the figures is very cleverly managed; but the charm of the picture, which cannot be reproduced in our rough sketch, lies in the expression of the various faces. This, we believe, is Mr. Robinson's seventy-first medal.

We shall resume our notice of the pictures next week, meanwhile we pass on to a preliminary review of the apparatus.

APPARATUS.

The collection of apparatus at the Exhibition is large, much of it somewhat unique, the design, fittings, and finish, as a whole, are unexceptionable, and the entire display is being very critically examined, apparently with discrimination and interest. We commence by giving a synopsis of the collection, to be followed by fuller notices in detail.

A 15 × 12 camera with others of smaller dimensions are contributed by Messrs. Watson and Son, who also exhibit instantaneous shutters of various descriptions.—Tourist and other portable cameras, with slides and an alpenstock stand, are exhibited by Messrs. J. L. Lane and Sons.

Messrs. Sands and Hunter have also a good show of cameras, including three of whole-plate sizes, possessing various peculiarities of mechanical construction; they also exhibit cameras of half-plate size, instantaneous shutters of several descriptions, a camping lamp, and an improved plate book.—One of the patent automatic changing camera-backs of Mr. Thomas Samuels (of which an account was published last year) is exhibited by the inventor, who also contributes packing-boxes for sensitive plates and a half-plate changing-back.—A combined camera, changing-box, and plate-box is exhibited by Mr. Herbert S. Starnes.

The London Stereoscopic Company have sent four cameras—whole, half- and quarter-plate, together with a "*multum in parvo*" half-plate set.—The "*vade mecum*" camera, with two double dark slides, and an instantaneous shutter, owe their presence to the Photographic Artists' Co-operative Supply Association.

The newly-patented "compactum" shutter of Mr. S. W. Rouch finds a place among the other exhibits of Messrs. W. W. Rouch and Co., which consist of their whole-plate patent camera with reversing frame, and the "special correspondent" set, for use on horseback.

Messrs. J. F. Shew and Co. are the largest exhibitors of apparatus in the Exhibition. They contribute about a dozen cameras, each differing in some respect from the other; camera stands of a variety of forms; two kinds of exposing shutter; a folding changing-box; reversing tops for camera stands; the Godstone washing-tray, and an adapter for a camera—a combination readily converting a camera into one of larger size.

Mr. Warnerke affords the visitors an opportunity of examining some Russian productions, consisting of two cameras invented by Professor Ezutchewsky, and made by Klatchko, of Moscow, containing respectively twelve and sixteen plates, which may be brought into the proper position for exposure in rotation in the open daylight.

Messrs. Marion and Co. show their patent new syphon plate washer, a miniature camera, and a camera with Cadett's new pneumatic shutter.—Mr. Cadett himself also exhibits his shutter.—Several specimens of the Phœnix instantaneous shutter of Messrs. Reynolds and Branson are contributed; an adjustable instantaneous shutter by Mr. Thomas Furnell; and two shutters (one a "drop" and the other a "spring") by Mr. T. J. Smith.—A patent "simplex" slide and reversible camera-back are exhibited by Mr. A. G. Hopkins, and a developing-dish by Mr. Andrew Pringle.

In addition to the foregoing there are also pieces of apparatus connected with the lantern, such as Beard's universal self-centering slide-carrier.

As on a previous occasion, we shall describe these in detail, with illustrations where required.

The wave of opinion in favour of yellow light for dark-room illumination appears to be spreading on the continent, as it certainly has to a great extent in America. In the present number of Liesegang's *Photographisches Archiv* the editor states that he has adopted it in his developing-room with great comfort to himself. He says that he finds two thicknesses of golden fabric sufficient, and speaks in high terms of the quantity of light transmitted and the freedom from veil of the negatives developed under this light. For preparing emulsion plates, however, he still considers a ruby light necessary; but it is possible that if he had tried additional thicknesses of the "fabric" he should have found, as some of our English workers state, that the resulting yellow light is at least as safe as a ruby giving the same amount of light by which to work.

From the same number of the *Photographisches Archiv* we cull the following story:—An American gentleman found the prolonged absence of his wife, who was on a visit to her parents, become tedious. He, therefore, had a photograph of his house taken with the wife of a neighbour sitting in the verandah, engaged in conversation with him. The picture being sent to the absent spouse she returned by the next train.

It must, we almost think, have been a photographer who spoiled the Liebig memorial statue at Munich. It was covered over with spots and stripes, and a close examination revealed the fact that silver and manganese had been the agents employed to produce the defacement—probably in the form of nitrate of silver and permanganite of potash. Photographic experiences, however, were made use of in rendering the statue white again. The metals were converted into sulphides by means of sulphide of ammonium, which, as it could not be applied for a sufficiently long time in the liquid form, was mixed with kaolin and placed in contact with the stains for twenty-four hours, after which it was removed and replaced by a fresh supply—also allowed to remain for a day—and then carefully washed. The next step was to remove the sulphide by dissolving in cyanide. This also was done by the aid of kaolin, which was used as a sponge, so to speak, to hold the cyanide. The effect was perfect; all but a few stains were removed, and these few were finally got rid of by a further similar treatment.

There seems to be some disagreement about the appearance of the new comet. Mr. Denning, writing from Bristol, says that it is by no means a conspicuous object; while Lieut-Col. Tupman writes from Harrow, on the same date, that it is a rather bright telescopic comet, capable of being just seen with a binocular. Dr. C. Zelbr, of the Imperial Observatory, Vienna, has been calculating its elements, and finds that it is slowly approaching both the sun and the earth, and consequently increasing in theoretical brightness. About the twenty-fourth of November is the estimated time of perihelion passage, at which period it will be about half as far again from the sun as the earth is. It is now about equidistant from sun and earth, and will slowly approach the earth till towards the end of the month.

The *Athenæum* states that the celebrated Austrian traveller, Mor Déchy, has during the past summer made an extensive journey in the Caucasus, with the combined object of photography and mountain exploration. He had an August of unprecedentedly bad weather, but managed, nevertheless, to obtain upwards of two hundred photographs, which it is hoped may be exhibited at the annual meeting of the Alpine Club next month.

Photography is to the fore also in Major Serpa Pinto's expedition, who is reported to be leaving Mozambique for the Nyassa lake, Tanganyika, and the Upper Congo. His expeditionary force consists of two hundred and fifty carriers and a hundred armed men. A lieutenant of the Portugese army and an English photographer are attached to it. We may expect that this region, about which such extravagant fables were uttered by the old historians, will yield a vast crop of subjects of the most interesting character. Photography destroys some wonderful romancing, though it substitutes its own share of marvels.

With regard to the suggestion to attach the camera screw to the tripod top, so as to ensure its always being at hand when required, Mr. G. Watmough Webster informs us that he can bear testimony to its usefulness, after having had the method in use for nearly two years, the suggestion of the means for doing this having been made by Mr. J. Leigh, of Manchester, who had had it in use for a considerable length of time. Mr. Watmough Webster adopted the method with a Rouch tripod by removing the brass ring against which the screw works and substituting a fresh one tapped so as to fit it. A considerable portion of the thread of the screw from the part nearest the handle was then filed away, so as to allow it to work free when screwing into the camera. When unscrewing it after use, the moment the camera was loosened no further turns were needed, and the screw was left fitting loosely and unable to become disengaged within the central aperture of the tripod head. It will, perhaps, scarcely need remarking that, in case of more cameras than one being in use, either all would have to be adapted with female screws of a similar size and pitch, or the advantages of the method—namely, the assurance of the constant presence of the screw with the tripod—would be lost.

The remarkable sunset glows—such a prominent subject of interest last autumn—are again making their appearance, and from all quarters come accounts of the phenomena and their beautiful tints. The most generally received theory, as our readers are aware, ascribes the strange appearances to the effects of the eruption of Krakatoa last year, the dust ejected from the volcano being supposed still to remain suspended in the air. The same explanation was given by M. Cornu, in a paper read before the French Academy, to account for the corona now visible round the sun, and the variations in its form and colour. His paper gave also a method of increasing its luminosity and photometric observations upon its light.

Apropos of photometers: the *Journal of the Russian Chemical and Physical Society* contains an account of a new instrument for schools, devised by Professor Petronshevky, an adaptation of which might possibly be useful to photographers. This new photometer allows the amount of light received by books, paper, &c., on the desks of the scholars to be accurately and quickly measured. Such an instrument should be of considerable use for many purposes, if its simplicity and accuracy are correctly reported.

Some of the photographs exhibited at the Canadian meeting of the British Association are, perhaps, the most remarkable ever taken. Amongst these, in particular, may be mentioned those by Professors Liveing and Dewar of the spectra of explosions. They were made in an iron tube with quartz ends, and, it may be thought, must have had great elements of personal danger in them.

DIFFICULTIES IN AMATEUR PORTRAITURE.

It is all very well to advise the amateur photographer to "stick to landscape work and to leave portraiture alone." He must possess a great deal of determination if he can adhere to the resolution which he may make in accordance with the advice.

Apart from the natural attraction of portraiture—of working on a human subject which will have an interest in the result—there is the importunity of friends. Why that importunity should exist has always been a mystery to me, seeing how far short the portrait of the most skilful amateur must fall compared with that produced by a professional, who has a studio at his command and is a good retoucher, or employs a retoucher—unless, indeed, the sordid consideration of the saving of money has something to do with the matter.

However, the fact remains that the friends of the amateur will solicit him "to take likenesses of them." There is something a little cool in the request if we take into consideration the expense in both money and time involved in exposing (say) three or four half-plates and printing a dozen cabinet impressions from them. Less than a dozen will never satisfy, whilst the capacity of some individuals for absorbing prints appears to be quite indefinite.

The request is a little cool, I think, in whatever language it is couched; but if, as is often the case, it comes in the form "You may take me, too, if you like," it transcends most things in impudence. To such the amateur, if he be wise, will reply, "Yes, I may." Also "I may *not*," especially as a request put into such words comes always from the mouth of an individual of the "male persuasion," and generally from one who is preternaturally plain looking. Of course the amateur must consider himself honoured by a request in any form to have her portrait taken when it comes from one of the fair sex.

The difficulties which stand in the way of the amateur portraitest, especially if he be situated in London, are by no means small, in spite of all that is said by the vendors of apparatus for the use of amateurs. These vendors naturally find it to their advantage to make out that since the introduction of dry plates the taking of portraits in an ordinary room is a mere joke.

The first and chief difficulty is, of course, that which applies to portraiture of all kinds — the difficulty of posing. Of this I do not consider myself qualified to speak, and, therefore, say nothing.

The next difficulty is that of *lighting*. This is one where a little advice may be useful. To secure roundness without hardness is the great difficulty. It is best to have one window only as a source of light. The wider this is the better. With a very wide window—a bay window, for example—it is possible to get lighting almost as good as in a studio.

The tendency of most beginners will be to place the sitter just by one side of the window—perhaps a little behind it. Then if the camera be placed at the other side of the window a very brilliant lighting may be got, and a portrait *of a kind* may be taken with an exceedingly short exposure — probably but little longer than is necessary in a studio. I have, however, found it quite impossible, with the sitter placed as indicated, to avoid a very heavy shadow on one side of the face, or to avoid having too great a proportion of the face in shade, even supposing the shadow not to be too intense. To get a suitable proportion between light and shadow it is necessary that the angle between the line joining the centre of the source of light and the sitter, and that joining the camera and the sitter, should be comparatively small. In other words, it is necessary that when the sitter is facing the light he may also be *almost* facing the camera. To effect this he must be placed at some little distance from the window, and somewhat behind it. If the camera be now placed at the corner of the window remote from the sitter it will be found that an image is got which is at least two-thirds or three-quarters light — only one-third or one-quarter shadow. A reflector must, of course, be used to soften the shadow. I have found nothing better than a sheet, which may be placed over a screen or clothes-horse, or, still better, may be held in the hands of an assistant—by two if they are to be had. In the latter case the sheet is held so as to extend from the sitter as far as possible in the direction of the camera. If the sitter be looking towards the light the sheet may be kept in motion during the exposure. This will somewhat soften the transition from light to shadow.

The next difficulty lies in the length of exposure which is necessary. Even with the most rapid plates this is at times excessive. In the "table of comparative exposures" which I gave in The British Journal of Photography some time ago, and which the Editors were good enough to reprint in the Almanac, I gave four seconds as the exposure for a portrait in an ordinary room with a lens working at $\frac{f}{6}$ the full aperture of the ordinary portrait lens). Of course this is a very vague approximation, but I think that, with the conditions which I had in my mind at the time I wrote the table, it will be found to hold pretty good. I thought of a sitter placed as I have just described, a fairly large window, a bright north light in the country, and a plate giving about 16° on the sensitometer, that being about the rapidity of the best commercial plates at the time at which I wrote. Excellent plates can now be had at least two or three times as rapid as any that could then be relied upon. Even if these be used, however, the exposures given in the table will be found to be fairly correct *for the conditions usual in a London house*. The light in London is, at the best, not so good as that in the country, and, as a rule, a certain proportion of it is blocked out by houses opposite the windows.

If nothing larger than *cartes* be attempted there is no difficulty in always using as large an aperture as $\frac{f}{4}$, in which case the exposure will be by no means out of the way. When we come to cabinets, however, the difficulty is greater, and we must, as a rule, use a much smaller aperture than $\frac{f}{4}$; indeed, I think $\frac{f}{8}$ is about the largest that will, as a rule, give a tolerable result. We now have our exposure increased to about a-quarter of a minute, which is a very long one if no head-rest be used. My own experience is that four or five seconds is the utmost length of time that the average sitter can remain so still as not to show evidences of movement in a photograph. But it is not only the moving during exposure that is so troublesome; it is the moving of the sitter nearer or further from the camera after focussing and before exposure. The amateur using a camera not specially constructed for portraiture is not likely to be exceedingly expeditious in the processes which intervene between focussing and exposure. Half-a-minute, at least, is likely to elapse. He does not like to tell the sitter to remain absolutely still from the time the focussing is finished till the time of the exposure, because he knows the effect it will have on his expression. If he tell his sitter that he need not remain absolutely still, but that he must not appreciably increase or decrease the distance between himself and the camera, he will only hopelessly confuse him. As a matter of fact it will be found that, in nine cases out of ten, the distance between the head of the sitter and the camera will be found to have altered an inch or two between the times of focussing and exposure. This will not show in the case of a *carte;* but it will in the case of a cabinet or anything larger, if lenses of the proper focal length—that is, double the longer dimension of the plate—be used, and if the aperture be the largest practicable.

For all these reasons I say that for working in an ordinary room—in London, at anyrate—if portraits larger than *cartes* are to be attempted, a head-rest should be used. This should only be caused to *touch* the head, and must not be brought into position till after the posing has been done. My friend, Mr. W. Cobb, gave me an excellent hint in telling me that when the exposure was short it was sufficient to bring the rest to bear on the *shoulder* of the sitter.

Backgrounds are always a trouble to the amateur. If he operate at his own house there is no reason why he should not have one or two prepared backgrounds. If he go to a friend's house to take portraits he must do the best he can. The old idea of the blanket cannot be surpassed for heads which are to be vignetted. It must be placed well out of focus. Nothing looks worse than any indication of the texture. For ordinary portraits a curtain hung in folds makes a good background.

When it is desired to get anything more than a head and shoulders, working indoors, there is the greatest difficulty in getting the camera far enough from the sitter without getting it into such a position that there is too much shadow exposed to it. We must either have too much shadow or must place the sitter at a very considerable distance from the window; in which latter case the exposure will be somewhat protracted — not so much as might be expected, however.

The amateur is not likely to have a studio stand for his camera, and the ordinary tripod may prove a "weariness of the flesh" to him. Its legs gets mixed up in a marvellous way with the furniture, and slip in the most unexpected manner. Moreover, they are usually far too long, unless, indeed, they are of the kind which slide up, and which may be shortened as much as is desired. The height of the lens should not be above that of the eye of the sitter.

Concerning the quality of negative which it is desirable to get in the case of a portrait taken indoors: I may say that I consider that the best pictorial results are to be had from negatives which appear a little under-exposed; such as show, at least, a little quite clear glass. The shadows in a room are always very deep, and the high lights comparatively bright. If we expose so as to work into all the deepest shadows it is ten to one that the face will be spoiled by incipient halation. W. K. BURTON.

SENSITOMETER SCREENS.

IN an article in our last number on *Phosphorescent Tablets for Sensitometer Purposes* we intentionally refrained from any description of the graduated screen, since that subject has been so frequently dealt with in these columns during many years past. We have, however, received several letters requesting instructions; so, in order to avoid the necessity for reference to back volumes, we shall here give a few brief hints.

We have to consider three principal points, namely, the most convenient form of instrument, the most suitable material through which to filter the light, and the relative values of the different steps or tints. As regards the general form of the screen: it consists of a series of graduations formed by superimposing varying numbers of thicknesses of some translucent material. The first question to decide is the best method of arranging these tints in order to secure the maximum of convenience. In the Warnerke screen, as most of our readers are aware, the tints—twenty-five in number—are ranged in rows of five, forming a square of a little over two inches, the numbers running alternately up and down the lines of squares so as to preserve their sequence. This is a convenient and compact arrangement, and, so far as its mere application as a sensitometer is concerned, leaves nothing to be desired. But where, in addition to the reading of the highest visible number, it is desired to compare the density of particular tints produced upon different plates, it does not permit of these being brought into juxtaposition for the purpose of close comparison.

A better form for this purpose, and one which is more easily constructed, consists of a series of narrow strips stretching right across the plate, which may conveniently be of quarter size. Allowing an eighth of an inch at each end of the longer dimension for the rebate of the frame, we can form a series of sixteen bands a quarter of an inch wide—quite a sufficient number for most purposes. If a wider range be required the tints must be made narrower.

Now, with regard to the translucent medium of which the screen is made: many different materials have been used, including tissue-paper (white and coloured), thin sheets of gelatine, ordinary sensitised paper graduated by successive exposures to light, as well as carbon tissue, and even dry-plate films treated in the same manner. In the Warnerke instrument the screen consists of a Woodbury print from a graduated mould; but the process of manufacture is not available to all, nor is it needful to adopt it, except for the purpose of securing uniformity between different screens.

Of the materials mentioned all those are objectionable in which any decided colour is present, as owing to the varying colour-sensitiveness of different plates they are not likely to give reliable results when used for purposes of comparison. What is required is a tint as nearly neutral as possible, the different grades being formed by a gradual suppression or cutting off of the light rather than by a change of colour. Where a colour-screen is employed it may probably prove reliable when employed (say) with a bromide plate prepared in a particular manner, while in connection with a bromo-iodide plate its readings would be altogether different.

These conditions are best fulfilled by the use of colourless tissue-paper, by carbon tissue, or by a dry-plate film, if the latter be developed so as to be free from green fog or pyro. stains. On the whole we prefer the two former.

As regards the relative values of the tints: while it is desirable that some definite ratio should exist between the successive gradations, as in the Warnerke screen, it is not by any means an easy result to attain. The amateur or operator who employs the sensitometer simply for his own purposes will soon find, by actual experiment, the relative values approximately of his different tints; indeed, it is probable that such approximate determinations will be infinitely more trustworthy than those obtained by theoretical calculation. The question as to whether the gradations should be in arithmetical or geometric progression is one that must be decided in accordance with the purpose for which the instrument is required—the former giving a delicate scale of narrow range; the latter a wider range with greater contrasts between tint and tint.

The only objection to the paper scale is that the "grain" of the paper sometimes renders it difficult to read a faint tint; a fine silk paper should therefore be selected, as homogeneous and free from texture as possible. No gum or other adhesive should be employed except at the extreme edges, as that would infallibly produce irregularity. The following is the plan to adopt for (say) a quarter-plate screen. Take as the basis a piece of smooth, preferably patent plate, glass—$4\frac{1}{4} \times 3\frac{1}{4}$; apply a very little paste along the extreme edge of one of the shorter sides, and along this attach a strip of tissue-paper three-eighths of an inch wide. Allowing an eighth of an inch for the rebate this will give the first quarter-inch tint. Again: paste the edge and attach a second strip five-eighths of an inch wide, and so on, each time increasing the breadth of the strip by a-quarter of an inch. When the last tint is reached—that is to say, when the fifteenth piece of paper measuring $3\frac{1}{4} \times 3\frac{7}{8}$ has been attached—the last piece is cut a little larger than the full size of the glass, sufficient allowance being made for it to overlap an eighth of an inch. This is folded over and pasted to the front of the glass, and serves to keep all the rest in position. It may be necessary or desirable to progress by double thicknesses or to depart from the strict order of arithmetical progression; but by this method it is obviously impracticable to adopt geometric progression—at least for such a long range of tints.

If carbon tissue be employed it should, after sensitising, be squeegeed on to collodionised glass, and, when dry, stripped. In order to graduate it, the tissue, with a piece of opaque paper or thin card in contact with the collodion surface, is so arranged between two pieces of glass clamped together with American clips that the opaque paper may be drawn out gradually a-quarter of an inch at a time, in order to give successive exposures of varying lengths. Suitable means will readily suggest themselves to the ingenious operator, by which the arrangements may be carried out so as to obtain regularity and neatness. The tissue is mounted for development upon a quarter-plate, and treated in every way like an ordinary carbon print.

With regard to the graduation there will be a very wide latitude. Exposures may be made of gradually-increasing length, or a unit being fixed similar exposures may be repeated the requisite number of times. If the light be variable it will be advisable to adopt as the unit a very faint tint on albumenised paper in the Woodbury or similar photometer.

A gelatino-bromide plate may be treated in precisely the same manner; but in this case the relative values of the tints will depend more on the power of the individual plate to render the different gradations, than to the careful regulation of the times of exposure. In fact, except for very rough work the dry plate is not to be recommended. The carbon image, on the other hand, depends entirely upon the length of exposure given to each tint, and the relation of tint to tint cannot be varied in development. The whole range of tints may likewise be intensified, if necessary, by any of the well-known methods, without in the least destroying their due relations.

In conclusion: we may repeat that such an instrument as we have described, consisting of the home-made screen and phosphorescent tablet, can be of little use except to the operator himself, and must not in any way be regarded as a standard, even though similar conditions of construction be followed as nearly as possible. Still, for individual use, it will be found a convenient guide.

ON FURNELL'S LENS.

[A communication to the South London Photographic Society.]

IN addressing you this evening I intend my remarks to apply more especially to the amateur, whose equipment usually includes but one lens to reproduce all he may attempt in his photographic rambles; but I trust they will interest even the practical photographer who is armed with a whole battery of lenses.

It is well known that in order to produce pleasing results and artistic excellence in landscape photography one lens is insufficient, and even three of different focal length would be no excess. That is, a lens of short focus for buildings in close and confined situations and another of medium focus for general views are requisite, whilst a third of much longer focal length is needed to reproduce distant objects, &c.; and any lens capable of variation in its focus so as to serve for these varied purposes would be a boon to both the amateur and professional photographer.

In THE BRITISH JOURNAL OF PHOTOGRAPHY for April 27, 1883, Mr. Thomas Furnell described a photographic lens specially suitable for landscape and architectural photography, the focal length of which may be varied at will within certain limits, and which has certainly not received that attention from photographers its merits deserve.

The Furnell lens consists of a front combination of two lenses of somewhat novel construction. The outside one is of crown glass—

convex on its exterior and plano on the interior; and the inner lens is of flint—plano on its inside and concave on its back surface—the plano sides of the flint and crown being cemented together by Canada balsam. Behind the front combination, and separated from it by a distance about equal to its diameter, is a double-concave lens of flint glass. The most posterior lens is placed at a slight distance from the concave lens; it is of crown glass and plano-convex, and three back lenses of varied foci are supplied to complete the set. By using one or other of the back lenses, or no back lens at all, we can obtain with the half-plate lens either of the following focal lengths—seven, eight, nine, or fifteen inches. This lens gives a flat field, straight marginal lines, freedom from flare, covers well with stop No. 16 P. S. S. (Photographic Society's standard), and can be made at a moderate cost.

One peculiarity of this lens is that, if the front cemented combination be well and carefully made, the posterior lenses may be of far less accurate workmanship, ordinary spectacle lenses *if properly centered* acting quite as well as those made with all the optician's care and skill. Moreover, the concave flint lens may be replaced by a concave spectacle lens of *crown* glass; and, further, the curves of the three back plano-convex lenses may be altered to either double-convex or meniscus without injury to its working powers or disturbance of the chemical focus. In order to test its merits I have made one of these lenses with every possible care and attention in strict accordance with the author's description. To be enabled to give an unbiassed opinion I placed it in the hands of Mr. A. Cowan, and some of the results of his trials are now before us, proving Mr. Furnell's lens to be both useful and efficient; but if you ask me if I am *entirely* satisfied with this lens my answer would be a negative one, for its many good qualities are marred by two defects. These are want of rapidity and a total absence of uniformity in the stops; and to remedy these defects I have strong hopes of shortly bringing out a lens on somewhat the same lines, under the title of the "Compound Doublet." This compound doublet will consist of one brass mount only, into which any one or two of the lenses forming the set may be screwed for use.

By varying the lenses employed I hope readily to obtain for the half-plate size either a focal length of six inches, of eight and a-half inches, or of twelve inches. These focal lengths have been selected because they are especially suitable for general use, embracing horizontal angles respectively of 65° with the six-inch, 45° with the eight-and-a-half-inch, and 31° with the twelve-inch focus; and, further, with six stops it can be worked so as to give all the advantages of the Photographic Society's standard stops.

These six stops I propose to engrave as follow:—A on the largest, then B C D E and to F on the smallest. The first four, A B C D, will be 8, 16, 32, 64, when used with the twelve-inch set of lenses. The middle four, B C D and E, will be 8, 16, 32, and 64 with the eight-and-a-half-inch set of lenses, and the last four, C D E F, will be 8, 16, 32, and 64, when used with the six-inch set of lenses.

Such is a rough outline of what I hope to accomplish, and all that I have hitherto done in this matter points to success at no very distant period of time. If success be gained it will be largely due to Mr. Furnell, as his writings have certainly pointed out the path by which that success can be reached. W. ACKLAND.

THE SODA DEVELOPER MODIFIED.

As the soda developer for gelatine plates is just now receiving a large share of attention, I make no apology for asking you to favour me with space in your Journal to record the results of some experiments that have occupied my spare moments during the last two years. I think they explain satisfactorily some of the anomalies which, judging from what one reads in the pages of the journals, seem still to perplex not only amateurs, but professionals, in the pursuit of our art-science.

At the beginning of dry-plate work it seemed to me—as, doubtless, it did to others—most desirable to get rid of ammonia, if possible, in the operation of development, on account of its extreme volatility, and the possible consequences to health of constantly inhaling an atmosphere charged with its vapours. This last consideration particularly has led me from time to time to try other formulæ which did not contain the objectionable free ammonia. Still *none* of the substitutes for that alkali proved equally good; for, with them, either the development proceeded too slowly or the colour of the developed image was unsatisfactory. So there was no help for it; ammonia had to be retained, or pyro. must be exchanged for the oxalate developer, and I have a strong preference for the former.

When Mr. H. B. Berkeley published his sulphite-of-soda formula I tried it, and formed a very high opinion of its merits; but a short experience of the use of sulphite of soda and citric acid convinced me that it greatly retarded development. Observing Mr. MacLellan's recommendation for preserving pyro. with sulphurous acid alone, and perceiving that its volatility would prove objectionable to its use, I substituted this acid for the citric mentioned in Mr. Berkeley's formula with the best results. I published the alteration in THE BRITISH JOURNAL OF PHOTOGRAPHY, and have since observed that others have recognised the advantage of the change.

About this time I tried the effect of soda along with the pyro., preserved by different agents, and was surprised to find that it yielded better results with the sulphite of soda, as above prepared, than it did with other preservatives. With several acids—notably the boracic, as the keeper of the pyro.—hardly any development was effected, so powerfully did salts (those formed with the soda) counteract its energy. There was one—I believe only one—objection to the new formula, and that was the colour of the image, which I could not then modify to my satisfaction; so ammonia was restored to its old place, and thenceforth for some time attention had to be given to the prevention or cure of green fog, which was the chief fault, in my opinion, of sulphite of soda.

More recently I noticed that soda was again attracting attention, so I resumed my experiments with it, and this time they proved completely successful. I had discovered a new way of bringing pyro. under the keeping power of sulphurous acid, which I was sanguine enough to think would altogether displace the old method in my practice. It was as follows:—Pyro., one part dissolved in ten parts of sulphurous acid (strength nine per cent.), barely neutralised with ammonia. Thus prepared with sulphite of ammonia the mixture keeps well, is more colourless than a solution made with sulphite of soda, and, moreover, works cleaner, the plates being more free from green fog.

This new preparation was tried with soda (*plus* sulphurous acid) in place of the ammonia bromide, and the result was all that could be desired as regards energy and colour of the image; but there was a trace of green fog, and this circumstance struck me forcibly, because it seemed to confirm a suspicion which had been excited in my mind by a singular coincidence—previously noticed—that green fog had disappeared almost entirely, even on plates very prone to it, when the pyro. kept by sulphite of *ammonia* was used in conjunction with the ordinary ammonia bromide solution. But now, on the contrary, green fog made its appearance (even under soda development, which was supposed to be exempt from that evil) when ammonia took the place of soda in the ingredients of the pyro.; so it was fair to conclude that a combination of the two alkalies in the developer was the cause of green fog, or, in other words, the tendency of ammonia to produce green fog is much increased by the presence of soda. A repetition of the above experiment, using pyro. solution containing *soda* instead of ammonia, proved the justness of the conclusion; for now the film turned out absolutely free from all trace of the evil, and the colour of the image was perfect.

I have not yet worked by the new method long enough to be able to speak with certainty of its merits; but, thus far, it seems very likely to bring about a revolution in my practice, and ammonia may at length be altogether superseded. The following is the formula I am now using:—

No. 1.

Pyro.	1 part.
Sulphurous acid	1 „
Water (distilled)	8 parts.

No. 2.

Saturated solution of carbonate of soda	6 parts.
Sulphurous acid	1 part.
Bichromate of potash (five per cent. sol.)	1, 2, or 3 parts.
Water	18 „

To develope a half-plate: take one drachm of No. 1 and mix with two and a-half ounces of No. 2. Use in the ordinary way. The addition of bromide does not seem to be needed, except in the case of over-exposure of the plate. Development proceeds more slowly than with ammonia, but otherwise soda has several advantages. Its only failing is a slight tendency to produce frilling on some plates very prone to the fault; but this may easily be prevented by passing the plate through a bath composed of *protosulphate of iron*—say two ounces to the pint of water—with a quarter of an ounce of tartaric acid to make it keep. The sole function of the sulphurous acid in the above formula is to modify the colour of the developed image; therefore no more of it should be used than is necessary to produce the colour desired, because the *sulphite of soda* formed in the developing solution powerfully retards its action, as may easily be proved by omitting the acid in No. 2, when it will be found that development goes on with great energy, rivalling pyro. and ammonia.

Finding that the sickly-coloured image which is produced when sulphurous acid is omitted from the above formula can easily be made to take a pleasing and suitable tone, by passing it through the iron bath before named between the operations of developing and fixing, I have been induced to alter my practice in favour of this latter method, because it saves time, and the result is quite as good.

The plate should be well washed both before and after immersion in the iron bath, in which it should remain from two to five minutes, according to the tone required. The longer it stays the blacker the image becomes.

Bichromate of potash takes the part of an accelerator, but how it does so I am unable to say. About two years ago I added a little to my pyro. developer to see if it would prevent green fog, when, behold, it accelerated energy! It must have the effect of hardening the gelatine also, because there is less tendency to frilling when it is present. W. Hanson.

SILVER PRINTS.

In reading Mr. W. K. Burton's communication on *Silver Prints* in your issue of the 26th ult., there appear certain points confirmatory of the theory that hyposulphite of soda is not *the* cause of fading. It is, however, somewhat unfortunate that the sensitised paper used was a secret preparation, as all the experiments are based on unknown quantities. That ready-sensitised paper contains less soluble silver salts and a considerable quantity of some acid not contained in paper prepared at home is patent to most persons who use it. However, that the image is substantially the same as when ordinary sensitised paper is used there is little doubt; at the same time the additional unknown substances used to effect its preservation may possibly affect such experiments as those made by Mr. Burton.

In his experiments Nos. 1, 2, and 3 the prints have all faded almost to obliteration, *no* hypo. being used. In experiment No. 10 hypo. was used for a very short time—ten seconds—and the print remains good. The deductions to be drawn are, firstly, that silver prints fade, whether subjected to the action of hypo. or not, *if not washed.* This is precisely the effect that might have been anticipated; but if, when well washed after partial fixing, they remain under circumstances unchanged for a considerable time—I may add if thoroughly fixed—they will remain unchanged for an indefinite period. Whether subjected to the action of light or enclosed in a portfolio makes no difference. That the effect of fading is produced by causes other than hypo. I have frequently endeavoured to point out, both in communications to this Journal and also in papers read before the photographic societies, with my reasons for so thinking. May not the same substance that causes the deterioration of gelatine plates when used to pack them, and, as you have shown, is *not hyposulphite*, be the cause of the difficulty? I merely throw this out as a suggestion. The more rapid and pronounced effect may be owing to the extra sensitiveness of the gelatine plates.

Mr. Burton's idea that the time usually given to fixing is unnecessarily long is rather dangerous, for he may rest assured if any salt soluble in the hypo. solution be undissolved and left in the paper the print is certain to decay; it will turn yellow, brown, and unsightly in a short space of time. The more it is exposed to light the sooner will the change take place. The same effect will occur if, after the hypo. has effected its purpose of dissolving the silver salts, it, with them in solution, is not thoroughly washed out of the paper, the hyposulphites being extremely prone to decompose.

If the substances we desire to eliminate were, as Mr. Burton seems to think, confined to the very thin layer of albumen it might be sufficient to give a very brief immersion in the hypo. bath. But it is not so, for they more or less entirely permeate the substance of the paper from front to back. This is practically demonstrated in obtaining a plain paper print by floating the back of the paper instead of the albumenised surface on the silver bath. Even if the process of silvering be performed as rapidly as possible on the albumen side of the paper and dried it will be found that a touch of hypo. solution on the back of the paper will rapidly produce a dark stain of sulphide of silver. The fixing process must, therefore, be continued until the whole substance of the paper is deprived of the salts therein contained; and then the hyposulphite solution with its dissolved silver salts must be thoroughly and effectually removed by washing, for not till then can we pronounce the silver print permanent.

Mr. Burton asks—How can it be made evident that the proofs are fixed? If he will try the experiment of holding a print up to the flame of a gas burner from time to time during the process of fixing, he will have no difficulty in perceiving a disappearance of mottling and the gradual clearing of the paper as the fixing process progresses. It is customary to allow the prints to remain in the hypo. a short time after the clearance is apparently completed. About a quarter of an hour is the usual time occupied for the whole process; but with very thickly albumenised paper a little longer time is advisable, as it is always as well to be on the safe side.

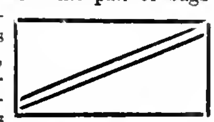
We may fairly conclude that, if a finished print become yellow or brown all over or spotty, either the fixing has been imperfectly performed or the proofs have been badly washed afterwards; and that if a print fade without changing yellow or brown it is owing to the very slight, delicate character of the impression in the first place, or to its having been in contact with some substance prejudicial to its permanency *outside* the usual processes necessary to form a silver print. From numerous examples that have from time to time been brought under my notice I believe that a thin negative which will print in a very short time in the shade will never produce a thoroughly permanent silver print, and that a very *lightly* printed proof from any negative whatsoever will remain but a short time without showing signs of fading. To produce permanent work there must be a certain amount of strength in the impression to begin with—sufficient to carry it satisfactorily through the different processes it has to undergo from the printing-press to the mount. Edward Dunmore.

BOTTLES *VERSUS* GAS BAGS.*

Apparatus for Storing Gases: its Cost and Dangers.

Gas Bags.—Bags made in the early days of the lime light were bladder-shaped or globular, placed between square pressure-boards held in place by four corner rods, as in Dr. Woodward's apparatus, described and figured in his work on *Polarised Light;* or square, made after the manner of an accordion or bellows-camera body, so as to expand into a square receptacle on being filled with gas, and fall "flat as a pancake" when empty. These were usually placed in a square box, which served as a guard when travelling and for pressure-boards when the lid was weighted. Then came into use the better form of wedge-shaped bag, which afforded an element of pressure supplemental to that of the weights employed, namely, leverage. These were placed, when required for work, between "a pair of pressure-boards" hinged at one end, the cross pieces of wood employed for strengthening the boards being utilised as rests for the weights.

Of late years, to economise space and weights, Mr. B. J. Malden placed both bags between one pair of pressure-boards, wedge-end to wedge-end, with the thin edges of the wedge-shaped bags raised by a suitable arrangement of the boards to secure a safe balance of the weights. Another operator, ignoring the extra leverage pressure obtainable from the wedge-shaped arrangement, placed his pair of bags "head to tail," so as to form a square pile, thus:—



In this case, a skeleton box held both bags in place when filled for travelling. The lid, working on guides, served as the upper pressure-board and sustained the weights. By an ingenious arrangement of hinges the four sides folded down and packed the bags when empty into a small space for the homeward journey.

Gas bags are made of various strengths according to price. For "oxy-spirit" or "blow-through" jets "thin bags," made of cream-coloured material, are employed. When both oxygen and hydrogen or house gas are employed with "mixed gas jets," "thick bags" must be employed to sustain the greater amount of pressure required to secure the greatest amount of light attainable by the "bag system." To do all that is obtainable by forethought to provide against accident, I used always to have my thick oxygen bags made in light-coloured material with the stopcock bright, and one stopcock on the jet bright *en suite*, to aid the eye of the operator as to all oxygen connections. My hydrogen or house gas bag was made of thick, black material, with black stopcock to bag, and that on the jet black *en suite*, so that all the hydrogen connections were also at once recognisable. To prevent the lighted jet being extinguished by accidental pressure, I employed red-rubber tubing, from which the coil of spiral wire used in its manufacture had *not* been removed, with the exception of a couple of inches at the ends of each length, left for "springing-on" to the stopcocks. All my stopcocks were made with single lever taps, which stood parallel with the delivery-tubes of the cocks when the gas passage was closed and at right angles when full on. The stopcock of gas

* Continued from page 618.

bags was of larger size than usual, being a full three-eighths of an inch in the bore. Lashings were affixed to each cock to prevent the lever handle being accidentally opened when not in use, so as to avoid waste of gas or admission of extraneous air.

The dangers which beset gas bags are—1. Using them for the storage of oxygen when newly made, with an atmosphere of methylated spirit or hydro-carbon rubber solvent unejected. This is avoided by distending all new bags with air by the aid of a cheap double-bellows, closing the cock, leaving for some hours, emptying by rolling the bag up tight, with the cock full open, driving the air out inch by inch as the bag lies flat on the floor, and closing the cock till connected with the generating apparatus. Those who wish to preserve their bags would do well to empty them after each exhibition, distend with air by means of double bellows, and keep them distended for some hours. Oxygen has a deteriorating influence on bag material if left in for any length of time. I may here state that I never came across an instance of delivery-tubes being choked by the *débris* from the decaying lining of a gas bag, for the reason that I never employed old bags; but, from what I have seen at *post mortem* examinations of defunct bags, I can believe blockage from such a cause very probable, although I should not have thought it possible that such *débris* could form a train from jet to bag for an explosive "run-back."

2. From the accidental admixture of oxygen and hydrogen in the same bag, or of hydrogen and atmospheric air *when not under sufficient pressure.*

3. Accidental admixtures of the gases, &c., may come about through blundering operators, by sheer "cussedness," as our American friends very graphically designate that bull-headed stupidity not difficult to discover among the "lime-light men" at our places of public entertainments, and gentlemen very learned in classics, theology, and other non-scientific subjects, who, because it is their calling to teach others, cannot bring themselves to believe it possible they are themselves open to be taught the proper manipulation of a scientific instrument, when in the commonplace form of "a magic lantern." With this class it is rarely possible to get any explanation how a blow-up has come about, as they have only vague recollections, if any at all, as to *what* they did do, antecedent to "an accident."

In the recent accident at Drury-lane Theatre, had the bags *been under proper pressure instead of free* when a light was brought near, the probability is no explosion would have occurred. Another cause of admixture is when an oxygen and hydrogen bag of equal size are connected by tubing with a mixed-gas jet, when the most powerful light (next to the condensed gas method) is desired and both pressure-boards are loaded with one hundredweight each; and if in the dark half-a-hundredweight *slides down* out of proper place from the upper end, or *falls off.* In a little time the gas *from the full-weighted bag,* not being able to find sufficient vent at the nozzle of the jet, works round through the delivery tubes to the insufficiently-weighted bag, and an explosive mixture is there found with a train of mixed gas in the tubes extending to the light at the nozzle. At the moment of greatest inflammability being attained the explosion occurs.

Again: with the same arrangement, with weights equal and in *proper position,* one of those individuals who are so fond of "loafing" around a busy operator, and what is vulgarly but graphically termed "noseing" the apparatus, finds the upper edge of one of the bags conveniently placed for resting his elbows on, or he may rest his foot thereon, or he may even sit upon that bag (I am only putting on record what *has* occurred!). Of course he imparts an extra (and unthought-of) pressure on *that* bag, and drives the gas therein over to the companion bag. Then he withdraws his weight, and a "*suck-back*" occurs at that moment at the nozzle, the train is ignited and "up (or down) goes *that* donkey," with it the apparatus, and probably the innocent operator!

Here it may be a fitting place to point out that an exhibitor cannot be too careful as to building up a barrier round his apparatus which will exclude dangerous intruders, and literally keep people "at arms' length." Who would have calculated on such a *contretemp* as this:—A well-known lantern exhibitor whilst lecturing noticed a diminution of the light on the screen. His assistant could not correct this shortcoming, so the signal "turn up lights" was given. On overhauling the gas bags the pin of a large brooch was discovered thrust through one of them. A lady sitting on a form used as part of the barrier had undone her shawl, and, seeing the cushiony protuberance, deliberately, but "without malice aforethought," turned the scientific appliance into a pincushion. Another cause of admixture is through using a large bag (as for hydrogen, where two volumes to one of oxygen are burnt) with a small bag, in which case the weights being placed at the upper end of a longer pressure-board the increased leverage forces the gas from the large bag round through the connections into the small one.

Palpably it is safer to employ two bags for hydrogen, though one bag *of proper shape* would suffice.

The results arising from unequal pressure by weight and leverage can be demonstrated without danger by filling the gas bags with atmospheric air. Such experiments appeal to the eye in a manner not so likely to be forgotten as mere verbal or printed warnings. Absolute explosions can be made with small bladders filled with a mixture of house-gas and atmospheric air, the weights, &c., being confined within bounds of striking distance by stout cord when used in model apparatus.

4. The fourth source of danger *is the key to all the ordinary causes of accident when dealing with lime-light apparatus,* namely, insufficent pressure on the gas receptacle—be it gas bag, gas-holder, or gasometer—before a light is put to the nozzle of a *mixed-gas jet,* or while the jet is burning. A half-hundred weight *on each receptacle* is sufficient to avoid accident.

From the very first lecture and demonstration I ever gave on lantern manipulation I did my best to impress this simple axiom on the minds of my students, in a paraphrase of the old admiral's (some say it originated with Oliver Cromwell) address to his crew before going into action—just such advice as that rough-but-ready type of the old sea-dog of the British navy, Commodore Sir Charles Napier, would have given to "his following," namely—"Put your trust in Providence, but keep your pressure up!" You have here the secret of safe manipulation and "*all there*" in a nutshell.

I once had a customer who was so clever as a linguist and theologian that I was afraid to let him have a set of dissolving view apparatus till I had "put him through his facings" in the manipulation of his purchase. His ire was great when I suggested the advisability—nay, the necessity—for such a practical course. When I state that he was great on a new reading of "Revelations" wherein Napoleon III. was the undoubted "anti-Christ," and that I had to get up a set of lantern pictures of the most mysterious character, with maps of the world as it was and as it was to be, and portraits of illustrious persons—with horns innumerable on their brows (having reference *to political matters—solely!),* bulls, bears, and rams, apocryphal from a strictly natural history point of view, &c., &c., &c.—why most of my readers will justify me in the decision I came to, and as the result will show. He came (from the country), and he saw (how I manipulated), and he conquered (all the little details, I flattered myself). He paid his account and took himself and his apparatus "right away" home. The next night I was awakened out of my first sleep by a violent ringing of our house-bell. A telegram informed me he had blown his purchase "all to smithereens!" and cursing me in Biblical phraseology for supplying him with such dynamitical apparatus. Feeling this unjust I slept "the sleep of the just," and next morning requested particulars. The response amounted to this:—Instead of purchasing, begging, borrowing, or *other alternatives,* a set of four half-hundred weights, he loaded his pressure-boards with all the fenders and fireirons he could collect from about the house. The carrying out of instructions as to equal pressure on each bag was, consequently, *vague.* He "lighted up;" there was a soft, spluttering noise, and a poor—very poor—picture on the screen. Then he (did *just what I had warned him not to do)* put one hand on each bag, pressed his hardest, and exclaimed—"Ah! *that* is just such a light as Mr. Highley got; that is it—that is beautiful!" Then he took his hands off, freely perspiring with his efforts; then—there was a bang! He was on his back! the windows were blown into the street, two large folding-doors wrecked on their hinges, the pressure-board mere matchwood, and the bags ripped and smoking like fusee paper. Here comes the curious part of this truthful story. There were twelve persons surrounding that apparatus, and not one was seriously hurt—*a characteristic* of oxyhydrogen explosions. The force expends itself in an angular direction upwards, after the manner of gunpowder—as dynamite does downwards, and nitro-glycerine in a horizontal direction.

Where one bag for oxygen is only required—as with the oxy-spirit jet, or oxy-house gas blow-through jet—the chances of accident are reduced to a minimum. The space at my disposal will not allow me to go into details as to bell gasometers, Pepys' gas-holders, and other metallic contrivances seldom used but in lecture-rooms, institutions, or well-appointed theatres, such as the Alhambra, Surrey, &c. The same rules apply to such store vessels as I have specified in regard to bags; but *the system* of working presents fewer chances for one receptacle to be more heavily weighted than the other. Theatres are conservative strongholds, so there is little wonder that metallic store vessels are the exception and not the rule. This is not so in America. If gas bags are kept filled with gas for some days, they will be seen to shrink in bulk, and the contained gas will have become deteriorated. This is not so with metallic reservoirs.

Now, as to cost:—

	£	s.	d.
A bag of medium quality, 36 × 24, and 24 inches in the wedge, with stopcock	2	12	6
Pair of best pressure-boards	1	0	0
Six feet of red rubber wired tubing	0	5	6
	£3	18	0

	£	s.	d.
Pair of thick black and white bags, 42 × 30 × 28, and 42 × 30 × 24 inches, with stopcocks	7	17	6
Malden's double pressure-board	2	12	6
Best red rubber wired tubing	0	10	0
	£11	0	0

When gas bags are employed metal connections are not a necessity.

SAMUEL HIGHLEY, F.C.S., &c.

OPINIONS OF THE LONDON DAILY PRESS ON THE PHOTOGRAPHIC EXHIBITION.

THE PHOTOGRAPHIC SOCIETY.—The annual exhibition of the Photographic Society of Great Britain, which will be opened to the public today in the Gallery of the Royal Society of Painters in Water-Colours, in Pall Mall East, will be remembered rather by reason of the generally high level of the results obtained than for any startling novelty in the treatment of subjects or methods of work. There are, indeed, very few pictures among the thousand or more exhibited which would not have been ranked with or next to the leading productions of five or six years ago. The causes of this advance along the whole line will be found directly, to some extent, in the revolution which has taken place in the chemical processes of photography, and secondarily—and in consequence of this change—in the conditions under which the camera can now be employed, in the enrolment among the exhibitors of a largely-increased number of amateurs of cultured taste, enjoying means and leisure for the successful practice of the art. A traveller may pack in his portmanteau the whole of the apparatus he requires to photograph scenes or places he visits, and on his return home may hand the sensitive plates to a professional photographer, to bring out or develope the images latent in the dry gelatine films, and to print direct from or to enlarge the pictures produced. How long the plates may be kept after exposure in the camera cannot yet be said, but, as an instance in the Exhibition shows, they may safely be kept at least as long as any traveller is likely to be obliged to postpone the after processes. Dr. G. Berwick shows *Dumblane Cathedral* (481)—a clean, sharply-defined print from a negative exposed in July, 1880, and developed in July, 1884. Moreover, if the traveller choose his point of view well, paying due regard to the forms in which the objects before him appear to be grouped in his camera and to the position of the sun at the time—in short, to the composition and lighting of the work—he may, like Professor Donkin in his Alpine studies, return with small pictures that on enlargement are as pleasing in effect as they prove full of the most minute and instructive physical detail. While touching on the reproduction of Alpine scenery we may conveniently direct the attention of the visitor to the set of views in Switzerland—*The Lyskamm, Mont Blanc, Märjelen See*, and *Monte Rosa* (23)—by Signor Vittorio Sella, to which a medal is awarded. These large and singularly fine pictures are printed direct from the negatives taken in the Alps.

In comparison with the changes which have been made in other branches of the photographic art, the most important advance noticeable this year is in portraiture. The greater uniformity of quality obtained by improved methods of manufacturing sensitive gelatine plates has, no doubt, something to do with this. A photographer's attention, too, is not now distracted by fears lest his prepared plate should be spoilt if he stops to improve the pose of a subject at the last moment; but with the power obtained by the use of rapidly-impressed plates of taking portraits which are more or less satisfactory as pictures of people in their own homes, there has grown up a demand for more naturalness and ease in style. Several examples may be found in the gallery of this change, which substitutes for the plain or painted background and the classic pillar and balustrade, or the hack table and chair, the luxury of Oriental hangings and æsthetic furniture and surroundings, with a tendency, however, it must be observed, to so fill the picture with pretty detail that the portrait of the sitter is apt to be lost in the crowd of objects. The series of portraits of ladies (243-252), for which the judges have awarded a medal to Mr. H. S. Mendelssohn, may be cited, those of *Lady Brooke and Child* and of *Miss Grant* showing both the gain in freedom of treatment and the dangers of over-elaboration of accessories. Turning to the introduction of figures into landscapes and interiors it is matter for congratulation that the photographers who were tempted by the facilities new discoveries placed in their hands to essay the presentment of emotional incidents already show a chastened ambition. Brought in as the groups of children and rustics are in Mr. H. P. Robinson's *The Cuckoo* (64) and *He Never Told His Love* (66), in Mr. J. Gale's *Off to Market* (69) and *The Smuggler's Cave* (70), and as the little girl feeding ducks is in Mr. John G. Horsey's view of a charmingly-embowered homestead *The Pets* (183), pictorial effect is heightened by the presence of the figures; and even in the cottage interior, *Mother's Love* (282), a composition by Mr. J. Hubbard which has gained a medal, the photographer is well within the bounds set him by his dependence upon the dramatic attitude of his model. When, however, he goes beyond this and attempts the portrayal of strong feeling—as in an admirably composed picture of a country churchyard where a girl has thrown herself upon a grave in a passion of grief, hiding her face in her sister's lap—the very realness of the scene suggests unreality and simulation, because the author of the picture has not the painter's privilege of presenting such an incident as imagined, and the mind revolts from the supposition that the camera could be turned in cold blood on a scene of such distress.

Of instantaneous photography there are many specimens, the most remarkable for artistic worth being the medal pictures of *Yachts Racing in the Solent* (309), taken by Messrs. G. West and Son from a sailing boat, so that camera and subjects were both moving when the exposure of the plate was made. Another medal is awarded to Mr. W. P. Marsh for *Studies of Breaking Waves*; and there is a well-defined and consequently apparently motionless express train, of which the picture (206) by Mr. C. Grassin was taken with an exposure of the three-hundredth part of a second. Studies of woodland, mountain, sea, and clouds are as numerous and as freshly-delightful to the lover of good photographs as ever, admirable among many being *Views at Hampstead* (381), by Mr. Edward Dunmore; *Rydal Water* (366), and other views, by Mr. W. Wainwright, jun.; *At Home and Abroad* (352) and some Yosemite and other scenes, by Mr. Andrew Pringle; *Bonchurch Old Church* (202), by Mr. J. Duncan Pierce; several in a set by Captain Abney; *Views in Surrey* (537), by Mr. C. A. Ferneley; *North Wales* (465), by Mr. A. E. Durham; *The Valley of Desolation*, South Africa (552), by Mr. R. Harris, a stormy seascape; *Rescued* (260), by Mr. H. J. Godbold; and *Peeps into Cloudland*, obtained by Mr. B. Wyles. Arresting attention by their delicacy of tone the platinotype prints repay one for the close examination they invite. A medal has been deservedly awarded for a set exhibited by Mr. H. B. Berkeley (209, 219, and 221). The chilliness of a misty wintry river scene (167), by Mr. G. Renwick, is suggestively rendered by the cold bluish grays of this process, which, with quite another purpose, is no less happily suited to the copy by Mr. F. Hollyer of Mr. Burne Jones's painting, *The Six Days of Creation* (145). Architectural work is well represented by Mr. F. Machell Smith's wondrously-massive and solid-looking *North Portal of the Cathedral at Chartres*, by the marble-like brilliancy of the Rev. J. S. Knight's *Temples and Monuments at Athens*, by Mr. G. Hadley's *Interiors of Lincoln Cathedral*, and Mr. Alfred Tagliaferro's medal picture of the *Tombs of the Knights of Malta in St. John's Church* (234). Mr. Henry Stevens again contributes some of his matchless studies of flowers and foliage. Of the scientific and educational uses of photography there are examples in the microscopically-small pictures on glass of Saturn's rings shown by Mr. A. Ainslie Common, F.R.A.S., and again in the magnified photographs of sections of plant stems, parts of insects, &c., by Mr. J. Renton Dunlop, and two photographs of lightning by Mr. M. Auty (485). Small but masterly copies of oil-paintings are shown by Mr. Edwin Cocking. Photo-engraving is illustrated by Messrs. T. and R. Annan, and the portraits of the *Late Duke of Buccleuch* and *Sir Daniel McNee*, and the three-quarter figure of a girl are full of promise for the future of this branch of art.—*The Times.*

THE PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—The exhibition of photographs by this Society, which will be opened today at the Galleries of the Royal Water Society in Pall-mall, is chiefly remarkable for the advance in artistic excellence observable in the landscape work, which, as on the last occasion, forms the prominent feature. Photography is fast advancing its claims to be regarded as an art as well as a scientific and mechanical process, and, in place of the clear, hard backgrounds and disproportionate dark foreground patches that used to characterise landscape scenery under the lens, it is now possible to represent mist-clad hills, delicate gradations of distance, and soft shadows. This is especially instanced in Mr. W. England's beautiful views in Switzerland, Mr. Vittorio Sella's *Snow Scenes from the Alps*, which have gained a medal, Mr. J. P. Gibson's *Autumn Evening on the Tyne*, and other views, *The Picturesque Spots of North Devon* taken by the School of Military Engineering, Mr. G. Renwick's *Winter Scenes*, and Mr. J. G. Horsey's *Bits of Surrey*. Among the medallists Messrs. G. West and Son carry off the palm with photographs of *Yachts Racing in the Solent*, taken from a sailing boat, which are perfect little pictures for form and effect. Messrs. T. and R. Annan, of Glasgow, exhibit results of the new photo-engraving process, which is similar to copper-plate engraving, only that it is untouched by hand and is produced entirely by light and shade. Mr. H. P. Robinson is again successful with rustic groups of cottagers, and Mr. B. Wyles has some very fine effects in cloudland that should be interesting to artists. Mr. W. P. Marsh exhibits some striking instantaneous studies of *Sea Spray*, which have obtained a medal. In portraiture there are but few notable exhibits. The London Stereoscopic Company have good portraits of *Mr. Alma-Tadema, R.A.*, and *Mr. G. Grossmith*; and Mr. Mayall shows a praiseworthy portrait of *Mr. James Glaisher*, the President of the Society. Mr. Lafayette takes a medal for exceptionally fine portraits; so do Messrs. H. S. Mendelssohn, H. B. Berkeley, A. Tagliaferro (for church interiors), M. Auty (for photographs of lightning), J. Hubbard, and the Autotype Company. Groups of amusing figure subjects are by Mr. Malcolm H. Clerk and Mr. W. Cotesworth. It is noticeable that the use of the gelatine plates has so far superseded the old method that examples of the latter are quite the exception.—*Daily News.*

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—The President (Mr. James Glaisher, F.R.S.) and Council inaugurated the annual exhibition of the Photographic Society of Great Britain on Saturday evening by a *soirée* at the Gallery of the Royal Society of Painters in Water-Colours, Pall-mall East. The Exhibition, which will open today and remain on view till the 13th of November, can hardly be said to be disappointing, although there is little to be noted in the way of advance either in the artistic qualities of the exhibits or the scientific application of photography as compared with recent years. Some progress has, however, been made in the process of photogravure, and the specimens shown by Messrs. T. and R. Annan, of Glasgow, are remarkable for delicacy and mellowness of gradations. Klic's invention seems destined to become invaluable for the production of works suitable for high-class book illustrations, and Messrs. Annan are undoubtedly working it with great success. These monochromes are printed from copper plates, which are engraved by chemical processes, the tints resembling in their flatness water-washes of Indian ink or sepia. It is difficult to distinguish between some of the specimens of photo-engraving and carefully-finished drawings in black and white, the resemblance being so close. Messrs. Annan have this year, as last, been awarded a medal for the scientific application of photography. Many of the best photographs are exhibited by non-professional gentlemen, who study the subject purely *con amore*, and are able to devote to it almost any amount of time and capital. In this category may be cited the frame of instantaneous views taken from a yacht in Scotland by Mr. T. W. Boord, one of the members for Greenwich; also the effective studies of flowers in vases, by Mr. Henry Stevens, of King-street, Covent-garden. Captain Abney, R.E., F.R.S., again, is an accomplished master of the art, and the diversified subjects which he exhibits, produced from gelatino-iodo-bromide plates of his own preparation, are equal to anything that has yet been done by means of the camera. Several other non-professional photographers contribute excellent work. The combination pictures of Mr. H. P. Robinson are interesting examples of the artistic manipulation of photography. He has been awarded a medal for *The Mill Door*, a work of real merit. In some other of his pictures the figures are not quite so natural, betraying by their pose their knowledge of the photographer's presence. At the same time it must be admitted that Mr. Robinson's productions are more free from this obvious defect than are those of most of his *confrères* who attempt combinations of figures and landscapes taken on separate plates. The instantaneous studies of sea-waves dashing on the shore, and mountains of feathery spray, exhibited by Mr. W. P. Marsh, have gained a medal. It would be useful if in these, and similar examples, it were stated whether there had been any retouching. It is difficult to distinguish in all cases whether the pencil of the artist has been employed or not, and any intimation with respect to this matter would be welcomed. In portraiture the practice of retouching is largely adopted, and does not debar the exhibitor from the Society's awards. It should be made a *sine quâ non* in all such cases that a print from the untouched negative should accompany the hand-elaborated example. The spectator would then be able to discriminate between pure photography and skilled or unskilled—and it is more often unskilled than skilled—handicraft. The Photographic Society do not seem to distinguish by their awards the one from the other; and, although the novice can easily detect retouching more or less laboured here and there, it would be a point gained if he could, by comparing the negative print with the hand-finished performance, be enabled to judge of the quantity and the quality of the artist's work. Possibly some of the sitters might object to being displayed publicly without having their angularities and blemishes toned down and their wrinkles obliterated; but in the interest of photography these scruples ought to be disregarded. There are exhibits in portraiture by Mr. J. Lafayette, Mr. J. E. Mayall, Mr. H. S. Mendelssohn, Mr. W. Byrne, by the London Stereoscopic Company, enlargements by the Woodbury Company of negatives by Messrs. W. and D. Downey, and a frame of comically-treated cats and dogs by Mr. H. Pointer, all worthy of commendation. Mr. Cecil V. Shadbolt, the aëronaut, contributes photographs taken from the car of the "Monarch" balloon, on the 13th of August last, in an ascent from the Crystal Palace; and, as everybody cannot go up in a balloon, these views—one of them of streets resembling a carpet of geometrical pattern—cannot fail to interest, altogether irrespective of any scientific merit or otherwise which they may possess. On the tables will be found an assortment of cameras, shutters, plate sets, lanterns, and other photographic *paraphernalia*, by different makers, and of the most recent pattern and approved type.—*Morning Advertiser.*

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 13,103.—"Reproducing Photographs by Printing and in Producing Printing-Blocks or Rollers therefor." L. H. Philippi, 55, Chancery-lane, London.—*Dated October* 2, 1884.

No. 13,107.—"Production of Permanent or Durable Pictures upon Canvas, Linen, Wood, or Similar Substances." W. T. Morgan and R. L. Kidd.—*Dated October* 2, 1884.

No. 13,137.—"Photographic Lens Shutter." S. W. Rouch, 180, Strand.—*Dated October* 3, 1884.

No. 13,156.—"Arrangements Applicable to Photographic Shutters, whereby the Duration of Exposure can be Varied." J. W. T. Cadett, 84, Grove-lane, Camberwell, S.E.

PATENT SEALED, September 30, 1884.

No. 4,989.—"Changing Sensitised Plates in Photographic Cameras." James Sturrock, *Advertiser* Office, Dundee.—*Dated March* 17, 1884.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
October 14	Bolton Club	The Studio, Chancery-lane.
,, 14	Glasgow Amateur	Institution Rooms, Buchanan-st.
,, 14	Newcastle-on-Tyne	College of Physical Science.
,, 15	Photographic Club	Anderton's Hotel, Fleet-street.
,, 16	London and Provincial	Masons' Hall, Basinghall-street.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

On Thursday, the 2nd inst., at eight o'clock, a special meeting of this Society was held (in accordance with a resolution passed at the June meeting) at the House of the Society of Arts, John-street, Adelphi, W.C., "to consider the future of the Society." Mr. W. Ackland occupied the chair.

It was announced that a framed testimonial and a cheque for fifty pounds had been sent by the Society to the widow of their late President, the Rev. F. F. Statham, and a letter of acknowledgment from Mrs. Statham was read.

Mr. W. Brooks having taken the chair vacated by Mr. Ackland, the latter gentleman read a paper on *Furnell's Lens.* [See page 647.]

The Chairman thanked Mr. Ackland for his paper. He considered that the lens described would supply a want long felt, particularly as he understood it was a cheap lens; not that we had any reason to complain of the performance of the lenses issued by our best opticians, but the price was too high for many, especially amateurs. He hoped the results that Mr. A. Cowan got would prove that the Furnell lens possessed all the good qualities Mr. Ackland attributed to it.

Mr. A. Cowan passed round a number of prints from negatives taken with the Furnell lens. The lens had been used with back combinations of very various form and focal lengths. One set of prints showed that there was no appreciable disturbance of the chemical focus with any of these combinations, and another that there was no appreciable distortion. He did not think that the lens could compete with a set of good double combination lenses; but for amateurs and others who could not afford such a set he thought it would be invaluable. He had himself had the courage of his opinions, and had recently gone out to take architectural subjects provided with the Furnell lens only.

Mr. J. Traill Taylor said he was grateful to Mr. Ackland for proving what he (Mr. Taylor) had been trying for years to hammer into the heads of the photographic public, namely, that when the front combination of a doublet lens was a deep meniscus the back combination could be varied greatly in form, material, and focal length without appreciably disturbing the relation of the chemical and visual foci, and without giving appreciable distortion. He (Mr. Taylor) then sketched on the black board a contrivance somewhat similar to that introduced by Mr. Furnell, for which a patent had been taken out by Mr. Howard Grubb some time ago. He (Mr. Taylor) had tried it, and had found it excellent. He also mentioned the lens of Morrison, of New York (already described in these columns), in which there is combined with a deep meniscus front combination an *uncorrected* back lens, the focal length of which latter might be varied.

Mr. Cowan asked whether, when two combinations of different focal lengths were used, there was any rule as to what particular relative lengths gave the best result as regarded flatness of field.

Mr. Ackland knew of no rule.

Mr. Mackay asked whether the lenses were necessarily corrected exactly as Mr. Furnell showed, or whether any other method of correction might not be employed.

Mr. Ackland said that possibly other means of correction might be used, but that there was the advantage of cheapness and convenience in the form shown.

Mr. Haddon thought it was more difficult to make flat surfaces for lenses than to make curved surfaces, and therefore considered that the correction of the front combination might be more easily effected by having curved contact surfaces.

Mr. Taylor observed that it was true that opticians considered it easier to produce a curved than a flat surface, and they invariably preferred it for their contact surfaces, on account of the increased power it gave them to obtain actinic correction.

Mr. Ackland said that, when he talked of flat, he did not mean mathematically flat. Curves of long radius might be used.

Mr. W. K. Burton asked if a lens of any considerable size had been made after the Furnell pattern. It was only when large sizes were attempted that the test of the design of a lens was severe.

Mr. Ackland replied that no large lens of the kind had been constructed.

Mr. W. Cobb said that he had an instantaneous shutter constructed to work between the combinations of a lens. He had had various lenses of his own adapted to this, and as a consequence could interchange one combination of any of these lenses with a combination of another. He had tried all the possible changes of combinations, and had got the best result with a front combination of a Voigtländer and a back combination of a rapid rectilinear.

Mr. Taylor remarked that there might be an advantage in the arrangement which Mr. Cobb mentioned, as a doublet which had a flatter front than back combination gave good results. Such would be the case in the arrangement mentioned by Mr. Cobb.

Mr. T. Bolas said the whole thing seemed to him to amount to this—that it was possible to combine various lenses much more freely than was commonly supposed. It was, however, curious to see how the opticians set their faces against such procedure. You went to one of the best opticians and asked him if you could use a single combination of his doublet as a landscape lens. He would doubtfully shake his head; but should you suggest the use of one combination of one of his lenses with another combination of another optician's lens, he would simply stand aghast.

Mr. F. A. Bridge knew the feeling of opticians in the matter pretty well. He had heard that by bringing the combinations of a doublet closer to each a wider angle could be taken in than when they were arranged as sent out; but he had not dared to go to the manufacturer of a doublet to get the necessary adapting tube made.

The Chairman then proposed a vote of thanks to Mr. Ackland. This was carried by acclamation.

There was after that some discussion as to whether or not the November meeting should be a technical one. It was eventually decided that it should not.

It was announced that at the November meeting Mr. J. Traill Taylor would show on the screen a set of sixty lantern slides to illustrate a lecture on *Florida: Its Orange Groves and General Features*, which he would then deliver.

After this there was a discussion on "the future of the Society," the upshot of which was that it was determined to send a circular to members requesting them to express an opinion as to whether the Society should continue to meet or not. A committee was nominated to draw up the circular. The meeting was then adjourned.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society, held on Thursday, the 2nd instant, the chair was occupied by Mr. A. L. Henderson.

The Chairman exhibited an appliance which he had brought from America, called an "automatic retoucher." It consisted of a pencil moved rapidly backwards and forwards in the holder by clockwork. The effect of this movement was that a series of dots or mechanical "stipple" was produced as the pencil was drawn across the surface of the negative. The lead of the pencil was stated to be metallic, instead of the usual plumbago. He also described a mechanical contrivance called an "air-brush," by means of which a fine stream of pigment was projected upon the surface to be worked upon. This was intended for finishing enlargements, and in artistic hands fine effects were stated to be very rapidly produced. In illustration of this a sketch of a human eye and part of a face were shown, which had been produced in the Chairman's presence in an exceedingly short space of time.

A photograph was shown which many years before had been sized with gelatine and then coated with dammar varnish. On one portion where the varnish had not gone over the picture the latter was considerably faded, whilst the remainder was bright. The composition of the varnish used was one ounce of dammar to two quarts of benzole.

EDINBURGH PHOTOGRAPHIC SOCIETY.

The ninth ordinary meeting of this Society was held in 5, St. Andrew-square, on the evening of Wednesday, the 1st instant,—Mr. W. Neilson, President, in the chair.

The minutes of the last meeting having been approved,

Mr. Norman Macbeth proposed that a small committee be appointed to draw up details for a monthly competition among the members, in order to make the study of the picturesque more an object of the Society. He said:—Having brought this motion before the Society at the last meeting, I have much pleasure in now laying before the members some notion of the object and its possible operation. Indeed it would be a good arrangement for the Society if each department were kept distinct and under special committees, so that full justice be done to them respectively. For instance: I would divide the objects of the Society into three departments, namely, the chemical, the artistic, and the mechanical. I would have small committees to each, not exceeding three, and that they have no other department to occupy their mind but the one which they were specially adapted for and appointed to. This suggestion may yet form the subject of the Society's consideration. In the meantime I would press upon you the claims of the artistic department, particularly in reference to composition and effects of the pictorial. With a view to the study of this I would propose that at each monthly meeting of the Society members bring forward some of their selected work done during the summer; that these be submitted not so much for mere criticism but for friendly conference; that members be called upon to give their opinion as to the respective merits of each, and specially pointing out what they conceive would be an improvement. At the close of the conference a vote by papers, numbered according to the number attached to the respective work which the members consider best, to be taken. The one having the greatest number of votes to be set aside for the custody of the committee, and at the close of the session another vote to be expressed by the Society as to the best of all that were formerly approved of, and probably some award be given. This, Mr. Chairman, is what presents itself at present to me as to the carrying out of my notion. Of course we shall be happy to hear any suggestion which members have to make on the matter, and then (if approved of) proceed to appoint a committee for drawing up details.

The motion was seconded by Dr. Hunter and carried, and Messrs. Norman Macbeth, Alexander Matheson, and John Simpson were appointed as a preliminary committee to consider the matter.

The President proposed that the balloting for new members be by means of tickets with the words "admit" and "reject" printed upon them, the ticket to be dropped into the ballot-box by members on entering the room. This was agreed to.

The following gentlemen were proposed as new members, to be balloted for at next meeting:—Mr. F. W. Palmer, Mr. Edward Binning, Mr. Alfred G. Tagliaferro, and Mr. Charles Waterson.

Mr. J. M. Turnbull next communicated some notes on *Sulphite of Soda in the Developer*. Having traced the history of this salt as an adjunct to the developer, he proceeded to show the reason for the contradictory evidence as to its usefulness. He pointed out the unstable character of sulphurous acid, and also of the liability of the sulphite of soda to change to sulphate. The sulphite of soda as purchased was usually strongly alkaline, and to remedy this many people added citric acid; but that produced citrate of soda, which was a powerful restrainer, hence *sulphurous* acid should replace citric acid. By this means a reducer was formed instead of a restrainer. Sulphurous acid was, however, a feeble acid, and it required about fifty per cent. of that acid to be added to the ordinary sample of sulphite of soda to secure the desired acid reaction. It was to be remembered that the same sample of sulphurous acid was constantly getting weaker, the gas which formed the acid constantly escaping every time the bottle was opened, and therefore it was necessary to ascertain by test paper that sufficient acid had been added. When these simple directions were followed the sulphite developer was entitled to all the praise and none of the blame that had been bestowed upon it—the development being rapid, and the negatives beautifully clean and of fine colour.

In reply to a question concerning the hydrokinone developer,

Mr. Hugh Brebner said he had discarded as impracticable the formula issued therewith, namely, two grains of hydrokinone, one ounce of water, and five minims of liquor ammonia, as even with a full exposure he could only succeed in bringing out the very faintest of images, and that, too, after an absurdly protracted development. By increasing the proportion of hydrokinone from half per cent. to somewhat less than two per cent. he found that very great density, perfect detail, and exceptional quality could be easily produced with considerably under-exposed plates (home made). Captain Abney, the introducer of this developing agent, claimed that with a four per cent. to six per cent. strength only half the exposure necessary with alkaline pyrogallol was required. Dr. Eder, again, stated that "a two per cent. aqueous solution of hydrokinone, to which a few drops of ammonia have been added, is thin, but admits of silver intensification." He (Mr. Brebner), while regretting the limited extent of his experience, nevertheless expressed his opinion that hydrokinone promoted abnormally-short exposures, great density, and exceptionally-fine quality. The only drawback which he found this developer to possess was an apparently characteristic ruddy-brown colour, which, although beautiful in itself, was scarcely conducive to rapid printing. He (Mr. Brebner), however, deprecated the acceptance of his evidence as conclusive upon any point whatsoever.

Mr. A. B. Stewart next developed several negatives by the potash developer of Mr. Beach. He said:—For some time back considerable discussion has been going on as to the merits of a developer which would seem to be, for general use, better suited to the requirements of the photographer than any other yet published. I now give a summary of that correspondence. Of the innumerable developers which have from time to time been promulgated, the principal survivors seem to be pyro. and ammonia, pyro. and washing soda, and ferrous oxalate. Hydrokinone I do not include, as its price, if nothing else, would probably prevent its general adoption. But to each of the developers which I have mentioned there exists some objection. The pyro. and ammonia developer gives off noxious fumes, and in cases of prolonged development causes stains and fog in the negative. Of the washing soda I have had no experience, but I see from the photographic journals that complaints are largely made that the negatives produced by it are apt to be yellow. The objection to the ferrous oxalate is that it is non-elastic; there is no latitude for exposure, and, in my experience, prolonged development produces iridescence, especially round the edges of the plate. The potash developer of Mr. Beach, however, seems to be free from these objections. The published formula is—

Pyro. Solution.

	Warm distilled water	2 ounces.
	Sulphite of soda (chem. pure)	2 ,,
Dissolve. When cold add—		
	Sulphurous acid	2 ounces.
	Pyrogallic acid	½ ounce.

Potash Solution.

A	Water	4 ounces.
A	Carbonate of potash (chem. pure)	3 ,,
B	Water	3 ,,
B	Sulphite of soda (chem. pure)	2 ,,

Combine A and B in one solution.

For a 5 × 4 plate with instantaneous exposure, take one and a-half ounce of water, two drachms of pyro. solution, and one and a-half drachm of potash solution. The advantages claimed for this developer are—that with it plates require less exposure, that it does not give off any deleterious fumes, that it does not fog or stain the negatives, it needs no restrainer, but is simply modified by dilution to meet over-exposure where necessary. Complaints have been made by some workers that this developer causes the plates to frill. I can only say that I have not found it to do so, and I do not use alum until after fixing, when I put the plates in a chrome alum bath for a few minutes. You will observe that chemical purity is strongly insisted on in the formula given; but I may tell you that in making my solutions I used the ordinary commercial qualities of the different salts, and while this may be the reason of the dark colour of my pyro. solution I do not find that the developer works any the worse. I had intended to bring plates with varied exposures, but yesterday afternoon when I began to prepare for tonight the sun had disappeared, though the air was clear, while the wind was so high that my camera would not stand without being held, and an accident to my shutter rendering it useless, I had to make the exposures as rapidly as possible with one hand, while I held the camera with the other. My lens was an old French stereoscopic doublet, with a focus of four inches; and the aperture of the stop I used was a-quarter of an inch in diameter for the first plate and three-sixteenths for the rest. The plates are Britannia plates.

A discussion on the question—*Has the Introduction of the Modern Gelatine Dry Plate been Advantageous?* was to have been opened by Mr. J. Howie, who, it was understood, would have replied in the negative; but, as he failed to make an appearance,

Mr. W. Crooke said that from all points of view he considered the modern gelatine plate had been of immense advantage. For landscapes and studio work they enabled subjects such as moving objects and passing expressions to be captured that could not be seized by collodion; but for reproductions of engravings and similar objects requiring strong contrasts, he believed collodion still maintained its supremacy.

Members were reminded to send in specimens of work for the annual display which takes place at next meeting. These should be in the hands of the Curator not later than the day before the meeting (Tuesday, 4th November), so as to allow of their being hung properly.

A vote of thanks to the Chairman terminated the proceedings.

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION.

The first monthly meeting for the session 1884-85 was held on Thursday, the 2nd inst., in Lamb's Hotel, Dundee,—Mr. J. C. Cox, President, in the chair.

After the routine business had been disposed of,

The President delivered his annual address as follows:—I have no intention, as I am credited with in the circular, of giving an address; but you will expect from me a word of congratulation on this the opening night of our fifth session. Before I do so allow me to refer—and it is with regret—to the loss our science has sustained by the death of several prominent workers, namely, the Rev. F. F. Statham, who was twenty-five years President of the South London Photographic Society; Mr. H. Baden Pritchard, editor of the *Photographic News*; and Mr. C. Jabez Hughes—whose names were honourably associated with the literature of photography. Of these our immediate connection lies with Mr. Pritchard, who, as you will remember, so kindly acted as one of the judges at our highly-successful photographic exhibition three years ago, and whose decisions gave the utmost satisfaction. He was a staunch supporter of everything tending to the advancement of photography, and we cannot but lament his early death. Nor can I but notice the decease of Mr. Colin Sinclair, of Edinburgh, who also kindly gave his services as judge at our exhibition. The report of this Society, which you have before you, and which I understand is to be taken as read, must, if we look back two or three years, convince us that it is thriving beyond expectation both in regard to membership, attendance, quality of work produced, free offering of papers on interesting subjects, and last, but by no means least, the credit at our bankers. Not the least of our success, I may say, is due to our young Secretary, Mr. D. Ireland, Jun., who is an enthusiast himself, backed up by his friends, the Committee of Management and the members in general. He certainly has worked well for the Society, and he means, I have no doubt, to still further increase his usefulness. I have to ask you to accord him a vote of thanks, and the same to our worthy Treasurer, Mr. J. Robertson, and to our Auditors, Mr. Baxter and Mr. Rodger. The School of Photography, established in Regent-street, by the Polytechnic Christian Institute, is quite a sign of the times. The following extract I take from an *Art Magazine*:—"Here the amateur may obtain that practical knowledge which far outbalances all theoretical reading, and after one course of lessons—which are gratuitous—may execute work in which he may well take pleasure, besides thoroughly mastering the principles of the art. Indeed, more may be learned in one lesson at the School, by reason of the excellent practical method followed, than by the study of all the wilderness of manuals. The application of photography is now so extended and varied, and its practice so simplified, that it appeals to all classes and professions, as well as to those who are attracted to photography for its own sake. With ladies, too, it is fast becoming a veritable hobby. It involves no risk of accidents—of burnt and blackened hands, and injured dress." This, gentlemen, is what has been established in London, and we as a Society might follow the Regent-street school, though in a much less degree, by offering practical lessons, even at a small fee, in at least the rudiments, as a trial. I think we should find out from among us if anyone would undertake this. One or two passing remarks, and I am done. Why is it that we have been unable to induce ladies to join this Society? We have to blame ourselves—not them. You may tell me we have tried them; but they reply—"It is no good joining your Society, for we do not understand. I rejoin—"Form the class of rudimentary demonstration I have hinted at, and then there will be some inducement for them to join us." They do not, like numerous gentleman amateurs, want the theory of working; they wish to know merely how to go about things correctly, without asking the "reason why." I do think this is worth our consideration. I should also like at this meeting to broach the idea of holding another exhibition, and I think that at next meeting we should have a discussion on the advisability of arranging another one.

Mr. G. D. Macdougald then read an interesting and able paper on *Chemistry and Photography*, on which some discussion ensued, and for which a hearty vote of thanks was awarded. [This paper will appear in our next number.]

It was remitted to the Council to make arrangements for a series of lecturettes, to be given at the monthly meetings, on different branches of photography.

An inquiry was found in the question-box as to whether better results were obtained by washing prints thoroughly before toning, and it was agreed that although the toning was quicker in the case of an imperfectly-washed print, still most of the tone was lost in fixing. A washing of about half-an-hour in the case of ready-sensitised paper was recommended.

A vote of thanks to the Chairman brought the meeting to a close.

COVENTRY AND MIDLAND PHOTOGRAPHIC SOCIETY.

A meeting of this Society was held on Thursday, the 2nd inst., Mr. Councillor Andrews in the chair.

The minutes of the previous meeting having been read and confirmed,

The Chairman showed a very portable camera stand made out of three bamboo fishing-rods, which was greatly admired by the members present on account of its lightness and simplicity of construction.

Mr. T. Baynton, who had promised a communication on *Practical Dry-Plate Development for Beginners* for this evening, having been called upon by the Chairman, said:—"Mr. Chairman and gentlemen,—I am not here this evening to advertise the 'Coventry' plate, of which, as you know, I am the manufacturer; neither am I here to give information or instruction to you, Mr. President, and many other gentlemen I see around this table. I am here, however, at the request of the Secretary for the purpose of demonstrating to beginners a simple and satisfactory method of development, by which the veriest beginner can produce good negatives; and I may here say that there is nothing novel either in the formula or manipulation."

A negative and print from the same was here passed round, the President and members present observing that it was equal in pluck, detail, and brilliancy to a fine wet-plate negative.

The formulæ used by Mr. Baynton are as follow:—

No. 1.

Citric acid	20 grains.
Water	20 ounces.

No. 2.

Am. fort. ·800	1 ounce.
Pot. brom.	100 grains.
Water	3 ounces.

Into two ounces of No. 1 put four grains of pyro.; add one drachm of No. 2, and immediately flow over the plate.

The meeting then adjourned to a large and well-appointed dark room to witness the demonstration.

Mr. Baynton remarked that he had several plates exposed on the same subject as negative and print shown—*A Dilapidated Cottage, Out-houses, and Neglected Garden.* The exposures were made in sunshine—time, half-a-second. He (Mr. Baynton) here said—"Now, gentlemen, which shall I make first—a thick or thin negative, or one of printing density?" [The meeting decided to have one of proper printing density first.] The solutions were measured and at once thrown over the plate, the dish being kept in motion. In a few seconds the high lights were seen, and gradually the whole image was brought out. The developer was allowed to act until the shadows were considerably coloured, the operation lasting two and a-half minutes. After fixing and slight washing, the negative was placed in a saturated solution of alum, to which some protosulphate of iron had been added and again slightly washed. It was now handed round for inspection, the members declaring the result to be perfect. Another plate was developed. The solutions were of the same strength, but the development was stopped earlier, or before the shadows lost any of their brightness. He (Mr. Baynton) remarked that many amateurs would consider development in this case complete; but he would show them that the result would be plenty of detail, but a want of density. [The result was as stated.] Another plate was now placed in a dish, the solutions being half as strong again. This time the development was carried on until the shadows were completely obliterated, the result being an extremely thick, dense, but clean negative.

The meeting then adjourned to the light, and

Mr. J. M. Danks, in proposing a vote of thanks to Mr. Baynton, remarked that although that gentleman said the introduction of iron into the alum was nothing new, it was certainly a "wrinkle" for him; and, from what he saw of the tone produced thereby, he thought it was just the thing for transparencies.

It was decided to devote the next two or three meetings to the question of development, as required by plates wrongly exposed. Mr. Baynton promised to develope some transparencies at the next meeting.

Correspondence.

THE ETHOXO-OXYGEN LIMELIGHT.

To the Editors.

Gentlemen,—Mr. Broughton's statement in regard to the possible "catching fire" of my patent ether saturator is calculated to produce a false impression.

Your readers should understand that it is not only free from danger (the flame can be instantly smothered with a handkerchief), but it cannot possibly occur except under circumstances which would cause a really dangerous explosion with saturators which have no porous filling. Even the best safety tubes have such objectionable features that only those who are afraid will use them; so it is very desirable to have a saturator which even a careless operator can use without them, and feel sure his life is not in peril. My saturator has this merit, together with that of giving a *perfectly steady* light, with no obstruction to the flow of oxygen.

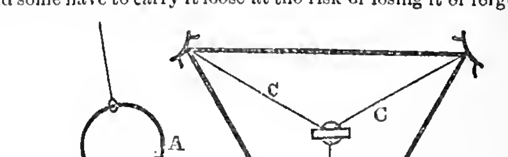
Mr. Broughton appears to insinuate that I "praise" my own invention; but I certainly have not misrepresented it, and my claims will be allowed by everyone who knows all the facts.—I am, yours, &c.,

Philadelphia, September 23, 1884. Fred. E. Ives.

THE CAMERA SCREW.

To the Editors.

Gentlemen,—Several of your correspondents seem to find a good deal of difficulty in rapidly placing the screw which attaches the camera to the stand, and some have to carry it loose at the risk of losing it or forgetting it.



B, Collar on screw. The split ring, A, must just pass over this; when the three small rings are put on, it cannot come off again. C, String.

I have fastened mine to the triangle, as shown in the diagram, and never find any difficulty or delay in setting up for a "shot." It is always in its place.—I am, yours, &c., A. Corbet.

Adderley Rectory, Market Drayton, October 4, 1884.

THE TRICYCLE AND THE CAMERA.

To the Editors.

Gentlemen,—An article appeared in your last issue on *Where to go With the Camera* and photographic trips on tricycles, which is interesting, but the author does not say the size of plate or apparatus used or the kind of tricycle he rode. I think it would be always better, especially to riders, if that were mentioned; for I carry a whole plate set on my rotary "Coventry," and find twenty to thirty miles quite enough for one day's work, although I have gone fifty miles and over occasionally. The weight, with two double slides and a dozen extra plates—which I change in a bag, and which I also use for a focussing-cloth—is about thirty pounds, with stand.

I have always made my own plates with much success, and several batches I have made from Mr. A. F. Genlain's formula—which appeared in THE BRITISH JOURNAL OF PHOTOGRAPHY of July 13, 1883, page 403—without a single mishap. I am now using plates twelve months' old, and find them equal to others freshly made. I develope with Martin's formula, which, in my opinion, cannot be beaten.—I am, yours, &c., W. CLARK.

31, *Coventry-street, Brighton, October* 6, 1884.

EDWARDS'S MACHINE FOR COATING PLATES.

To the EDITORS.

GENTLEMEN,—I am pleased to see by your last issue that your correspondent, Mr. S. Fry, has concluded to abandon the blustering tone of his previous communications. His last mild effusion, although containing assertions about as accurate as his former statements, needs no special reply from—Yours, &c., B. J. EDWARDS.

Hackney, London, October 6, 1884.

[This letter must close the correspondence.—EDS.]

THE CAMERA OF THE FUTURE.

To the EDITORS.

GENTLEMEN,—As regards the alleged haste of camera-makers to meet the wants of the public: how is it that, although the necessity for a falling front has been known and felt for years, also the necessity for about double the length of motion for the rising front than that usually allowed, these benefits have never been obtained, although they involve but a trivial amount of carpenter's work?

I sympathised a few years ago with Mr. Donkin in his narrative of how he had to hack his new camera about to get a falling front.—I am, yours, &c.,

October 8, 1884. W. H. HARRISON.

[We think that Mr. Harrison overlooks the fact that *many* of the cameras of the present day provide the means of lowering as well as raising the lens; and some of them possess this property in a very marked degree.—EDS.]

DEVELOPING FORMULÆ.

To the EDITORS.

GENTLEMEN,—In reference to the leader on *Anomalies in Developing Formulæ*, in your last number, perhaps the following may be of interest.

I have been doing little but experiment in the spare time I have had for the last six months, trying to get a developer that would give me the density I wished for. I tried numerous combinations with iron, and ultimately gave that up. I then went back to a combination with pyro., but gave that up, and now I have been using various makers' plates, with *one* developer, *without* ammonia ·880, *without* bromides, *without* pyrogallic or iron, and think I have got what I want.

I hardly like to be too confident at present as to my success, but an over-exposed plate does not give a *thin* result, but the dense result of the old wet plate, and no fog either with under- or over-exposure.

If it be likely to be of interest—which I shall see by the insertion or otherwise of this—I will next week give the developer; one component of which, by the way, is not quite new.—I am, yours, &c.,

Greenhithe, October 8, 1884. W. T. F. M. INGALL.

[We shall be very glad indeed to publish our correspondent's new developer.—EDS.]

Notes and Queries.

IN reply to a query by "J. S.," we have to state that, if our information be correct, several leading dry-plate manufacturers in the United States of America are of European birth. Cramer is a German, Carbutt an Englishman, Inglis a Scotchman, and so on with others.

"PLEASE give, in your next Journal, the meaning of 'orthopanactinic.'—H. B. SHARP."——In reply: Without going into the etymology of the term, it is intended, in its application to a lens, to signify that such lens produces pictures that are rectilinear, or free from distortion.

"IN using Chadwick's oxygen generator for the lime light I have at times been troubled with the jet gradually stopping up during an exhibition. Has any other reader been troubled in the same way? Can anyone suggest a remedy? I have tried lime in the water of the gas holder, but that does not cure it.—OXYGEN."

W. COTESWORTH writes:—"Mr. Hammerton, in his book, says that one disadvantage of silver point work is that it cannot be reproduced by photography. I have tried a head on pure white paper (I enclose result). I find that with this most delicate of all pencil work great care is required, and I cannot reproduce it with a pure white ground, as in the original, with gelatine plates. Query: do you consider it possible to obtain the density and pure white ground with gelatine? Would it not be quite possible, and, indeed, not difficult, with collodion?"——In reply: We imagine that this class of work should be done by collodion rather than by gelatine. The greatest possible intensity must be obtained—such an intensity as, for instance, can be produced by the agency of bromide of copper applied as a bleaching agent, followed by an application (after washing) of solution of silver nitrate; or of bleaching by means of diluted hydrochloric acid with bichromate of potash, followed by an application of solution of Schlippe's salt. Either of these would ensure a white ground being obtained.

OPERATOR writes requesting us to furnish him with a formula for compounding a developing powder for wet collodion negatives.——In reply: A developing powder consists of protosulphate of iron mixed with other ingredients, all of which are crushed and mixed in a mortar. It is altogether impossible to give the composition of any of those powders which, at one time or another, have been placed on the market; but we have heard of one that was stated to consist of a mixture of eighty grains of acetate of soda, one hundred grains of loaf sugar, and three hundred grains of protosulphate of iron—all finely powdered and intimately mixed—this proportion being intended to be dissolved in a pint of water.

"SCOTLAND" says:—"I have bought a stock of negatives belonging to a photographer who has been sold up by order of the Sheriff. Amongst these negatives are some copyright ones. The copyright is mine now, I suppose, to publish from these negatives, now my property."——In reply: Our correspondent is wrong. The negatives are his, because he purchased them in an open and legal manner; but unless he has had the copyrights of these negatives properly transferred to him he cannot make any use of them whatever. If he issue so much as a single print the proprietor of the copyright, whoever he may be, can come "down" on him without ceremony and lay an action for damages. See and get the copyright in these pictures assigned at once, and then the negatives may be utilised without fear.

Exchange Column.

No charge is made for inserting these announcements; but in no case do we insert any article merely OFFERED FOR SALE, *that being done at a small cost in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a* NOM DE PLUME *be thought desirable), otherwise the notice will not appear.*

Wanted, a dark slide for my half-plate camera, in exchange for either chemical or electrical apparatus or books.—Address, CHEMICUS, 50, Coltart-road, Liverpool.

I will exchange THE BRITISH JOURNAL OF PHOTOGRAPHY for *Photo. News*, posted on Monday; also set of gramme 50 to $\frac{1}{100}$ gramme.—Address, H. GOVER, 101, Waterloo-street, Hanley.

I will exchange, for anything useful in photography, a rolling-press, almost new, with 12 × 8 polished bed, and a background, one side plain and the other exterior.—Address, J. EDWARDS, 79, Ashford-road, Eastbourne.

What offers for THE BRITISH JOURNAL OF PHOTOGRAPHY from January 1st, 1877, to present date? Wanted, whole-plate view lens; difference adjusted.—Address, G. H. E. SUTTON, 64, Oak-terrace, Sycamore-road Nottingham.

I will exchange Cook's tourist camera, by Elliott, changes twelve plates $7\frac{1}{4} \times 4\frac{1}{2}$, with lenses complete; also portrait lens, for whole-plate or 10 × 8, four-inch diameter, twelve-inch back focus. What offers?—Address, G., 2, Eardley Villas, Eardley-road, Streatham, S.W.

I will exchange a magnificent excelsior folding tricycle (folds to twenty-seven inches), nearly new, cost, with accessories, £23, for a 12 × 10 bellows-body camera and a 4D Dallmeyer's lens. Send specimen of work. —Address, J. T. FIELD, 8, Montpelier-row, Blackheath, S.E.

I will exchange a 10 × 8 brass-bound Kinnear camera, swing-back, &c., with changing-box for same, by Rouch, and fitted with a Ross's 10 × 8 medium-angle doublet. Wanted, a whole-plate portrait lens by Ross or Dallmeyer.—Address, MANAGER, Meadow's Studio, Arkwright-street, Nottingham.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

NOTICE.—*Each Correspondent is required to enclose his name and address, although not necessarily for publication. Communications may, when thought desirable, appear under a* NOM DE PLUME *as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.*

PHOTOGRAPHS REGISTERED.—

Thomas Roberts, Bradshawgate, Leigh, Lancashire.—*Photograph of Henry O'Connor, S.J.*

John Hodge, 31, Union-street, Stonehouse, Devon.—*Photograph of the Interior of Plymouth Guildhall.*

George Washington Wilson, Queen's-cross, Aberdeen.—*Group Photograph of Mr. and Mrs. Gladstone, Lord and Lady Aberdeen, and others; also Group of Mr. and Mrs. Gladstone, Lord and Lady Aberdeen, Miss Gladstone, Lord Haddo, and Lady Marjorie Gordon.*

MEADOW.—Your query was answered in our issue of August 22nd, at page 544.

T. WALLACE.—Write to Dr. Liesegang, of Dusseldorf. We believe he supplies the paper.

R. A. DUNN.—The plates show a marked example of the so-called "Coignet spots," and in an exaggerated degree; indeed, it is about the worst specimen we have seen for some time. Discard the gelatine and try another sample.

T. A.—You should have acidified the bath after sunning and filtering. The fog is fully accounted for by your omission.

GINGER.—1. We have had no experience with the paper. You had better write to the manufacturer.—2. The Royal Academy opens the beginning of May next.

J. T. CLARK.—Dissolve the gold in a mixture of one part of nitric to three of hydrochloric acid. Do not use more of the solvent than is actually necessary for the solution of the metal.

A YOUNG BEGINNER.—You should experience no difficulty in the operation. If air-bubbles get imprisoned press them out with a squeegee or with the finger. With care, however, none need be formed.

G. FOXALL.—The appearance is probably due to the efflorescence of alum used in the preparation of the emulsion. No doubt if you had examined the plates carefully before exposure it would then have been perceptible.

A.—The spots are caused by the silver paper being pressed in contact with the negative while it contained hyposulphite of soda. The only method of avoiding them in future is to wash the negatives more perfectly than you have done hitherto.

J. J. EMANUEL.—The stains on the prints are clearly due to careless manipulation, chiefly caused by being handled with fingers contaminated with hyposulphite of soda while they were being washed to free them from the silver, or whilst they were in the toning solution.

THE PHOTOGRAPHIC EXHIBITION.—We regret that some of the exhibitors in Pall-mall should think fit to write requesting "a notice" of their exhibits. We regret it because it is a certain means of securing their entire omission from mention of any sort, favourable or otherwise.

J. R. WILSON.—Do not remove the prints from the mounts, but carefully wash off the dirt with clean water and a soft cloth. Arrange the pictures so that they are illuminated with a strong *side* light, and copy in the ordinary way, giving a full exposure and making the negative tolerably dense.

CELT.—1. The knowledge can only be acquired by experience.—2. If the pictures are *really* taken instantaneously there will, of course, be no necessity.—3. About the same, or a little longer. Why not try the experiment by developing two plates side by side? It would increase your experience.

PRINT.—Touch out the spots with oil colour, thinned with rectified spirit of turpentine. Use the colours sold in tubes by the artists' colourmen. These, when thinned with the turpentine and applied sparingly with a sable pencil, will dry in a very short time, and will not be removed when the print is enamelled.

T. D. P.—The charge is certainly not excessive, if the instruction be good. You may, with perseverance, teach yourself photography. Whether you receive instruction or teach yourself you must bear in mind that considerable experience will be necessary before you can successfully practice photography commercially.

J. W.—From what we recollect of the scene the picture must be taken pretty early in the day, otherwise the glen will not be artistically illuminated. Without this the photograph will possess but little merit compared with those of the same subject which are to be found in the shop windows. The subject is a difficult one to deal with.

DYNAMO.—1. Such a machine will yield a light suitable for portraiture.—2. One of Siemen's lamps will be about the best for the purpose. A less expensive contrivance may be made to answer, but you will then have to regulate the carbons by hand.—3. It is simply a concave reflector, somewhat like a large umbrella, lined with white paper or even whitewashed on the inside. This contrivance you can make for yourself.

S. E. K.—1. Any of the so-called slow combustion stoves will be suitable. The one mentioned by you is very convenient; but no stoves of this character are adapted for cooking purposes.—2. With a good paper, sensitised on a plain solution of nitrate of silver slightly acid, there should be no difficulty in keeping it from one day to another.—3. Write the name of the subject on the negative neatly with black varnish. It will then appear in white letters on the prints.

X. Y. Z.—1. The colour appears to be all right—at least for this season of the year. Darker may be required in the height of summer.—2. Stop off nearly all the top and front light, and rely more upon the side light.—3. The coarseness is due to injudicious lighting. You have built a studio in which you are clearly unable to manage the light successfully. Such a studio is certainly capable of yielding good results in skilful hands; but it is of a form that is the most difficult to manage, so as to get the best and most uniform effects under all conditions.

RECEIVED.—J. D. England; Henry Holman. In our next.

HOLDER FOR THE *CARTE* PORTRAIT.—To the numerous devices for supporting a *carte* or cabinet in a leaning direction on a table or shelf Messrs. Richards and Wilkinson, of Birmingham, have added another, which, being well made, will compete seriously with those flimsy foreign productions to be seen so commonly in toy shops and bazaars.

ALBUMENATE OF SILVER.—Herr O. Löw has, says the *Archiv*, thoroughly investigated albumenate of silver. In the dark, in an ammoniacal solution of nitrate of silver, albumenate of silver does not change, and it is not until heat is applied that a reddish-brown substance is precipitated, which redissolves in ammonia, and from which it may be re-precipitated by dilute sulphuric acid. It is also soluble in excess of the acid as well as in all dilute alkalies, but it is insoluble in alcohol and in water. If the reddish-brown substance be digested in baryta water or in muriatic acid the greater part of the silver will be thrown down in the metallic state. The nitrogenous substance remaining in the solution possesses the reactions of peptone. Quantitative analyses of albumenate of silver showed a variable quantity of silver, depending upon the duration of the digestion and on the amount of nitrate of silver present; usually, however, it was about thirty-two per cent.

PHOTOGRAPHIC CLUB.—At the forthcoming meeting of this Club, at Anderton's Hotel, Fleet-street, on Wednesday next, the 15th inst., the subject for discussion will be *On the Collodio-Albumen Process as Applied to the Production of Transparencies for the Lantern and for Enlargement.*—To-morrow, Saturday, the 11th inst., there will be an outdoor meeting on Wimbledon Common, leaving Waterloo Station by the first train after 2 p.m. for Putney Station, to meet at the Windmill on Wimbledon Common.—Visitors to the Exhibition of the Photographic Society are invited to the Wednesday evening meetings at Anderton's Hotel, Fleet-street.

NEW EXPEDITION TO THE CONGO.—The *Mittheilungen* says that Lieut. Schulze, the commander of the German expedition to the Congo, spent the last few weeks of his stay in Berlin learning something of practical photography at the Technical High School, and took with him a first-class outfit of photographic apparatus. The exposed plates are to be sent to the laboratory of the Technical High School, Berlin, to be developed. The other members of the expedition, which sailed from Hamburg on the 1st August, on the steamer "Professor Woermann," comprised a topographer, a physician, an anthropologist, a botanist, a zoologist, and a mineralogist, in the persons of Lieuts. Kuno and Tappenbeck, Drs. Wolff and Büttner.

ON STRIPPING-OFF GELATINE NEGATIVE FILMS.—In the *Bulletin de la Société Francaise* M. Bory recommends dipping the plate bearing the negative to be stripped off into a very weak solution (say 1 to 50 to 500) of fluoric acid, washing well first in spring water, and then in distilled water. To prevent expansion of the film he recommends hardening it in alum for several hours. He finds that in stripping negatives in this way retouch in lead pencil is not injured by the washing. In order to get the gelatine film free it should be gradually removed from the glass while in the alum bath after it begins to come off and to dry. He also recommends a dilute solution of fluoric acid for cleaning glass bottles and other vessels. The best cures for injuries caused by fluoric acid are, he says, aqueous solutions of ammonia or borax. Fluoric acid is generally considered rather a troublesome and dangerous substance for unskilled persons to meddle with, though that objection may not be valid for such very dilute solutions as that mentioned by M. Bory.

A TONING BATH FOR COLLODIO-CHLORIDE PRINTS.—The *Archiv* says a solution of acetate of soda in water, to which a little dilute solution of chloride of gold is added just before toning, is an excellent toning bath for collodio-chloride of silver prints. It is not advisable to prepare at first a bath containing one gramme of chloride of gold to one or two litres of water, as in a few days its toning power would suffer, and one would be constrained to add fresh gold solution. It is more economical not to add more gold to the bath than is required to colour the number of prints to be toned. It is, therefore, recommended to prepare two solutions—one containing thirty grammes of twice-dissolved acetate of soda in one litre of water, the other containing one gramme of brown chloride of gold in three-quarters of a litre of water. The first of these solutions is intended for constant use, and is to have a certain quantity of the gold solution added to it before each time of using. The excess of gold, which in time falls to the bottom of the bottle, is allowed to remain there until a quantity sufficient to make it worth while to redissolve has collected. In this way there is extremely little gold actually lost. The gold solution itself does not precipitate any gold, and, like the soda solution, keeps an unlimited time. About an hour before beginning to tone, a quantity of gold solution should be added to the latter. This quantity will be larger or smaller according to the superficies of the prints to be toned and the bluer or redder tone desired. A little practice will soon enable one to judge of the quantity required. Should the prints tone too slowly in consequence of too little gold having been added they may be removed and a little more added, though when there are many prints to be toned it is best not to put in more gold than sufficient to tone them in about five minutes. The toning may be checked at any moment as with silver prints, and the print should not be washed, but transferred at once into a fixing bath of one litre of water to fifty grammes of hyposulphite of soda.

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THE SODA DEVELOPER AND SULPHITE OF AMMONIA.

Mr. William Hanson's article in our last number is a valuable contribution to the discussion which has been going on for some time on the above subjects both linked and singly; and the views of so old and experienced a practitioner deserve the closest attention. Mr. Hanson's conclusions are arrived at as the result of practical experience, and with their ultimate accuracy we perfectly agree; but we would offer one or two suggestions in connection with our contributor's theoretical deductions.

The first point mentioned by Mr. Hanson is that most of the substitutes for ammonia developed too slowly, or gave an image of an unpleasing colour. With regard to the former statement, we think from our own experience that it will scarcely be found to be borne out by fact, if the same degree of alkalinity be observed in the different solutions. It is quite possible that in using carbonate of soda — or other carbonated alkali — even in comparatively strong solution, there may be a less feeble developing action than with an apparently weaker solution of caustic ammonia. As regards the latter fault there is, perhaps, more reason to complain; but, as there are many who successfully employ soda in spite of the complaints made by others of yellow stains, it is probable that the truth lies in the fact that we do not yet know how to use it properly.

The superiority of sulphurous acid over others, such as citric or boracic, we can also readily endorse, since the salts of the two latter are known to be powerful restrainers of development; while sulphurous acid and its salts are reducing agents, and as such—especially the salts—actually aid development instead of retarding it. In proof of this we have shown that pyro. and sulphite of soda alone, without ammonia, soda, or other alkali, are capable of very satisfactory development. Free sulphurous acid would, no doubt, have a similar effect but for the superior restraining power it possesses by virtue of its acidity, weak though that may be. But it must be observed that the superiority noticed by Mr. Hanson, when using carbonate of soda in conjunction with sulphite of soda and sulphurous acid, may be due to the absence of restraining sulphates, citrates, *et hoc genus omne*, rather than to any specially beneficial action of sulphurous acid.

Then, again, in reference to green fog, which is supposed to be prevalent with certain plates when ammonia is used and to disappear when carbonate of soda is substituted: if, as there seems now little reason to doubt, green fog be a silver stain any substance employed in the developer which is capable of dissolving silver bromide will tend to the production of this defect. Looking at the question from this point of view, both ammonia and sulphite of soda are solvents of bromide of silver, and hence both capable, under favourable circumstances, of causing green fog. Sulphurous acid is not—or, at least, to so slight an extent as to be practically inappreciable—a solvent of the silver haloid, and it is therefore practically free from that tendency; and sulphite of ammonia, which exercises a far less solvent action than the corresponding sodium salt, therefore offers a chance of greater immunity from the evil.

The combination of ammonia with pyro. and sulphurous acid is, therefore a better one than ammonia with pyro. and sulphite of soda, or carbonate of soda with pyro. and sulphurous acid, which last combination, of course, results in the formation of sulphite of soda, and consequently reintroduces the tendency to produce green fog. The fact that Mr. Hanson obtained green fog with a carbonate of soda developer containing sulphite of soda is no more surprising than that an ammonia developer should produce the same result. In either case the necessary silver solvent is present, and it only requires that the exposure should be short enough, or the development sufficiently protracted, in consequence of other retarding influences, to bring out the green fog in all its strength.

The theory propounded by Mr. Hanson that the combination of ammonia and soda in the same developer is the cause of green fog requires some further proof. The result obtained in the case quoted by him can be more simply explained by reference to what has been said above. He uses carbonate of soda (*plus* sulphurous acid) in conjunction with pyro. and sulphite of ammonia. The result of such an admixture is to form sulphite of soda, and probably to liberate a quantity of ammonia. It may, perhaps, truly be said that the effect is produced by the mixture of the alkalies, but the conjunction of the *quasi* innocuous carbonate of soda with the equally harmless sulphurous acid would quite suffice to explain the trouble.

The recommendation to use as little sulphurous acid as possible is a good one, but we must dispute the correctness of Mr. Hanson's reason for this advice. He says * * * "*the sulphite of soda* formed in the developing solution powerfully retards its action, as may easily be proved by omitting the acid, when it will be found that development goes on with great energy, rivalling pyro. and ammonia." We have already shown that sulphite of soda does not "slow" development, provided it be not oxidised into sulphate. Sulphurous acid may, however, have a slowing action, but not in the way suggested. Carbonate of soda is a more powerful agent in development than the sulphite; hence, if a portion of the former be converted into the latter then the developer is weakened. Add to this that the carbonic acid liberated in the operation will—some of it at least—remain in solution. Carbonic acid being a restrainer, we have now a weakened and restrained developer, which will answer to Mr. Hanson's result without calling in any retarding action of sulphite of soda.

The substitution of sulphite of ammonia is a step in the right direction; but so long as either ammonia or soda, or both, may be used, so long will it be impossible to completely guard against green fog. So far as the retarding of the developing action is concerned, that can be overcome by employing pure sulphite of soda or freshly-made sulphurous acid. The chemical knowledge and experience involved in the manufacture of sulphurous acid or of sulphite of soda is so small that we would almost advise our readers to make these substances fresh whenever required.

MOUNTING LANTERN SLIDES.

Among several subjects brought forward for discussion at the last meeting of the London and Provincial Photographic Association that of the most suitable means of mounting lantern transparencies elicited the greatest amount of interest.

There are some slides which, while beautiful in themselves, are yet mounted in such a slovenly manner as to seriously detract from their saleableness and appearance while in hand. In other cases the paper bindings get frayed and torn away from the glass before the slides have been many weeks in use. To those who are not professionally engaged in the manufacture of lantern slides the subsequent mounting is the *bête noir*—the fly in their pot of ointment. It is no uncommon thing to hear a photographer say—"I will make as many transparencies as you like, but absolve me from having to mount them."

And yet the mounting is a sufficiently simple matter when analysed. You take hold of the photographic transparency, place a suitable mat upon it, cover it with a clean glass, and run a strip of binding paper round the edges. That is all. It is this strip of binding paper that causes trouble. No matter what skill and time are involved in its application, in many instances a day will not have elapsed ere it splits away from the glass, and the disgusted neophyte concludes with some bitterness that there is something about the glass which is repellent of paste.

There are two important points to be observed in the mounting of a transparency. One is to obtain a suitable paper for the purpose, the other being to avoid pure gum arabic as a paste. A solid-bodied paper with a glazed outside surface looks well; but one of this class, suitable for the purpose in question, is not to be procured in the open market. It is requisite that the binding paper be soft enough, and of a texture sufficiently open to absorb the mountant and to become quite flaccid when moistened with water or with the paste that is to be applied. This state of flaccidity is of vital importance, as otherwise the paper will not remain in contact with the glass plates when sharply bent round their edges.

One manufacturer stated at the meeting referred to that, such was the difficulty he had experienced in obtaining binding paper of a character entirely suitable, he had to get it prepared specially for his purpose at a cost greatly in excess of that at which apparently similar paper could be procured. The paper known as "needle paper" was advocated by another maker as being well adapted for mounting. It is of a good colour (very dark blue) and becomes quickly flaccid when wet, being hard and strong when dry. Paper of that class, we may observe, is extensively employed for this particular purpose.

A thin black paper of the consistency of thick tissue paper has been employed with a considerable amount of success. Being thin and porous it adheres to the glass most tenaciously. Hardness is imparted, after it has become quite dry, by passing over it a camel's-hair brush charged with ordinary negative varnish. One gentleman, who prepares many slides for his own use, expresses an opinion that this forms a somewhat better mounting paper than any other he has yet employed.

The next important consideration is that of the mountant. We have said that pure gum must be avoided. Paper which has been coated, no matter how thickly, with mucilage composed of gum and water alone will inevitably crack away from the glass before long. This, however, may be rectified by mixing with it a little sugar or glycerine; but it is this addition of sugar that constitutes all the difference between success and failure. A handy way of preparing binding paper by its agency is to have the paper cut in sheets of the width of thirteen inches—assuming the slide to be of the usual dimension of three and a-quarter inches square—and then coat one side thickly with the saccharated mucilage. When dry it is cut into strips of the width of three-quarters of an inch—more or less to suit the taste; but whether the width be short of this, or in excess of it, uniformity should always be adhered to for the sake of appearances. A supply of these strips should be kept in readiness.

The mounting of a transparency by the agency of such strips is really a very simple matter. A strip of the coated paper is rendered flaccid by being drawn over a postage stamp damper, a sufficient duration of time being allowed to elapse in order to ensure the desired end being effected. This may with some papers be one minute, although a period of two minutes will probably be required in most cases. The transparency and its cover, with the mat intervening, having been grasped by the fingers and thumb of one hand, the strip of paper is laid down, gummed side up, on a suitable pad lying on the table. This pad may consist of a few sheets of blotting-paper or of any similar body. Bringing one corner of the glasses, which are held edge up, down upon the extreme end of the strip, they are pressed down as nearly in the centre of the strip as possible, and rotated so as to wrap the paper entirely round their edges, the final end of the strip (if such an expression be allowed) joining the commencement end. By the finger and thumb of the disengaged hand the paper is now bent over upon the sides and pressed into close contact with the glass, a little care being taken so as to get the corner portions to neatly overlap.

Common flour or starch paste is sometimes employed with most excellent effect. When this is the mountant, the strips of paper should be softened by being sponged with water previous to the paste being brushed over it; for it is doubtful if the paste itself would render it sufficiently flaccid to fold over as nicely as could be desired, unless in the case of very thin binding paper. This class of paste adheres well under the various viscissitudes to which a lantern slide is subjected.

A hint was thrown out by Mr. W. Teasdale, of Leeds, who was a visitor at the meeting to which reference has been made, that certain Birmingham manufacturers would not be averse to making preservers of thin brass for the special purpose of mounting lantern slides, provided they imagined that there would be a demand for them. This, if done, would prove an inestimable boon to those of the photographic fraternity who indulge in lantern work. The facility of mounting, the neatness of the finished picture, and the ease with which a picture could be dissected in order to effect any change either in itself or in its mat, are all features which will approve themselves to the photographer. We hope, therefore, that before long we may be in a position to announce the advent of these long-needed, much-to-be-desired lantern slide preservers. Then the production of these transparencies will be indeed a pleasure.

PRACTICAL HINTS ON MOUNTING AND PLATE-MARKING.

It will be remembered that a few weeks since we gave some practical hints on the artistic mounting of photographs. The method then described was that of mounting the pictures on "linen and stretcher," which is suitable, chiefly, for those of the larger dimensions. We, however, promised to revert to the subject and give some practical details of mounting on plate and India paper, and likewise producing the plate-mark such as is seen on engravings, which also greatly enhances the appearance of photographs mounted with a margin. We shall now redeem our promise.

One of the chief difficulties met with by the novice in mounting pictures on plate paper, whether with the printed imitation tint or with the India paper itself, is that of avoiding the cockling of the mount. This arises from the moisture in the mountant expanding the picture, which contracts again on drying. Different plans for avoiding the difficulty have been adopted, one of which is that of damping the mount evenly all over, so that it becomes thoroughly expanded before the picture is placed upon it. Then, as they dry, the mount and print shrink together. The plan, however, more generally pursued is to employ a mountant that contains but a very small proportion of water. If the mountant contained no water at all there would be no expansion of the paper, and, consequently, no cockling of the mount. India-rubber solution fulfils this requirement, and makes an excellent mountant for photographs on plate paper; but, unfortunately, in time the rubber "perishes," loses its adhesiveness, and eventually the pictures leave the mount.

Starch paste, made much thicker than is usual and applied sparingly to the print, answers very well indeed. Professional mounters, we are informed, usually employ a thin solution of glue, and apply it very sparingly with a sponge instead of a brush. The best mountant we have ourselves tried for preventing cockling is a thin solution of gelatine, in which a large proportion of methylated alcohol is made to take the place of water. This solution, when thinly applied, practically causes no expansion either of the print or the mount.

At a recent meeting of the Photographic Club, when the subject of the artistic mounting of photographs was the topic under discussion, Mr. G. Smith explained the system of mounting that was adopted, and probably is now, in the establishment of MM. Goupil et Cie., of Paris, in which the mounting, rolling, plate-marking, and titling of the pictures was done in a single operation. As this method is simple, expeditious, and completely avoids all risk of cockling, we shall give it in detail.

The plan was this:—A quantity of India paper was coated with starch paste, on one side only, and allowed to dry. The prints were starched on the back and also allowed to dry. They were afterwards trimmed. In the evening of the day before the pictures had to be mounted the requisite number of pieces of starched paper were cut to size. These were then moistened, much after the manner in which paper is damped for printing purposes. A few sheets were placed on a flat surface, a few sheets more were dipped in water and laid upon them, then a few sheets of dry on them, and again some wet, and so on in alternate layers. When the whole batch had been thus treated it was allowed to remain under pressure till the following morning, by which time the moisture in the wet sheets had permeated the dry ones. The paper was then ready for use. The object of this treatment was to render the paper evenly moist without having it actually wet.

The mounting was accomplished as follows:—A metal plate, with the title engraved upon it and inked in, was placed upon the bed of a rolling-press. On this was put—in proper position, known by small register marks—the photograph, face downwards, then on it a sheet of India paper, starched side uppermost, and over this was laid the mount. The whole was then passed through the press, and the operation was completed. It will be seen that in this method of mounting both the print and the plate paper are kept dry, and it is only the intervening India paper that is moistened—the starch on the prints adhering to the unstarched side of the India paper, and the starched side of that to the mount, so that cockling is most effectually avoided. The plan, as described, is for working on a large scale; but the same system may be utilised for single prints, the only precaution necessary to be taken being that the starched India paper is *evenly* damped before using. This may easily be accomplished by placing it for a time between moistened sheets of blotting-paper. This method of procedure is far preferable to that usually pursued of first sticking the India paper on to the mount, and on that mounting the print.

It may be well to mention, for the information of those who may wish to do their own mounting, that India paper—or, rather, what is known as such, for we are told that very little genuine India paper is now employed in printing—may be procured from most wholesale stationers who make foreign papers a speciality. It can be had in a dozen or more different shades or tints, and the size of the sheet is somewhere about (for we have not an entire sheet before us as we write) forty-two or forty-three by thirty inches. The sheets should be starched whole, as the paper will keep any length of time. If a stock of the paper be prepared it will be ready for use whenever a piece may be required.

We shall now say a few words about plate-marking, which so much improves the effect of pictures when mounted with a margin. This is usually done by rolling the print, after mounting, upon a highly-polished steel plate with bevelled edges, and an elastic material, such as two or three thicknesses of blanket or felt, between the back of the mount and the roller. But the photographer who works on a limited scale only, and yet wishes to do his own mounting, may not care to go to the expense of a number of steel or copper plates for the different sizes of pictures, as they are somewhat costly, and, moreover, require considerable care to preserve their highly-burnished surface from oxidation when not in constant use.

However, expensive plates are not absolutely necessary, if we are content to make the rolling of the print and the plate-marking separate operations. Let the print be mounted and rolled in the ordinary way. What is then required is a zinc plate of suitable size for the marking. Sheet zinc ready surfaced may be procured from any dealer in lithographic materials. That known as "12 or 14 B. W. gauge" is the most suitable for our present purpose. The edges of the zinc must be slightly bevelled with a file and finally polished—first with snake stone and water, and then with a piece of charcoal and oil.

The method of using it is this:—A piece of paper, the size of the mount, is placed on the bed of the press. On this is adjusted the zinc plate, face upwards, in the exact position the mark is required. The mounted print is then laid, face downwards, and arranged so that its edges exactly coincide with those of the sheet of paper. By this simple means accurate registration is secured. Over the back of the mount is then laid a couple of thicknesses or so of felt, such as is used in pressure-frames, or of blanket. The whole is then passed through the press. With an elastic material at the back of the mount, very little pressure is required to produce an impression of the plate compared with what is required to roll or surface the print itself.

MORE ABOUT FRILLING AND BLISTERS.

We have continued the series of experiments upon this subject, the results of which we have on former occasions brought before our readers; and we are already able to throw fresh light upon the causes of these troubles and upon the application of remedial measures. It goes without saying that a plate subject to blisters or frills is less common now than used to be the case; but that it is to be met with in commercial plates of good standing is sufficiently proved by the appearances presented by a batch of plates that have recently been brought before us, and which, indeed, were the cause of our experiments being resumed, the plates in question having been made by one of the oldest houses devoted to that branch of manufacture.

The complaint about their action was that the negatives produced upon them were rendered utterly useless by the appearance of a multitude of small blisters, which no treatment that the gentleman who sought our advice had been able to apply was of the slightest use in mitigating. He put them down as caused by the weather; but when we learnt that the first plates of the same batch were entirely free from the defect it was perfectly obvious that the matter was one of mode of treatment rather than deterioration or imperfection in the manufacture. As no light could be thrown on the subject by the owner we requested him to leave us a few to experiment upon, and after a time we were able to find a complete cure of a thoroughly satisfactory nature.

The evil only making its appearance in connection with the operations of fixing and washing, our attention was naturally given entirely to that phase. In a former article we showed how, in the majority of cases, a complete cure for frilling tendencies was to be found in the draining of the plate thoroughly from hypo. before placing it to wash, and with these plates we found our method uniformly successful. There are, however, two drawbacks to this plan—first, the time wasted, so to speak, in waiting for the draining to be thoroughly carried out; and, secondly, if the plate remain for too long a time subject to the influence of the hypo., the tendency, more marked in some plates than others, for the image to become weakened and apparently dissolved. By giving the negative full intensity, and not protracting the draining period for too long a time, little or no fear need be entertained on this score; still, if the same effect without this drawback could be obtained by other means, they would, as a matter of course, be adopted, all other things being equal.

Guided by precisely the same principles that actuated us in instituting the experiments leading to our giving to the photographic community the above-mentioned cure for frills, we were able to arrive at a mode of treatment which, with the plates in question, enabled us to produce or prevent at will the appearance of the blisters. We have pointed out how it has been proved that when a crystalline substance passes by osmotic action through what may be termed the pores of a membranous or other similar substance, it is, as a rule, replaced by a definite quantity of water; and that salts vary considerably in the relative amounts of water that they require to replace them—such a salt, for example, as chloride of aluminium being replaced by nearly three hundred times the quantity of water that would pass to replace chloride of sodium under the same conditions. It is, as we have said, clear enough that the most likely cause of blisters at this stage is the replacement of the hypo. by a so much larger quantity of water, and the consequent tension placed upon the film which is sufficient to cause it to separate from the glass, the result being blister or frill, according to the place in the film where the action takes place.

Draining the film well removes a large portion of hypo., and leaves a smaller quantity in the film to be replaced by water, and thus blisters do not form. The question that arises is—Cannot the hypo. be removed by any other means before placing the plate under the tap? We saw no clear way of removing the hypo. from the film, but the same effect could be produced by not putting it there; in other words, by using a weaker solution, and, as a consequence, leaving a smaller quantity to be exchanged for its osmotic proportion of water. This was a very simple thing to try, and it answered completely. With the plates left in our hands we were able to produce any number of blisters by using an extremely strong fixing solution, or to have a negative perfectly free from them by diluting the same solution with an equal bulk of water.

Upon communicating the results of our examination to the owner of the plates he was able to remember that, previous to his blister difficulties, he had made a fresh fixing bath, and that as the water had stood for several days over an excess of the crystals, and had been stirred at intervals, the solution must also have been almost saturated, and thus in a condition most favourable for the full play of the osmotic action we describe.

Another consideration is introduced which suggests also a course of inquiry that might have favourable results. We have shown how water replaces certain salts in large quantities; but it is also known that this power of replacement is capable of being considerably modified by the presence of other substances, sometimes even in very small proportions. Thus, carbonate of potassium has its powerful osmotic action of two hundred and twenty times that of chloride of sodium reduced to almost nothing by the presence of an equal portion of the latter salt.

Again: sulphate of potassium, which has a moderate action, has it reduced to a minus quantity (that is to say, more salt than water passes through) by the presence of the merest trace of a strong acid, while an alkaline carbonate raises it most considerably, from twenty-one to over two hundred degrees. The inference we would indicate to be drawn from these facts is that the conditions of the fixing bath may greatly influence the osmotic action, and, in consequence, the frilling tendencies of plates submitted to its action. It is not to be recommended that we should add a strong acid to the hypo. bath, though there may be less evil than might occur with paper prints. Still, it is worthy of trial whether and to what extent the frilling and blistering might be governed by the addition of small quantities of hydrochloric or oxalic acid. It would be a nice question to discriminate whether the frilling tendency of acid *qua* acid, or its possible reduction of osmotic force, would be the greater power. That old hypo. baths must gradually become acid is obvious from the well-known reaction between the oxygen of the atmosphere and the dissolved salt, and whether in practice sufficient ammonia to neutralise it is introduced from partially-washed plates is open for experimental proof.

There is here, however, matter for a large number of experiments, which we shall, on our part, follow up at some future time. Meanwhile, there is no subject that could be more easily taken up by the general reader, and in his hands we leave the matter for the present.

THE PHOTOGRAPHIC EXHIBITION.

[Second Notice.]

In consequence of the backward state of the catalogue, and some little irregularity in the making of the awards, the following names were omitted from the list of medallists last week:—Portraits, H. S. Mendelssohn. Enlargements, Autotype Company. Instantaneous pictures, C. Grassin. Winter scenes, G. Renwick. *Genre* picture, *Out of Sorts*, Adam Diston. Small studies, G. Hadley; and *genre* picture, *Knuckle-down Fight*, Mrs. S. G. Payne. With the exception of Mr. Mendelssohn's, these form a second edition of the judges' awards.

Resuming our notice of the pictures, we find a number of frames of various descriptions of work by Mr. B. Wyles. First in numerical order is a frame of *Studies of Reed Plants* (No. 11), all of which are simply but artistically arranged, the most pleasing being *Marguerites.* Several frames of large sky studies, *Cloudland*, are excellent renderings of sky and cloud, but lack pictorial interest and completeness. Two figure subjects entitled, for no very obvious reason, *Rustic Figures—Sticks* (No. 169), and *Rustic Figures—Flowers* (No. 186), show careful posing. The remainder of the exhibits consist of views in Wales and elsewhere.

Mr. John Jackson's frame of *Views* (No. 18) contains some admirable work—as bright and fresh as the staunchest supporter of the wet plate could wish. *Druidical Remains at Stanton Drew* and *Wickham Bridge on the Frome* are especially noticeable. *Walton Castle, Clevedon* (No. 447), by the same artist, is a splendid study of fir trees, with the castle in the distance; and *A Somersetshire Lane—Evening* (No. 540) is a tasteful selection of west-country rustic scenery.

Mr. W. E. Debenham exhibits two charming studies in red chalk, of which we prefer No. 30—two little children gracefully posed, whose expressions have been caught with wonderful felicity. No. 283, a single figure subject, is so utterly skied that it is impossible to examine it.

Messrs. Robinson and Thompson exhibit a number o frames of views. An enlargement of *Venetian Boats* (No. 31) makes a most pleasing and artistic picture, but much of its beauty is due to the brush. Nos. 137, 138—two views of *Mersey Sailing Club, The Start*—are good average specimens of that class of work. The first is slightly marred by a want of detail in the white sails of the yachts—a fault from which the other is free. A frame of views, *Photographed during a Voyage from Liverpool to Venice* (No. 161), completes this exhibit. Noticeable amongst these are a street scene, Catania, and Vesuvius with his head hidden in cloud.

Mr. T. W. Boord, M.P., shows a frame of *Instantaneous Views, taken from a Yacht in Scotland* (No. 33), which are good studies of light and cloud.

Messrs. Adams and Scanlan exhibit a number of frames of theatrical portraits, the best of which is *Miss Dysart as Princess Ida* (No. 310). A frame of cabinet studies from "La Mascotte," "Serpolette," and other plays (No. 353), contains some excellent photography.

Mr. Valentine Blanchard's *Andrew Levy, Esq.* (No. 36), is a fine picture as well as a good portrait. His *Siesta* (No. 129) is grace-

No. 129—*A Siesta.* By Valentine Blanchard.

fully posed; but if the reclining lady were really enjoying her midday "nap" she would scarcely hold so steadily to the sunshade. As a sample of posing we have selected this for illustration. *A Message from the Sea* (No. 292) represents two fishermen who have just landed the name-board of some unfortunate wreck—"only this and nothing more." The exaggerated perspective of the board and the obtrusive block in the foreground rather detract from the merits of an otherwise clever picture.

Mr. Joseph Gale is again well represented, though his subjects are this year scarcely up to his usual high standard. *On the Skirts of the Downs* (No. 52) is a clever picture of a flock of sheep with the distant downs for background. *Off to Market—You'll Take Care of Baby* (No. 69) is the best composition of Mr. Gale's, and the picture tells its own story. A rustic cottage, a pebbly brook, and wooden bridge form the groundwork of the subject. The figures are two—mother and daughter—the former of whom calls out as she crosses the bridge the words of the title. No. 70, according to the inscription on the mount, is *The Smugglers' Cave*, but the catalogue describes it as *A Bundle of Shavings*. The mixture of names, however, serves to explain the picture. The background is filled by huge rocks, an opening in which leads to the smugglers' cave. At the entrance two rough-looking men—smugglers without doubt—are cooking at a fire composed, we presume, of a "bundle of shavings." *At Rye—Oh! Fie!!* (No. 71) does not suggest any connection between subject and title. At anyrate, in our ignorance of what the young woman has in her basket we are unable to find any. The composition is a good one, but poorly rendered in our drawing.

No. 71—*At Rye—Oh! Fie!* By J. Gale.

Three frames of portraits of high quality bear the name of Lafayette, of Dublin, and a medal has been awarded to two of these (Nos. 387-8) containing three-quarter length figures of "grand panel" size. No. 179 contains portraits of smaller size, all being of excellent quality from a technical point of view, while artistically there is little to find fault with. The selection made from No. 179, as an example of posing, is scarcely done justice to in our illustration.

No. 179—*A Portrait.* By J. Lafayette.

Mr. W. W. Winter is represented by four figure studies of large size. The most pleasing of these, *Just Off* (No. 173), which we have selected for illustration, represents a young lady, fully armed, "just off" to tennis. *Undecided* (No. 174) is a new rendering of the old, old story, the fair subject being evidently undecided whether to say "yes" or "no" to the all-important question contained in the letter she holds in her hand. *Sad Moments* (No. 190) and *Pleasant Thoughts* (No. 191) are in the same style; but the latter is a particularly happy *coup*, the expression and attitude being alike natural and appropriate to the idea conveyed by the title.

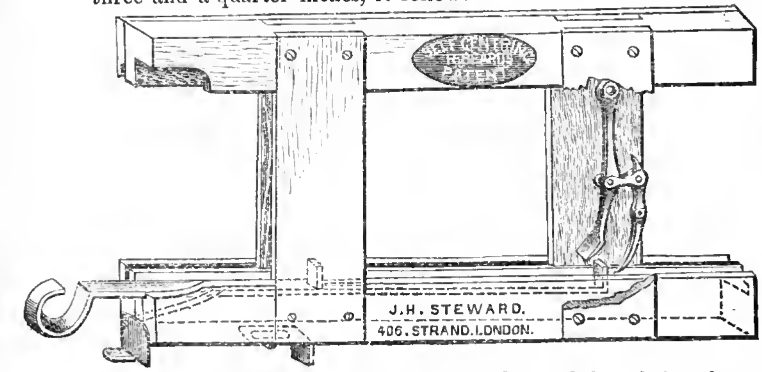
No. 173—*Just Off.* By W. W. Winter.

Messrs. Morgan and Kidd exhibit a large number of specimens of their work upon argentic-gelatino-bromide paper and opals, all of which are of considerable excellence. One of these, *A Portrait* (No. 98), we have chosen, because of the ease and elegance of its pose, for illustration.

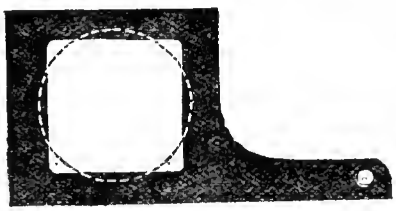
No. 98—*A Portrait.* By Morgan and Kidd.

APPARATUS.

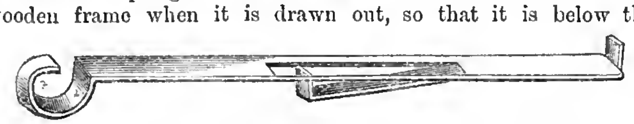
Distributed upon the tables are several specimens of a novel sort of lantern slide adapter, the utility of which strikes the observer at the first glance. This ingenious adapter allows of any commercial slide being automatically centered in the stage of a lantern. A difficulty previously experienced with registering slide-carriers has been the liability of damage to the slide by its falling out, and the necessity of the operator remembering the kind of slide that preceded it in the frame. A reference to the accompanying diagram will show that on the photograph being placed on the metal runner (when drawn out) in any position between the two projecting pieces, and the runner pushed home, the end comes in contact with the point of the lever and acts upon the photograph, so that it is brought to rest exactly in the centre of the opening. As the length of some slides, such as the original Woodbury slide, is four and a-quarter inches, the French *four* inches, and the English standard three and a-quarter inches, it follows that considerable trouble is



saved by this arrangement, as it allows of any of them being shown in rotation or consecutively without being put in separate carriers.

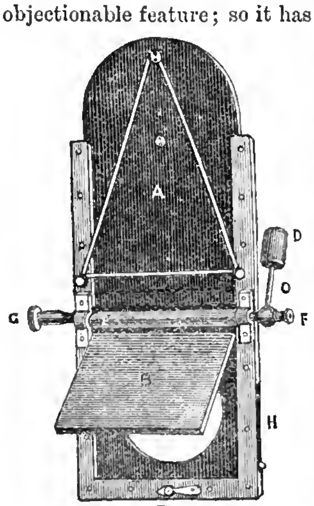


There is a supplemental groove in the frame for allowing metal masks to be inserted — circular or cushion-shaped — so as to preserve identity in the case of slides with various-shaped mats. The projecting piece on the runner is made to spring down into the hollow at the end of the wooden frame when it is drawn out, so that it is below the



level of the runner when inserting the slide. We give this adapter a cordial welcome on account of its undoubted utility. It is invented by an experienced lanternist, Mr. R. Beard, and the specimens in the exhibition are contributed by Mr. J. H. Steward, optician, Strand.

It is not long since we had occasion to chronicle an improvement in the clever instantaneous Phœnix shutter which emanates from the firm of Messrs. Reynolds and Branson, Leeds. In the "original edition" of this shutter there was a spring, similar to the mainspring of a watch, employed to aid the throwing up of the flap of the shutter, on the tension of which depended the rapidity with which this was effected. Owing to the liability of the spring to become unhooked or disarranged by the sudden, if not jerky, nature of the action to which it was subjected, this was felt to be an objectionable feature; so it has been removed in favour of a system



The shutter consists essentially of two movable parts, the drop portion A and the flap B, the movement of either of which can be accelerated independently — the former with a rubber band, and the latter by means of a weighted arm. The flap in moving upwards gives a gradation of exposure from foreground to sky; this action is extremely valuable in landscape photography and for cloud effects. When an exposure of about one-quarter of a second is desired, the band is removed and the flap is raised by means of the weighted arm C; the weight D being alterable as to size, and movable as to acting distance from spindle E. The arm C rotates on spindle, and may be fixed in any position by milled screw F. Very slow exposures may be made by fixing A by means of the pin attached to shutter, and by regulating the exposure by B; the movement in this case is imparted by means of milled head G. When this action of the shutter is used, the catch I must be released and the weighted arm clamped. The slowest automatic action of the shutter is obtained (without rubber-band) when the arm and weight are arranged at an angle of about 20°. If a rather quicker motion is wanted, arrange weight and arm at an angle of about 40°, and move the weight to its extreme acting distance, as shown at D.

in which a small weight forms the means of determining the duration of the exposure. This is shown in the annexed diagram, of which the above detailed description will prove acceptable to many. It will thus be seen that the degree of control which may be had over the shutter is practically illimitable. They appear to receive a large share of the attention of visitors to the Exhibition.

The London Stereoscopic Company exhibit four cameras—respectively whole-plate, half-plate, and quarter-plate. These are characterised by good workmanship and design. Another camera by these makers—the "*multum in parvo*"—is of different construction. It has several ingenious features which tend to increased facility of adjustment. Especially is this the case with the swinging of the back, both in a horizontal and vertical direction. The horizontal swing is effected by the simplest of all methods, namely, having the back of the camera attached to the base-board by means of a single screw in the centre, round which the back rotates. The vertical swing is obtained by having the hind portion of the base-board separated from the main portion, and connected with it by hinges and clamping-pieces at the sides. Notwithstanding the fact that in its construction there are some new departures to facilitate the folding and render it generally compact, we do not imagine that it will fulfil all the requirements of those who have of late been giving their suggestions as to the points which should find a place in the tourist's camera of the future.

THERE ought really to be some plan devised to enable exhibitors of apparatus to send their goods to Pall Mall with a reasonable hope of getting them back again whole. As it is, the amount of damage done during the period the exhibition is open is very great, especially to small articles, such as instantaneous shutters. It is scarcely desirable that the "hands off" principle should be adopted, nor is it possible to have attendants always present to exhibit each article, though this year an attempt has been made to improve matters by instructing one of the attendants in the working of all complicated apparatus. But we do think a notice might be posted, for the benefit of the blundering individuals we frequently see wrenching away at slides that will not open, to the effect that apparatus they do not understand is to be let alone until the attendant can explain it to them. Under the present system many manufacturers of apparatus refuse to exhibit at all, consequently the collection, as a whole, consists of a mass of fossil apparatus that most of us have seen years ago.

WE have before us an admirable print from a negative of Dunblane Cathedral, sent to us by Dr. Berwick, of Sunderland—sharp, clear, and brilliant as one could wish to see. The detractors of gelatine plates—those who insist that they must deteriorate by keeping—will be surprised to hear that this plate was exposed on July 21st, 1880, and developed July 21st, 1884. Four years between exposure and development is a fair test. How long the plate had been kept *before exposure* is not stated, but it matters not.

A COURSE of twelve lectures is being delivered under the auspices of the Committee of the Liverpool Free Public Library and Gallery of Art by the Rev. S. J. Perry, S.J., F.R.S., F.R.A.S., director of Stoneyhurst Observatory, the subject being *The Nature and Motions of the Bodies that Compose the Solar System.* A novel feature in this course is that each lecture after the first will be preceded by a discussion of the subjects dealt with at the previous lecture. A syllabus will be printed for each lecture, and this will be accompanied by a series of questions which may be answered in writing by those who desire to qualify for a certificate of proficiency. The first lecture was delivered on Thursday, the 9th instant, the series to be continued on succeeding Thursdays. The lectures are being largely illustrated by photographs and sketches.

WE see recommended a new use for the familiar "hypo." In a twenty-per-cent. solution, with the addition of a little carbolic acid and glycerine, it is said to be of great value as a dressing for contusions and bruises, the method of use being to saturate a cloth with the solution and keep constantly applied.

ACCORDING to M. Heddebault, when a mixed parcel of woollen and linen rags is exposed to superheated steam under a pressure of five atmospheres, the wool melts and sinks to the bottom of the vessel in which it is placed, leaving the cotton, linen, and other vegetable fibres intact and suitable for manufacture into paper. The pulp, through this purification from the presence of wool, is more valuable, yet does not cost more, seeing that the wool marc, from containing so much nitrogen, has a commercial value for fertilising purposes. Every method of improving the purity and evenness of quality of paper is of interest to the photographer, the quality of whose work in many departments is dependent in a great measure upon the paper he employs.

The foreign journals have been discussing methods for the detection of tartaric acid in citric acid—a by no means infrequent accompaniment. We have known cases where the one acid has actually been substituted for the other, though, at the present time, it would not pay to use the first-named acid as an adulterant, the prices being almost alike. According to one authority, Herr H. Akenstadt, tartaric acid may be detected by adding five drops of a five-per-cent. solution of the suspected sample to about half-an-ounce of lime water, which must be strong or the reaction will not be discerned. If tartaric acid be present a milkiness will ensue, and become more marked as the solutions gradually mix, shaking the mixture being carefully avoided.

Herr Push prefers to mix a small quantity of the citric acid in a dry test tube with ten times its weight of sulphuric acid, and then to allow the substances to react for an hour. He then places the tube in a water-bath heated almost to boiling, when the materials will melt to a lemon-yellow coloured liquid, which will remain unchanged for an hour if the sample be pure, but will become brownish coloured in half-an-hour, and reddish brown in an hour, if tartaric acid, even in so small a proportion as one-half per cent., be present.

The ammoniacal solution of shellac is said to be useful for the formation of dyes, and on the description given for making them a capital mode of colouring fabrics for dark-room windows might be founded. It is stated that a solution of aniline yellow in water, for instance, added to the ammoniacal solution—a description of a mode of making which has often appeared in our columns—gives a dye which is waterproof, and applicable to wood or paper. It is obvious to those who have any acquaintance with aniline dyes that the presence of ammonia will be utterly inimical to the integrity of some of the colours. Magenta red, for example, when boiled for some time in the lac solution, is first converted into red and then into violet. Still, there are colours that could be usefully employed, and the presence of the lac would so protect the surface of the fabric as to enable it to be sponged in order to remove the almost inevitable splashes from the dark-room manipulations.

The purification of egg albumen often assumes considerable technical importance, and various intricate methods for performing it have from time to time been proposed by chemists; but in a late number of the *Medical News* a method of a much simpler character, devised by Dr. Reichart, is described. He simply treats the solution of albumen free from membrane with carbonic acid gas, or even with the contents of a bottle of seltzer water. A precipitate of globuline, &c., is produced, and, when filtered off, leaves a solution of pure albumen.

We gave our readers, some few months ago, an account of the far-fetched standard of light adopted at the Paris Conference. The subject bristles with difficulties, and it is far from easy to believe that a quantity of melting platinum just ready to solidify can ever have much success as a standard on account of the vast difficulty surrounding its production. Some such feeling has actuated the members of the Philadelphia Electrical Congress, for, though they condemn the Paris unit as impracticable, they are so far from proposing a substitute that they were compelled to shelve the question for a time—or, in other words, "the subject awaits a report by-and-by."

The result of the new Patent Laws has been the production of a complete crush of work, leading to delay of a most inconvenient character. A competitive examination was held on the 9th ult. for the appointment of twelve more examiners, and the names of the successful candidates have already been published. Notwithstanding, however, this extra aid, the opinion prevails that at least double the number is required to enable the work of the department to be carried on without unnecessary delay.

THE LATE H. T. ANTHONY.

It is with the deepest regret that we have to announce the unexpected demise of Mr. Henry T. Anthony, of New York, whose portrait we so recently presented to our readers. Little thought we, when our portrait and brief biography appeared, that the hale and hearty subject would so soon be called away. But so it is; and photography generally — especially American photography — has now to mourn the loss of one of her oldest and most indefatigable votaries. The sad news arrived by cable, and no particulars are yet to hand. We extend our warmest sympathies to the bereaved relatives, as well as to the members of the firm of which the deceased had been so long a prominent member.

THE CAMERA OF THE FUTURE.

If twenty-five years' experience of amateur work in landscape photography with both wet collodion and dry-plate methods be any recommendation, I shall be glad to add my mite to the general information on the above-mentioned subject. I have used only one camera—a 12 × 10 size, of the form known as "Captain Fowke's," now quite obsolete; but I have never regretted my purchase. It is as good and as serviceable now as ever, though I have modified it by removing the "cone" in front; and it is with the idea that part of its constructive principle may be embodied advantageously in the future tourist's camera that I venture to offer my suggestions on the subject.

What we want in cameras for landscape work (but which would be equally valuable in the studio) is lightness as far as is compatible with sufficient strength for wear and tear, and the utmost possible celerity and ease in putting up and taking down, without loss of time or looseness of parts, which may be liable to be laid aside or lost in the field. The first is obtainable by doing away, as far as possible, with metallic fittings; the last is the study of the present period.

The main principles of Captain Fowke's camera are simplicity of construction, rigidity when set up, strength of material without excessive weight, and compactness for portability; but it has the defects of requiring considerable time and manipulation in setting up and taking down again, and many loose parts in the form of thumbscrews, brass rod, and loose base-board, which are troublesome to pack up and protect.

It would occupy too much space to describe the construction of this camera for the information of those of your readers who are unacquainted with it; but I will embody its most useful points in the description of a proposed form of camera I have been thinking out, but have not yet put into actual practical form.

What are our chief wants in a camera? In these days of variety of lenses we require a camera to open out to considerable focal length whilst closing up very compactly. I take as a standard for description a 10 × 8 instrument. In order to utilise the lens power to the utmost advantage the sliding body should pull out backwards from close contact (of three inches inside space) to eight or nine inches for portable symmetrical lens, and to (say) eleven inches full stretch for figure subjects. But it would be a great convenience *for certain work* if the focussing length *could be doubled* (say to twenty-two inches) for the sake of using the back lens only (as a meniscus) of any of the "doublet" or "symmetrical" lenses, or long focus portrait lenses for large heads; and this can only be got by adopting an extension of body towards the front as well as at the back (to be used only in special cases as mentioned).

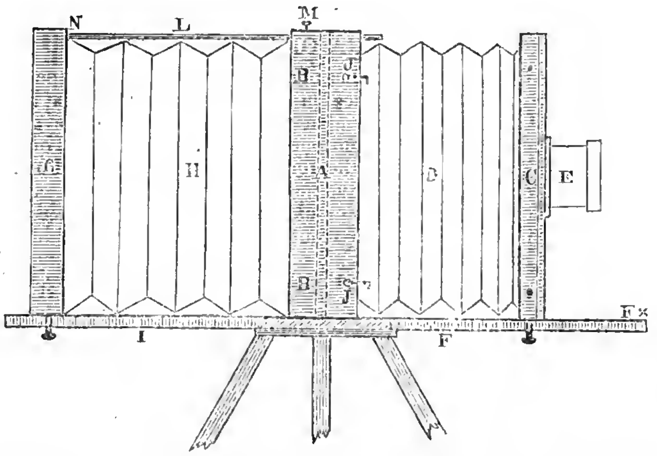
This front extension will, of course, add a little to the bulk and weight of the camera; but it can either be adopted for convenience or discarded as unnecessary, according to the wishes of the purchaser. It is a convenience of which I should much approve if it had been attached to my camera. The arrangement is an old one, and I only mention it as *not* being *a necessary portion* of the construction if *greater lightness* for carriage be the *chief* consideration. The accompanying diagrams will explain the plan I propose.

One of the principal points I wish to urge at starting is that *there is no practical necessity for any form of rack-and-pinion or screw-focussing arrangement.* These contrivances are expensive additions to the mechanical construction of cameras. They add materially to the weight, they interfere with the freedom of motion of the back frame, particularly in "side swing," and the utmost delicacy of focus can be obtained quite as easily—I think more easily—without them. I have never used them, nor felt their want. The "Fowke" camera back part is simply a free sliding movement along the surface of the tail-board, kept in place by two thumbscrews moving along two slots in the tail-board, and clamped there by a turn of the screw on each side when the focus is obtained. It is easy, certain, and firm when arranged, and gives an unusual amount of "side swing." I consider it might, with advantage, be adopted in all cameras in lieu of the stiffer-working rack-and-pinion or screw-focussing plans now so common.

The square form of camera is best, as giving more scope for rise and fall of the lens in front—a very important point in all cameras; and a reversible back frame makes it convenient for changing from horizontal to perpendicular in exposure of plates.

Fig. I.—A is a square frame of wood strengthened internally by another narrow frame glued on at right angles to it, shown by the

FIG. 1.



dotted lines B B—the width of A to be *just sufficient* to contain a *double* bellows-body when closed up, both parts being attached to the inner frame B. One part, D, is to extend forwards (only when specially required); the other, H, backwards for general focussing. C is the front of the camera (attached to the other end of the bellows) on which the slide for raising and lowering the lens is fixed with its lens flange and lens, E. *When the front part is used* C is pushed forward and fastened to its base-board, F, at any desired distance, but it can be extended to the full length of F. When not required it remains (in its position as packed up) close to A, to which it is clamped by brass side hooks (or best by bolts). G is the back part of the camera to carry the focussing-screen and dark slides. It pulls out to the full extent of its own tail-board when desired; or it can be closed up to A, thus giving a focussing stretch of about three to eleven inches. As shown in *fig.* 1, the camera double bodies are *almost* fully extended as for use with long-focus portrait or meniscus lenses; but for ordinary landscape work C would be closed up and clamped to A, using only the back extension, in which case the centre of attachment to the tripod head would have to be placed further back at the point of central balance. Two such attaching points are desirable.

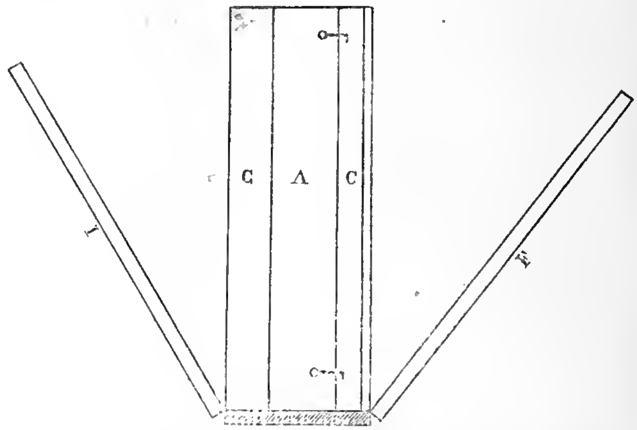
The two base-boards F and I are hinged to the bottom of A, and are strengthened in their horizontal position by the usual method. The back frame, G, can be fitted with the well-known appliance of hinged focussing-screen and reversing-frame for dark slides; *but no perpendicular or horizontal "swing adjustments" are necessary*, as the *free movement* of that part in the slots of the tail-board *allows more latitude than can be obtained by the usual complicated construction.* The fastening screws of C and G can be made either with thumbscrews underneath (as in Fowke's camera), which should be made *to slacken* out *but not to come right out*, or by milled-headed screws on the *top* of G, with a rod passing down each side of the frame and tightening against flat buttons underneath the tail-board. I prefer the bottom screws; they are more handy for use in getting the focus, and equally serviceable without costly construction.

Now turn to *fig.* 2, showing the camera partly packed up. A, G, and C all slide closely up together, F folds up in front, and I folds up at back, protecting the more fragile parts by their solidity. When folded up they are fastened by either brass clamps or leather straps across the top of A. A leather strap handle along the top of A will give hand-grasp for carriage.

The front base-board, F, when let down, would be somewhat in the way, and cut off some of the foreground *when the front, C, was not extended.* It should, therefore, be fitted with hinges, which, by a sliding movement sideways, can be "unshipped" and the board taken quite off and laid aside. It can be left at home for field work, and only attached when wanted for long-focus work; but the back tail-board must be a fixture, *strongly hinged and made as rigid as possible.*

There is one other point of construction to be mentioned. The *upper edges* of frames C and G would not be steady enough without some support beyond the rigidity obtained from the screws fastening them to their base-board. To obtain this a light brass rod, L, should screw into the front upper edge of G at N, in the centre, passing loosely through a hole in the top of A, and be clamped at any

FIG. 2.



required distance by a milled-headed screw shown at M. This rod is a very important element in the "Fowke" camera. It ensures great steadiness in the back frame when clamped, *and enables the back to be treated as a perpendicular swing-back*, either forward or backward, by means of the clamping screw; and I find it exceedingly useful in obtaining sharpness of foreground.

Sundry little minor contrivances can be adopted to complete the convenience of the instrument, but would take up too much space to describe; and, as I want to state chiefly the main features of the arrangement, I purposely leave them out.

Now notice the ease and simplicity of setting up or taking down. Open the tripod, fasten the camera on by the centre screw, unfasten the top clamps (or straps) and let down the base-boards. Now slacken the thumbscrews and draw out the back, then slip in the brass rod and screw it into the front of G. Attach the lens (by Mr. A. Pringle's method, for greatest convenience and celerity), and it is ready for work.

There are no loose parts, except the brass rod, which will go inside the front base-board. I think for *lightness and compactness* it will compare favourably with any form of camera, and the weight and inconvenience of rack and pinion or focussing-screw are avoided. The construction is so *simple* and *free from complications* that I consider *it ought to be inexpensive.* Double dark slides should be used, to be carried in a separate case from the camera; and the camera, when folded up, should slip into a light waterproof cover fitted with straps *to be carried as a knapsack.*

Amongst minor conveniences it would be a good thing if all cameras were fitted with *two spirit levels* in the main body, A—*one at the side*, horizontally fixed, to give the perpendicularity from back to front; and one *on the top* for horizontal correctness. It would save time and *give certainty* of the perpendicular position of the camera where buildings or interiors are to be taken.

If any camera maker cares to try his hand at a cheap *model* of this ideal camera, I shall be pleased to assist with ideas as to details. GEORGE BANKART.

THE FURNELL LENS.

I WAS much interested in what appeared in the last issue of this Journal respecting my lens; but I think the concluding remarks of the editorial article may cause many persons to alter, or add to, their lenses without exactly knowing the why or wherefore, and get into a muddle, thus gaining me anything but a blessing. But if they, leaving mathematics out of the question, should adopt some simple rule that anyone can understand, they will be the more likely to succeed.

Most doublet lenses have an adapter to lengthen the distance between the lens and stop when one of them is required to be used singly, and this lengthening piece is, doubtless, suitable to the depth of the front meniscus lens. This is important, if altered to my system, as the outer surface of the front combination requires to be distant from the stop one-tenth or one-twelfth of its focal length—the deepest meniscus requiring the shortest distance; but, of course, this is tolerably well known by this time.

If a back portion containing the two back lenses be added to the mount the concave lens must have the *curves* the length of three times the focal length of the front combination, and placed with its back surface a distance from the stop equal to one-twentieth of the focal length of the front lens. The function of the concave lens is to flatten the field, which can be made either round, flat, or concave according to the position in which this lens may be placed.

The focal length of the plano-convex lens should be one and a-half time the focal length of the front lens, but this can be varied. The function of this lens is to straighten the marginal lines and shorten up the focus. This lens may be a bi-convex, with its flattest side opposite the concave lens. The cell of the back lens can be placed equidistant from the stop with the front cell; but there is a latitude here, which is not, however, worth entering upon at present.

This addition to their lenses will make a nice little job for some of the amateur mechanics during the coming winter.

THOMAS FURNELL.

ACID IN EMULSIONS: A WARNING.

It has often been remarked that writers and experimentalists observe a not very honourable silence on the subject of their failures. Many seem to know nothing about the matter, yet there is not one photographer out of twenty who, at some time or other, has not been at his wits' end.

So it was with me one day when the reality and pleasure of plate-making seemed to be no more. As long as I followed the Editors' sound advice on emulsion and plate-making all went well—in fact, "as merry as a marriage bell;" and also when I followed the instructions of Captain Abney. But other days came, and with them other thoughts; in a word, I bade my former masters good-bye and began to think I could improve my emulsions, and consequently my plates, by using more acid, as others were doing with apparent success.

Now there can be no doubt that I was merely following the teaching of the past year or two, which decidedly favours the free use of acid. Some have even said that acid in an emulsion will keep out a whole train of evils; others that it will prevent fog; while many most emphatically stated that they could not get satisfactory results with acid. For my own part, I have little hesitation in saying that the too free use of acid is a step in the wrong direction, and one fraught with danger to a certain class of experimentalists.

The careless way which many writers mention the subject leads one to suppose that they do not appreciate the effect of acid in gelatine emulsion. With the exception of our Editors, no one has, as far as I can learn, directly written on this subject, which, if mentioned at all, is always very briefly handled. Yet I do not see why it should not be as exhaustively treated as the other side of the question, especially when we consider that a few drops—sometimes one—will spoil a large batch of emulsion, and render the image in the finished plate undevelopable.

There is another thing with regard to acid which many writers do not consider, or else they would not dose their pyro. with acid, as many of them do. By adding acid to pyro. it is easy to produce not only a slow plate, but reversal of the image.

But to return to the subject of acid in emulsions. According to Capt. Abney we have the following change:—"Acid organic compound bromine yields organic bromide and hydroxyl. The bromine, when coming in contact with gelatine, liberates hydroxyl or peroxide of hydrogen. This, as is well known, is a very strong oxidiser, and it will oxidise the neighbouring molecules of gelatine, or else the silver sub-bromide, and so produce an undevelopable image."

To prove that the introduction of an acid into a gelatine emulsion will cause the above important change I made the following experiment, and prepared four emulsions with four different quantities of acid. I used the boiling method, and in each case added the bromide to the silver along with the acid.

The first emulsion was prepared with 200 grains of silver; to this I added the bromide with one drop of hydrochloric acid. If the chemicals be acid an emulsion is decidedly better without this addition. The resulting emulsion was excellent, and always is when I use the minimum of acid. The plates work rapidly, develope easily, and fix quickly—qualities which cannot be obtained with an acid emulsion.

The second was prepared with two drops of acid, and the plates were precisely three seconds slower. I do not use a sensitometer, because I believe the true test for a plate is in the camera.

The next one was prepared with five drops of acid. With this quantity came a great change: plates coated with this emulsion were very slow, giving weak images, subject to reversal.

The fourth was now prepared with chemicals from the same stock; but in this case I added ten drops of acid. On mixing this emulsion I observed that the precipitate was very fine and the colour a beautiful red by transmitted light. At the end of fifteen minutes' boiling the colour had changed to a very decided blue—the most rapid change I ever got from the red to the blue variety. The emulsion was carefully washed as usual, and plates exposed in a good light with a large stop. On development, which was greatly prolonged, there was not the slightest trace of an image of any kind—thus proving that the free use of acid will destroy the developable image.

The question may be asked—What are we to do with the spoilt emulsion? With me it is a simple matter. My method is as follows:—I set the emulsion aside for one month (or more), by which time the alkaline reaction will have set in; but often this is accompanied by another evil, namely, decomposition of the gelatine. If so, pour the liquid emulsion into a larger jar, fill up with hot water, allow three days to settle, pour off the supernatant liquid, and again fill up with hot distilled water. In twenty-four hours it will again have settled to the bottom, when most of the water can be poured off and fresh gelatine added to the silver bromide.

An acid emulsion treated in this way will be found to yield plates as good as the best in the market. Let those who have doubtful emulsion by them "go and do likewise," and they will not regret the simple experiment.

HENRY HOLMAN.

ON CHEMISTRY AND PHOTOGRAPHY.

[A communication to the Dundee and East of Scotland Photographic Association.]

The science of chemistry is that which takes cognisance of the combinations of matter. One would imagine that this science must form a most important item in the education of a photographer, as he uses chemical substances to a considerable extent. As a rule, however, it does not. Photographers apparently, speaking of them as a body, have no inclination to understand the minutiæ of chemistry. This disinclination may be the result of a widespread opinion that a knowledge of chemistry is not necessary to the production of a good picture. A week or two ago, in one of the photographic journals, a writer gave it as his opinion that, in order to excel, photographers should not trouble over the minutiæ of formula or about any technical part of photographic work. To strengthen his position, he remarked that the true artist never condescended to paltry matters of that kind, but rather accepted materials put to his hand and questioned nothing. This gentleman instanced the old painters taking their painting material as they found it, their main object being to put colouring material on their canvas in a particular way.

Now, while we might all agree with this writer when he says that the main object to be kept in view by the painter or the photographer is the putting on of colours or the printing of lights and shadows in a particular way, it would manifestly be absurd to say he is not to trouble himself about the underlying technics. I doubt not, if we could get close up to the back window where Raphael or Rubens was working, we might find these gentlemen very busy with other implements than the brush and canvas. There is no reason to doubt—nay I have good reason to believe—that these good old painters made, mixed, and ground their own colours, and paid a very great deal of attention to the medium through which they were to give to the world their thoughts and ideas. We may well imagine their fear of colours fading or darkening.

The absurdity of the position is increased when applied to photography. If photographers in past years had taken processes and material as they found them, and remained content therewith, where would our art-science be in this year of grace? A more than ordinarily enterprising man might possibly be trying to take instantaneous photographs on daguerreotype plates; but this, perhaps, is not what our friend means. Photographers should be graded. First, there would be the great photographer himself—the idealistic and etherial. He would be surrounded and possess large and small satellites such as the camera-maker and the plate-maker, while such operations as printing, toning, fixing, and mounting would be done by obscure persons. He, the great, would sit in the centre of all, not dirtying his hands in the slightest, but devoting his whole energies to the production of ideas. In fact, this gentleman wished the term "photographer" to apply only to the man who searches out good combinations, makes good grouping, or has a knowledge of what does and what does not form a good pictorial landscape—just such an individual as would get his man John to inform him what lens to screw into the camera to suit a particular view; who would get John to estimate the light and the number of seconds necessary for exposure; who would further cause John to make plates, develope plates, to print, tone, fix, and mount; and, finally, to put into a frame the finished result for the exhibition wall as photographed by his august master. It would be very wrong to say that John in this case was better than his master, unless we knew if an equal power was possessed by John of finding or making good subjects, in which case he would be distinctly better than his master.

And this leads me to the subject of the evening—*Chemistry and Photography*. Should a man who essays photography know something of chemistry? Is a knowledge of the science a help or an encumbrance to him? An answer which will satisfy every case must be carefully framed, and to that end I would divide photographers into two great classes—the photographer whose sole object is to make and multiply pictures, who does not care very much about the means by which the pictures are made; and the photographer whose object is not only the making of pictures, but, in addition, the making of new and superior methods of operation.

To the photographer who simply makes pictures chemistry is not of much benefit; for chemistry, although it has to do with combinations, will not enable an operator to combine a number of individuals into a good group or to combine a tree and a mountain to form a good landscape. To the other photographer chemistry is of importance, as it enables him in some measure to intelligently examine already-known phenomena, and prevents him making absurd blunders or advocating absurd theories, as is too frequently the case amongst his other brethren. As an instance of the little yet aggravating mistakes sometimes made: the other day I learned from a friend that he had left for ten days some fine plate glass amongst a strong solution of caustic soda. He told me he did not know what had happened, but the glass was marked and spoilt and had lost its polish. The real state of matters was simply that my friend had unwittingly made a partial solution of his plate glass, glass being appreciably soluble in caustic soda.

Then, again, we are all more or less troubled with the very active man who rushes into print with a new idea, and supports it with a flow of language of astonishing abundance and acrimoniousness. We do not require to go far to find instances. A writer in one of the journals not long ago asserted that light reflected from an orange surface affected a gelatine plate to a greater extent than light from a blue surface, and actually went the length of asserting that experiments supported him. Little matters of this kind are continually cropping up, showing the value of a knowledge of natural philosophy and chemistry to the photographer.

On the other hand, too much should not be expected from chemistry. When anything out of the common occurs during some of the processes connected with photography—such as some blotching, staining, or other occurrence entirely unexpected—chemistry more than points to a probable cause. The science for the moment might appear to be at fault, may be able to do very little—not because the blotching or staining is caused by something outside the domain of chemistry, but simply that the cause is so occult, so intangible, as to be difficult of approach.

Photography is an art above all others which is based upon occult or semi-occult causes. The whole art has always appeared to my mind to be a good example, in a chemical sense, of what Professor Tait, of Edinburgh, calls an incalculable machine—a machine whose motions, although following strictly the usual lines of cause and effect, are quite incalculable owing to the occult nature of the causes regulating its motion.

To illustrate more fully what I mean, we may instance an egg balanced on end near the edge of a table. This is a possible feat, especially if the egg be rough and the place very still and free from vibration. Even if the feat were impossible we could imagine such a state of matters. All conditions remaining the same, the egg will remain in position, and neither fall on the floor or turn over on the table. But on the slightest disturbance from without reaching the egg—if we as much as look at it, to use an expression—the egg will in all likelihood either fall to the floor or turn over on the table. We have reason to believe—nay, we know to a certainty—that the falling to the floor or the simply turning over on the table is the result of a specific cause, but that cause is so inappreciable in itself as to elude the most careful observation. The most careful scrutiny of the surroundings of the egg would not enable anyone to predict which way the egg would fall.

This balanced egg may be likened to some of the conditions surrounding the chemical substances used in photography. In their constitution they are so delicately constructed and so easily, so to speak, put off their balance, that it would require almost superhuman intelligence to predict what amount of force would put them off their balance.

Some of the actions which take place are beyond prediction and calculation, and the science of chemistry is able to give explanations the value of which only amount to probability.

During the practical working of a photographic method there may, therefore, be observed many phenomena, the causes of which are obscure and not directly explainable; and the individual with a knowledge of chemistry is only permitted to look at them, as it were, from over a fence and at a distance. Yet such, it must be admitted, has a better chance of making advances in photographic art than he who will not even come and look over the fence.

Photography, I have said, is an art based on actions which are semi-occult. It therefore follows that it is an art open in the highest degree to extension by experiment, because the more a thing is covered up the more there is to uncover. Some people, I know, hold the opinion that photographic matters have come to such a degree of perfection that any great improvement is not to be looked for. Some people, I doubt not, also thought so in the days of Fox Talbot. But we ought carefully to avoid cherishing such an idea. That such feelings are prevalent is proved by the fact that in one of this month's magazines there is to be found an article written in a sad strain. This writer thinks, in view of the enormous number of inventions recently made, that he is nearing the "fag end of sensation." This I hold to be equivalent to saying that man has very nearly exhausted or, as the Yankee would say, "topped" the universe. Now, even as photographers, do we not know enough of this universe and its subtilities to feel that there are plenty of undiscovered things lying close around? Especially in this art of photography, I say, we have but to ask ourselves a very few questions to find we are far off the fag end of sensation. I hold that experiment is in the future to do a great deal for photography, and that in the future photography will do a great deal for general science.

Unfortunately there are amongst the multitude of picture-makers few experimental workers. There are few who endeavour to trace out phenomena for the love of the thing; yet I am sure that, amongst the members of a large society such as this, there are some who might take an interest in experimental photography, involving questions in chemistry and natural philosophy. In a large society something might be done in the way of reading educational papers. I do not mean to suggest that we are behind other societies in this respect; but we might very easily place ourselves in the front of them by making a specialty of the application of chemistry, natural philosophy, and allied science to the practice of our art. If one member were to take up the subject of the changes that take place in a prepared plate by the action of light, another the changes that take place in the plate and developing solution during development, while a third took up lens matters, I think it would prove beneficial to the Society.

In making these suggestions I am speaking as a member of the Council, and one who shares the responsibility of doing what he can to make the meetings interesting. The adoption of this suggestion would not interfere with the regular evenings of the Society. Four or five lecturettes with experiments could be delivered by members of the Society very much to the benefit of those who have only recently begun the practice of the art.

I shall conclude by hoping that the session will prove an interesting one for the majority of the members; and that, while not neglecting the interesting routine of societies like our own, such as lantern and other meetings, we may find at the end of the session drawn into closer fellowship the sciences of chemistry and photography.

G. D. Macdougald.

WHERE TO GO WITH THE CAMERA.

ROUND THE ISLE OF WIGHT WITH A CAMERA.

Having decided to make a photographic tour round the Isle of Wight, I packed up my half-plate portable camera, with three double dark slides, rapid rectilinear lens, and three dozen dry plates in a light knapsack.

Taking train to Portsmouth Harbour Station, I soon found myself on board the "Duchess of Edinburgh," which is the finest boat I have seen used for such short trips. Looking around there were numberless things to be viewed with curiosity and wonder; but my thoughts were more intent on the beautiful isle we were to visit shortly. I have seen some magnificent scenery, but I confess I have seen nothing surpassing the view of the Garden Isle, on a bright summer's morning, as you gradually draw near to it. It is a sight that would make the most disheartened amateur or the most dejected professional take up his camera with renewed energy, determined either to transfer a little of natural beauty to a gelatino-bromide or end his miserable existence with one of Shakespeare's bodkins. Arriving on the beautiful pier at Ryde, which is the glory of the town, I got a splendid view, and I heartily reiterate the lines—

Ascending with the gentle slope
From the blue Solent's tide,
We know not of a fairer place
Than this our lovely Ryde.

The view from the pier of the prettily-planned town, with its tall church spires and charming white villas tapering away into the thickly wooded districts, seems more like an imaginary picture than a real one.

Making my way into the town I soon found there were far too many spots deserving of attention. But as I had set out with the determination of only taking the best I could find, I thought it prudent to make myself acquainted with the place before I decided upon the subjects for my camera. Here I was most fortunate in purchasing one of *Mason's Guides*, which is written by a local gentleman, and contained all the information I wished for. It gave me a complete route, and mentioned all the principal places of interest, together with the number of miles between each hotel, &c.

In taking a walk round Ryde I was pleased with its cleanliness and general aspect. Unlike some modern towns, it seemed to have all things appertaining to the comfort and the health of its visitors. After I had taken the principal parts of it I decided to spend the remainder of the day in wandering about its shady lanes and coppices.

In the evening a military band from Portsmouth enlivened the souls, and gave elasticity to the steps, of the promenaders on the Pier. It was a splendid evening, and I am sure the old men and widows, young men and maidens, enjoyed themselves indeed. What a shame it is that man and Nature cannot come to a satisfactory agreement for the production of moonlight instantaneous views. But, enough of this; I enjoyed it and retired to my hotel to change the plates I had exposed for new ones, which I successfully managed by closing the door, drawing-to the curtains, blowing out the light, and then getting under the bed, where it was totally dark, and where I was able to handle them without the slightest fear of fog. Rising at six o'clock I went down to enjoy a bathe and give one more look at the beautiful panorama from the Pier.

Leaving Ryde I took the road to St. Helen's, and from there to Brading, where I exposed a few plates upon the old church, the town hall, with the old stocks, which, of course, are not used now; also "Little Jane's" cottage and gravestone—"the humble peasant girl whom the pen of Legh Richmond has immortalised." Then I pushed forward to Saudown, and tried a plate on the view from the cliffs, which is very pretty. Next I came to the lovely village of Shanklin, where I found a little extra stir on account of the Crown Prince and Princess of Germany paying it a visit that afternoon, of whom I got two good negatives, by wading a little way into the water with my camera and using a quick drop-shutter, as they put off in the gig to the yacht which was lying in wait. I also took the coast guardsmen in their boat, and then I went up to the far-famed Chine, which for rustic beauty will be difficult to excel. Exposing my last plate here, I was obliged to be satisfied with only a look at Bonchurch—the spot M. Paul Bourget spoke so highly of—as I passed through on the way to Ventnor, where I intended to put up for the night, having walked a good twenty-one miles under a scorching sun.

After I had disposed of a good meal I wandered down the pier, which was alive with people. I managed to find a secluded seat, where I could watch all that was going on in peace. The band played some lively tunes, whilst a mild breeze was coming up from the sea, which kept most of the visitors on their feet; and as the evening wore on the moon arose in its full, casting its silver rays across the water, and showing up the pretty buildings on the hill, until all seemed full of life and spirit, and as fascinating as some old fairy tale.

In the morning I was up with the sun, and seven o'clock found me once more at the pierhead with my slides renewed, and in high spirits, ready to commence the second day of my walk. Sitting on the pier for a moment to drink in all the beauties which Nature, with unsparing hand, has bestowed around this little spot, the soul is stirred with an indescribable feeling of joy and admiration. Looking towards the south-west you have the very high hills capped here and there with Gothic cottages and beautiful palisadings; then a little below these, set into the sides of the hills, are the larger villas, with their charming gardens and evergreen-covered balconies, spread in a sort of lovely confusion until they reach the esplanade and beach, which is a very steep and pretty shingle-covered one, with the usual number of bathing machines, boats, and skiffs.

I selected the prettiest part as my next subject, and I tried my best to do it ample justice; but it is such a picture that any part of it, however carelessly selected, cannot fail to give satisfaction to the most fastidious love of photographs.

After finishing my desired number in that place I once more took up my knapsack and mounted to the top of the cliffs in order to push forward to St. Lawrence, Niton, Blackgang Chine, and the Needles; but I could scarcely get more than two hundred yards at a time without turning round to give another look from the various high points at the beautiful town I had left behind. The sun was shining very brightly, and by noon the heat was almost unbearable. At length I was forced to leave the coast and take to the downs, until I immerged into the main road for Carisbrooke; then pushing forward with a sharper step in about four hours I came in sight of the grand old castle, into which I soon entered. Here I saw the apartments in which Charles I. was incarcerated; also the garrison well, which has a shaft 150 feet in depth, with fifty feet of water, and the bucket is drawn up by a donkey inside a revolving fly-wheel. Leaving the castle I had just a mile to walk to the capital of the island, Newport, having earned a good supper and a sweet night's rest. Starting early in the morning I took the road for Osborne, and from there to East Cowes, where I saw the Queen's yacht, "Alberta," lying at the neat little coast-guard station. Then I took the steamer for Ryde again, which I reached about half-past two on the afternoon of Saturday, August 9th, having done a good seventy miles in three days, and bagged two dozen assorted negatives.

J. T. R.

SCRAPS FROM MY HOLIDAYS.

[Abstract of a communication to the Derby Photographic Society.]

My reason for taking up the art of photography was because I wanted lantern slides to illustrate subjects for lectures which were not to be found in any maker's catalogue. My first attempts—not of a very artistic character—were made with a rough camera composed of a wooden box, a dark slide, and the objective of my sciopticon lantern. This summer I took with me to Dolgelley, in North Wales (in addition to a half-plate camera, the negatives from which I have not yet developed), a sciopticon camera for plates three and a-quarter inches square, which, with lenses and four double dark slides in case, weighs about four pounds. I took also Mr. Smith's brattice and Manx stands, each weighing about one pound. The former I found very useful for hill work, especially in climbing Cader Idris. In such cases the stand becomes an alpenstock, and is not an useless weight for the time like a folding one.

The object of my holiday—not forgetting, of course, fresh air and exercise—was geology, and not photography, and most of the photographs I took were to illustrate that science. During the fortnight I walked 250 miles, collected over a hundredweight of specimens, and exposed twenty-five plates. The weight of the camera was of some importance to me. Four pounds is quite enough on a hot day on rough ground, in addition to several pounds' weight of iron in the hammer and chisel, and that of any specimens brought home. I found no difficulty in the packing of plates either before or after exposure. The plates were the Manchester rapid ones, which were taken in the boxes as supplied by the maker, and after exposure were replaced in a similar way. The changing I did under the bedclothes at night, wrapping each box up carefully in non-actinic paper, numbering each box, and taking notes of the plates replaced, so that on my return home I was able to pick out any plate required for development.

A few of my transparencies were printed on gelatine-albumen plates (Chapman's); but the majority on Edwards's gelatino-chloride plates. They were exposed by contact with the negatives to a bat's-wing burner, at a distance of two and a-half feet. The exposures varied from five to fifteen minutes. And here let me point out, in passing, what probably most photographers know, that light varies inversely as the square of the distance, so that an exposure of twelve seconds, at a distance of four feet from the light, would be equivalent to one of three seconds at a distance of two feet. A short calculation will enable us to obtain the same results from different distances with the same exposure as we can from different exposures at the same distance from the light; so that, instead of varying the exposure, we may vary the distance, thus saving time.

The developer used was the one supplied by Edwards—a long exposure and weak developer giving reddish tones; a short exposure and strong developer gave rich black tones—the latter making, I think, the best pictures.

[The remainder of the time was spent in showing the transparencies with the sciopticon lantern and explaining them, and in exhibiting the camera and stands.] H. Arnold Bemrose, M.A.

PHOTOGRAPHY IN COURT.

USING THE ROYAL ARMS WITHOUT AUTHORITY.

The case against the firm of Messrs. A. and G. Taylor for unlawful use of the royal arms in their business was again heard at the Malborough-street Police Court on Wednesday last, the 15th inst., before Mr. Newton.

Mr. St. John Wontner, who, as on the previous occasions, appeared for the defendants, stated that Messrs. Taylor had made use of the royal arms in the belief that they had a right to do so; but, as they were now aware that they did not possess this right, they had had them removed from their premises and business documents. This, he thought, would serve sufficiently as a reason for the infliction of merely a nominal penalty.

The magistrate also took this view of the matter, and, looking at it in the light of a test case, he inflicted the nominal fine of one shilling, with two shillings costs.

Seeing that much interest has been felt in the question of the right to use the royal arms in connection with business, we here append a letter which has recently been issued to the town clerks of the various provincial towns in England :—

"Board of Green Cloth, Buckingham Palace, September, 1884. Sir,—At the commencement of her Majesty's reign, and up to the year 1853, a great number of warrants of appointment were granted by the Lord Steward to tradesmen in different towns, some of whom served the Court, and others held merely an honorary title, according to the custom of that time, which has since been abolished. All these grants were personal to those named in the warrants, and could not be transferred to succeeding partners, so that it is probable that by far the greater number of these have lapsed by the retirement or decease of the persons to whom they were granted. The Patent and Designs Act of 1883, an extract of which is enclosed, enacts a penalty of £20 in the case of persons assuming the royal arms without authority; and, as the grant of a warrant of appointment is the only authority for using the arms so far as the Queen's household is concerned, it has become important to ascertain what tradesmen actually hold these warrants. I shall be much obliged if you will look over the enclosed list of warrants granted to tradesmen in ——, and give me any information in your power for the guidance of the Lord Steward as to the existence, or otherwise, of the persons named therein, or any of them. Trusting you will excuse this trouble, I have the honour to be, sir, your obedient servant, T. N. March."

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 13,317.—"Photographic Cameras." JAMES THOMSON, 21, High Park-street, Liverpool.—*Dated October* 8, 1884.

No. 13,318.—"Photographic Cameras." JAMES THOMSON, 21, High Park-street, Liverpool.—*Dated October* 8, 1884.

No. 13,371.—"Lantern Front for Magic Lanterns." (Complete.) W. C. HUGHES.—*Dated October* 9, 1884.

No. 13,372.—"Instantaneous Mechanical Frame for Rapid Change of Pictures in the Lantern." (Complete.) W. C. HUGHES.—*Dated October* 9, 1884.

No. 13,596.—"Gelatine Plates, Films, or Tissues for use in Photography, and Process of Manufacturing and Using the Same; communicated by G. Eastman and W. H. Walker. (Complete.) A. J. BOULT.—*Dated October* 14, 1884.

PATENT SEALED, OCTOBER 10, 1884.

No. 9,899.—"Improved Photograph or Picture Stand." L. A. GROTH. —*Dated July* 8, 1884.

IMPROVED APPARATUS FOR DISSOLVING AND CHANGING PICTURES IN THE MAGIC LANTERN.

COMPLETE SPECIFICATION. By B. J. EDWARDS.

MY invention relates to an improved method of, and apparatus for, exhibiting a series of slides or pictures in the optical instrument commonly known as the magic lantern, and has for its object the changing of the slides or pictures mechanically by one simple movement of a lever or handle without any movement being perceptible upon the screen. This effect is produced by means of my invention with one single lantern in a manner which is more pleasing and less fatiguing to the eyes than the usual method of dissolving views with two lanterns.

In order to accomplish this object I first shut off the light, and consequently the picture, from the screen by gradually closing or covering the front lens or objective of the lantern, and during the momentary interval of darkness thus produced I rapidly change the slide or view and substitute another one previously placed in position, and then by gradually uncovering the lens I allow the new picture to fall upon the screen. By means of my apparatus these various operations of closing the lens, changing the slide or view, and reopening the lens are performed mechanically by one single continuous movement of a simple arm or lever. The improved apparatus consists of a slideholder carrying two slides, which, by moving the handle or lever, are alternately placed in position in front of the condenser, in connection with a screen or dissolver which alternately closes and opens the lens.

In carrying out this invention in the simplest possible manner, I fix a short rod or spindle turning on its axis parallel to the optical axis of the lantern, and which spindle is rotated by a handle or lever. At the outer end of this rod I attach an opaque screen projecting in front of the lens so as to cover or close it, a certain portion of the screen being cut away, so that during a part of the revolution the lens is uncovered and the light, and consequently the picture, is allowed to fall upon the screen; and by means of suitable eccentric gearing I connect the rod carrying this opaque screen to a swinging or sliding frame carrying two slides or pictures arranged in such a position in the frame or carrier that, when the lens is not covered by the opaque screen or dissolver, one or other of the pictures shall be at rest in its proper position in front of the condenser. I arrange the gearing or eccentric motion, so that the sliding or swinging frame shall be set in motion, and the picture changed during the momentary interval of darkness caused by the passage of the opaque part of the screen or dissolver in front of the lens. In order that the darkening of the picture shall be gradual I make the aperture in the dissolving screen with serrated edges; but I prefer, instead of this revolving screen, to close and reopen the lens by means of two thin sliding plates or diaphragms working in grooves attached in front of the lens, and I make the sliding plates with both ends concave, and I suspend these plates by means of a cord passing over and once round a drum or pulley fixed to the rod in place of the opaque screen before described. One of these plates being attached to each end of the cord they balance each other, one rising and the other falling as the drum revolves. I make the plates of sufficient width to cover the opening of the lens, and of sufficient length to keep the light entirely shut off during the time the position of the slide carrier is being changed; and I arrange that, when the upper concave edge of the rising plate comes in contact with the drum, the lower concave end of that plate is just free of the upper end of the lens, while the upper concave end of the falling plate is just clear of the lower edge of the lens. For holding the slides or pictures in position I use a double carrier of the usual construction, but arranged by means of guides or runners to travel easily in metal grooves attached to a second frame, which is firmly fixed in the lantern immediately in front of the condenser. The slide holder or carrier carrying the slides or views is moved from side to side by means of a lever slotted at its lower end and working on a pin fixed to the central division of the double slide holder; the upper end of this lever is firmly fixed to a rod or spindle turning on its axis, and placed parallel to the spindle carrying the drum before described. In order to connect the rod and lever which work the slide holder with the handle and rod which works the drum and dissolving plates, I adapt and make use of a modification of the mechanism commonly used for regulating the winding of ordinary Swiss watches in the following manner:—To the drum-spindle I fix a circular disc of metal having a single tooth or pin working in a corresponding recess or depression in another disc or segment of a wheel fixed to the spindle which carries the slotted lever working the slide holder. This second wheel or segment of a wheel has a recess cut in it in which the tooth of the disc on the drum-spindle works, and on each side of this recess a concave indentation of the same radius as the disc on the drum-spindle. By this means the lever working the slideholder is not only not moved by the rotation of the drum-spindle (except during the time that the tooth is engaged in the recess), but is securely locked by the close contact of the periphery of the one disc with the circular indentations of the other. The apparatus is so arranged that during the first portion of the movement of the handle or lever the rotation of the drum causes the lens to be gradually closed and kept closed by the passage of the dissolving plates, one over the other, during the time the slide carrier is being shifted, when the latter portion of the rotation of the drum-spindle uncovers the lens, the handle or lever being arranged to describe about a semicircle during the completion of these movements. Should any adjustment of the distance travelled by the slide carrier be required it is readily increased by raising the position of the pin on the central position of the slide carrier or lessened by lowering it. During the time that the lens is uncovered, and a picture consequently being shown upon the screen, the other half of the slideholder is projected clear of the lantern so that the slide which is not being shown can be removed and another substituted in its place, the slideholder being by the action of my improved apparatus securely locked so that the operation of changing the slide does not disturb the slide being exhibited. By this means and by alternately moving the handle from one side to the other the lens is alternately covered and uncovered, and the slide or picture is changed invisibly during the moment of eclipse.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—1. The closing and opening of the lens or objective of the lantern, and mechanically or automatically changing the slides or pictures by one continuous movement of a lever or handle substantially as hereinbefore described.—2. The special arrangement above described for opening and closing the lens by means of plates or diaphragms worked by a cord and pulley or drum.—3. The adaptation or application of the mechanical contrivance employed in watches for the purpose of changing the slides in combination with the mechanism for covering and uncovering the front lens of the lantern substantially as hereinbefore described.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
October 21	Bolton Club.....................	The Studio, Chancery-lane.
" 22	Bristol Amateur (Annual Meet.)	Studio, Portland-st., Kingsdown.
" 22	Photographic Club	Anderton's Hotel, Fleet-street.
" 23	London and Provincial	Masons' Hall, Basinghall-street.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AT the meeting of this Society, held on Thursday, the 9th instant, the chair was occupied by Mr. W. Ackland.

A letter from the Secretary of the Edinburgh Photographic Society was read, in which it was requested that members of the London and Provincial Photographic Association would act as judges in a competition that was shortly to be held amongst the members of the first-mentioned society. The Secretary was directed to write acceding to the proposition.

A letter was read from Mr. W. M. Ashman, who was to have delivered his lecturette on *Toning*, but who was confined to his room by indisposition. The lecturette was forwarded to be read by the Secretary, but it was decided to postpone the delivery until the 23rd instant, when it was hoped that Mr. Ashman would be able to read it and illustrate it by demonstrations personally.

Mr. WASHINGTON TEASDALE showed a number of transparencies printed upon commercial gelatine plates prepared expressly for this purpose. This led to a discussion on the best method of binding and fitting up transparencies for the lantern.

Mr. W. AYRES, for binding, used paper that had been coated with gum and sugar and dried. It was wetted for use with a postage-stamp damper.

Mr. TEASDALE preferred wheat glue. He thought it would be desirable to have metal rims instead of paper binding, so that the transparencies could easily be got at to clean off any dust or deposit that might invade them. He had had a few made on the plan of the rims called "preservers" that were used with glass positives, but they had to be made by hand, and were, therefore, expensive. If an order could be given for a quantity sufficient to justify the manufacturer in making dies to stamp them they could be made very cheaply.

Mr. AYRES remarked that dust could not be kept out by a metal rim as it was by an adhesive paper binding.

Mr. GEORGE SMITH used gum as cleanest for causing the paper binding to adhere. Some time since he had had metal rims for lantern slides, but found that it was necessary to use paper to keep the dust out.

Mr. J. BARKER preferred a mixture of flour paste with gelatine or glue. This set into a jelly, and was used cold.

Mr. W. K. BURTON referred to a developing agent recently introduced by Mr. C. Egli and Mr. A. Spiller—the hydrochlorate of hydroxylamine—and said that with the formula as published he had not been able to obtain an image; but by omitting the restrainer he had succeeded in obtaining an image of a beautiful colour and very clean. He would like to hear the results of experiments made by other members.

A MEMBER then inquired whether anyone could tell how a certain paper was prepared that was introduced more than twenty years ago, but for many years past had not been in the market. This paper was albumenised, and had to be sensitised in the ordinary way. After the usual treatment upon removal from the hypo. fixing solution into water the film of albumen separated from the paper, and could be transferred to anything required. He thought that lantern transparencies might be very satisfactorily produced by means of such a paper.

Another MEMBER, in reply, said that there were several methods of transferring an albumen film from the paper on which it had been printed. According to one plan the paper was coated before albumenising with india-rubber or gutta-percha. After printing, fixing, &c., the film was transferred by dissolving the india-rubber with benzole.

Mr. W. E. DEBENHAM remembered the paper referred to. It was introduced particularly for the purpose of making transfers on to ivory for colouring upon. The paper appeared to be coated with some starchy material before albumenising.

After the meeting Mr. A. L. HENDERSON invited the members and friends to stay to a supper which he had had prepared, and about forty sat down to a social and pleasant repast. The feasting over, after the usual loyal toasts,

Mr. DEBENHAM proposed that of the host, the delegate of the Society in the United States, the Ulysses returned from his travels—Mr. A. L. Henderson.

The toast was most heartily received, and was followed by that of "The Society," coupling with this that of the officers, which was proposed by Mr. J. TRAILL TAYLOR, who, in the course of his remarks, observed that he had been one of those concerned in the institution of the Edinburgh Society, now the largest photographic association in the world. He had also been present at the invitation of this Association, and he hoped for it a success similar to that enjoyed by its northern fellow society. One strong point in each was the fixing of the subscription at so low a figure as to be a hindrance to none, and it had been found in both cases that that small subscription was sufficient to cover all necessary expenses. In connection with the lecturette system, which had been suggested by the Curator, Mr. Haddon, and had been so successfully carried out, he observed that it was likely to be largely adopted in other societies. Mr. Henderson had started it in America by giving his lecture upon, and demonstration of, emulsion making, and he (Mr. Taylor) was aware, from correspondence with the President of the New York Society of Photographic Amateurs, that it was intended that the lecturette system should be made a leading feature in that Association.

The toast of the visitors, proposed by Mr. HADDON, was responded to by Mr. TEASDALE, who expressed the pleasure it gave him to see the faces of, and come into contact with, so many of those gentlemen with whose writings he was familiar in the pages of the journals and almanacs.

In the course of the evening

Mr. HENDERSON referred to the American Photographic Convention, which was to meet next year at Buffalo, and suggested that English photographers should make up a party to visit it. He felt sure that if this were arranged and known they would receive a most hearty welcome.

In reply to the toast of the honorary and foreign members,

Mr. TAYLOR remarked that with regard to the great American Convention that assembled once a year, and at the late meeting of which photography was scarcely ever mentioned, it needed "pulling together." It had even been said that its next meeting would be its last. He certainly thought that it would act as a stimulus to the American fraternity if it were known that a body of Englishmen were intending to pay them a visit. In a few weeks he would be in a position to convey personally to the photographic societies in New York the friendly feelings by which the members of the London and Provincial Photographic Association were actuated towards them.

The evening was then enlivened by songs and recitations. One song, given by Mr. William Cobb, made special reference to the host of the occasion.

PHOTOGRAPHIC SOCIETY OF IRELAND.

A MEETING of this Society was held in the Royal College of Science, Stephen's Green, on Friday, the 10th inst.,—Mr. Greenwood Pim, M.A., in the chair.

The minutes of the last meeting having been read and confirmed, Mr. A. G. Tagliaferro, of Malta, was elected a member of the Society. The following names were proposed for membership:—Messrs. S. Geoghegan, C.E., H. Magee, and Francis F. Hall.

Messrs. Samuel Baker and Thomas Curtis were elected to audit the yearly accounts before the next meeting.

Mr. C. W. WATSON gave an account of his recent trip through Derbyshire with the camera, and exhibited a large number of excellent views taken during the tour.

Mr. GEORGE MANSFIELD showed a series of 10 × 12 views which he had recently taken in France and Spain, all of which were much admired for their artistic and technical merits.

Mr. J. V. ROBINSON exhibited a patent instantaneous shutter the invention of Mr. F. W. Monsell, a member of the Society, and which formed the basis of a varied and interesting discussion on shutters in general.

Mr. THOMAS MAYNE showed a new expanding camera of great length, suitable for copying, &c.

Mr. JOHN L. ROBINSON'S paper, *A Week in Suffolk*, was, by consent, postponed until that gentleman's return.

The proceedings were then adjourned until the 9th November, when the annual meeting will be held.

ST. HELENS ASSOCIATION FOR THE PURSUIT OF SCIENCE, LITERATURE, AND ART.

PHOTOGRAPHIC SECTION.

A MEETING of this section was held on Wednesday, the 17th ult.,—Mr. Heather in the chair.

Mr. Bewley showed a number of views taken at Bettws-y-Coed during the month. Part of these were toned with platinum.

Mr. SHERLOCK said he preferred to use the platinum bath, as he could get as great a variety of tones with it as with gold, and the cost was only one-fourth that of the latter metal.

Mr. J. F. HOUGHTON showed a number of lantern slides of local scenery. Two (Chapman's albumen), developed by the pyro. sulphite method, from a formula given in Marion's *Photography*, were especially praised for their clearness. The remainder were developed by Cowan's solution; these tones were much admired.

Mr. THOMSON exhibited a number of lantern slides of some very pretty views near Buxton.

Mr. HEATHER showed about twelve prints toned with a solution made up of perchloride of iron, nitrate of silver, and hyposulphite of soda. The tones varied very much; some, however, had a very pleasing effect.

Mr. TAYLOR inquired if the prints were as permanent as the ordinary ones. He did not consider they would be, especially in a town like St. Helens.

Mr. HEATHER said his experience was limited to the few prints he had shown. He fully endorsed Mr. Taylor's remarks. He (Mr. Heather) then showed two negatives—one fogged, the other quite clear. He explained that while cooking the emulsion he found a series of small holes in the can, and consequently the emulsion was fogged. He then placed it in a ten-per-cent. solution of bichromate of potash for fourteen hours. After this treatment it was quite free from fog, but considerably slower.

After a discussion on emulsions, developers, &c., the meeting was adjourned.

BOLTON PHOTOGRAPHIC SOCIETY.

THE annual meeting of this Society was held at the Baths, Bridgman-street, on Thursday, the 2nd inst.,—Mr. E. N. Ashworth in the chair.

The minutes of the previous meeting having been read and confirmed, the following annual report was read by Mr. C. K. Dalton (Mr. Hawksworth, Hon. Secretary, being absent):—

ANNUAL REPORT.

IN presenting their fifth annual report your Council desire to congratulate you on the eminently satisfactory state of the Society. During the year 1883-4, there has been a large increase in the number of members; at no time since its formation has the Society stood on a sounder basis.

Your Council are happy to state that the balance in the hands of the Treasurer is steadily increasing.

The following demonstrations have been given during the session:—

On Toning and Fixing Silver Prints. By Mr. T. Parkinson.

On Enamelling Silver Prints. By Mr. J. Taylor.

On the Development of Platinotype Prints. By Mr. C. K. Dalton.

Lantern exhibitions have been given by Mr. W. Banks, Mr. R. Harwood, and Mr. T. Parkinson, and have undoubtedly added to the attractiveness of the Society.

The annual open meeting was held in April last, at the Baths, and was in every sense a success.

Your Council have again to regret the meagre attendance at the outdoor meetings. In fact, there has, strictly speaking, been only one meeting held during the summer months, although the weather has not been unfavourable. It is hoped that efforts will be made to render these meetings more attractive, and thus secure a better attendance.

The report having been accepted as read, a vote of thanks was passed to Mr. J. Hick, and regrets expressed as to his retirement from the presidency of the Society. Mr. Hawksworth having also desired to retire, the thanks of the Society were tendered for his energetic and valuable services as Hon. Secretary.

Messrs. Paiton and Taylor examined the voting papers. The following was the result:—*President:* Mr. J. R. Bridson.—*Vice-Presidents:* Messrs. Harwood, Ashworth, Parkinson, and Hawksworth.—*Council:* Messrs. Banks, Taylor, Knowles, and Slater.—*Treasurer:* Mr. J. C. Sewell.—*Hon. Secretary:* C. K. Dalton.

On the motion of Mr. B. ABRATT, a vote of thanks was passed to the retiring Council for their services during the past year.

SHEFFIELD PHOTOGRAPHIC SOCIETY.

THIS Society held its annual dinner and meeting at the Masonic Hall, on Tuesday, the 7th inst.,—Councillor T. Firth in the chair.

A very good muster of members sat down and did ample justice to a plentiful and well-selected meal, which, when over, gave place to the usual yearly routine of discussing and passing accounts, and electing new and re-electing other officers. The statement of accounts was read by the Treasurer, Mr. W. B. Hatfield, the most notable item in which was rather a serious loss on the last exhibition which was held in January of this year. Many remarks of noteworthy importance have from time to time been made by the members on the subject of exhibitions; but it is a fact that a great majority of them are unwilling to make another similar venture for some time.

After the accounts were passed the following officers were elected for the ensuing year:—*President:* Mr. W. B. Hatfield.—*Vice-Presidents:* Councillor Thomas Firth and Dr. T. H. Morton, M.D.—*Treasurer:* Mr. T. S. Yeomans.—*Secretary:* Mr. J. Taylor.—*Council:* Messrs. Bacon and Turner.

On vacating the chair Mr. FIRTH spoke of the prosperous condition of the Society. Although the exhibition had inflicted a loss on them, it had also called around them many who were now among them as members, contributing to their pleasure at each monthly meeting. They were now far more numerous and embraced a happy variety of careful workers, and he believed, with the new interest that was now being put into the working of the Society, good results might fairly be expected.

Dr. MORTON also declared his great satisfaction with the progress and improvement of the Society, and said he had felt sorry many times his business had prevented him taking part in the subject competitions, which had been the means of bringing so many good pictures to the meetings.

On taking the chair,

Mr. Hatfield said that it would be his study to maintain the interest and improvement the Society was now making, and he believed the only certain means to ensure that was a perfect arrangement of subjects for each night, and never to rely on chance conversation for the entertainment of the members. They did not want long and tedious papers filled with technical words and symbols, but short and pithy ones in plain and comprehensive everyday language; and when once a subject was announced for a night they should adhere to it, and all members do their best to make a complete discussion of every point bearing on that subject. After thanking the members for the honour they had conferred on him the business then proceeded.

The subject for this month's competition was the best picture of *Clouds*, and was won by Mr. Turner with a very beautiful half-plate of *Fleecy Summer Clouds.* These were round in their form, varied in light and shade, and filled with such an amount of charming and delicate detail that revealed in a moment you were looking on a truthful bit of Nature's glorious work.

Mr. H. Rawson brought a very rich print and negative of some clouds, which called forth great praise, and was a charming picture of another character of cloud, being dark and stormy, with a vivid light fringing the edges in artistic contrast. This was not for competition.

Mr. Turner had a number of good pictures of a summer's work on the table.

The subject for the November meeting will be ***Enlargements by Artificial Light on Argentic and other Sensitive Papers***, by Mr. Foxon.

DERBY PHOTOGRAPHIC SOCIETY.

The ordinary monthly meeting of this Society was held at the London Restaurant, Irongate, Derby, on Wednesday, the 1st instant,—Mr. Richard Keene in the chair.

The minutes of the previous meeting having been read and confirmed,

Mr. H. Arnold Bemrose, M.A., Vice-President, gave an address entitled *Scraps from my Holiday* [see page 667], which he illustrated with lantern transparencies by means of the sciopticon lantern.

A vote of thanks was passed to Mr. Bemrose for his interesting paper.

The report of the sub-committee appointed to consider the conditions of the subjects for study was, after a few slight alterations, adopted, the last day for sending in the prints being fixed for December 10th.

Mr. W. Haslam was elected a member of the Society. A cordial vote of thanks to the Chairman brought the proceedings to a close.

LEEDS PHOTOGRAPHIC SOCIETY.

The ordinary meeting of this Society was held on Thursday, October 2nd,—Dr. Thorpe, F.R.S., in the chair. There was a considerable attendance of members.

The following gentlemen were elected members:—Sir Percy Radcliffe, Rev. C. Courtenay, Mr. T. W. Harding, and Mr. R. T. McKay.—Messrs. S. Marshall and T. Dawson were elected auditors.

A large number of prints in silver and platinotype were shown by Messrs. Teasdale, Ramsden, Ward, Denham, McKay, Bothamley, and Pearson.

Dr. J. Walker exhibited a changing-bag of very simple construction, but most efficient, which elicited much admiration.

Mr. F. W. Branson exhibited a number of lantern slides to illustrate the effect of introducing sulphite of soda into the carbonate of soda developer, the result being great clearness, a warm brown tone, with great latitude in the exposure.

Mr. Pocklington exhibited a lantern slide toned with gold, in which the foreground was of a brown colour, the trees and middle distance green, and the sky a light blue. He (Mr. Pocklington) promised details of the process when he had made further experiments.

Messrs. Reynolds and Branson sent for exhibition a new lantern for the dark room with special features, which will meet with the approval of amateurs.

Mr. W. Teasdale, referring to a remark made by a member as to the manner in which he packed his exposed plates previous to development—that is, face to face without paper between—suggested that by this means the plates might be fogged. He based his opinion on the fact that, if paper were exposed to a strong light and then used for wrapping up sensitive plates, the plates so packed would be fogged. He was of opinion that the same result would be brought about—but, of course, not in so marked a manner—by packing exposed plates without anything between.

Dr. Thorpe intimated to the members that a committee had recently been appointed by the Leeds Philosophical Society for considering the question of furthering the interests of meteorology in some way, and he asked the attention of the members of the Leeds Photographic Society to this subject, as he thought they might be able to devise some method of determining the amount of solar energy sent down to us. This, he said, was one of the great problems of the present day. The subject had already been dealt with, and he described the various actinometers already in use. He said that what was required at present was not intricate and delicate apparatus, but some rough-and-ready method; and he expressed his opinion that this work might with advantage be undertaken by some members of the Society.

Several members made suggestions, and a general conversation on the subject ensued.

AMATEUR PHOTOGRAPHIC ASSOCIATION OF VICTORIA.

The monthly meeting of the above Association was held on Monday, the 1st ult., at the Royal Society's Hall,—Mr. E. C. Bell, Vice-President, occupying the chair.

After the election of new members and the nomination of two others for membership,

Mr. Baker proceeded to demonstrate the method of using Warnerke's sensitometer. He showed several of the sensitometers, and it was remarked by some members that if all those manufactured were similar to the samples exhibited very little reliance could be placed on them, so far as a general standard was concerned, as the density in no two of them was similar. When the development of the test plates was commenced, similar complaints were made by some of the members as to the coating of many of the makes of gelatine plates which reached this market, some samples, issued from the factory of a well-known maker, being conspicuous for uneven coating. [It was jocosely remarked by a member that gelatine emulsion must be exceedingly cheap, or the makers of plates could never afford to coat the backs of plates as freely as they do the faces, which was very often the case.] The result of the tests showed that some of Mr. Baker's make of plates registered as high numbers as the best makes of English plates which were tried.

The lecturer afterwards exposed and developed several opal plates of his own make, and a great deal of information was given, after which the meeting was adjourned.

Correspondence.

MARKINGS ON DRY PLATES.

To the Editors.

Gentlemen,—Some time ago I was much puzzled to find the cause of dark bands of fog on several negatives. A customer had sent to ask me the cause, affirming that it was the fault of the plates. I had already sent out several thousands of the same batch, and not having received any complaint you may guess that I was somewhat puzzled. On each negative, about half-an-inch from the right hand side, was a band of fog about two inches wide, exactly the same position and width on each plate.

The photographer also sent an unexposed plate of the same batch, but on developing it no trace whatever of fog was discernible. I knew very well that it would be difficult to produce fog always exactly in the same place even if I had wished to do so. The only reason I could give at that time was that the woodwork of the camera had become slightly smooth on the inside, and had reflected the light on to the plate.

The answer given remained without further explanation till last Thursday, when a gentleman called and asked me to develope a plate, as he thought there was something wrong with his dark slide. I developed the plate, and found a dark band on the right hand side of the plate, about one and a-half inch wide. On returning it to the dark slide I found that the mark corresponded exactly to the leather used for hinging the shutter of the slide. The leather smelled strongly, and had imparted a slight fog to the whole plate. The plate had remained in the slide for about one month, but during that time it had not been exposed to any white light.

I was informed that the plate if only kept in the slide for a short time was all right, but if kept for two or three days the band of fog was sure to appear. I am fully convinced now that the plates, the negatives of which had been sent back to me, had suffered from the same cause. The camera-makers should be more careful in selecting the leather they use for their slides, and save plates from being condemned through no fault of the plate-maker, as in the incident I have just related.—I am, yours, &c.,

21 and 23, Charles-street, Royal Crescent, Notting Hill, W., October 9, 1884. J. Désiré England.

TRICYCLES FOR PHOTOGRAPHERS.

To the Editors.

Gentlemen,—The letter in last week's Journal impels me to write and give my experience of the utility of a tricycle for the purpose of getting about and taking views, and to describe my own arrangement for the information of others.

The distance that can be ridden daily depends, of course, upon the physical powers of the rider; but it also depends, in some degree, upon the class of machine he rides. I may say, being guided in so doing by my twenty years' experience of cycling, that some of the machines mentioned from time to time in the press as being suitable for the photographer are about the worst of the tricycles before the public, being of a cheap, inferior, and improperly-contrived type. I will not particularise, but I have been sorely tempted to plunge into the arena several times, when I have seen letter after letter recommending machines for the purpose that I know full well would be sure to disappoint and disgust those who might be led to select them.

On a "sociable"—that is, a machine for two riders—I have found little difficulty in riding forty or fifty miles, carrying a complete set of apparatus, together with my own and my companion's luggage. On my "Carver"—a single machine—I can ride almost any distance within reason, either with a camera 8×5, made by Anthony, of New York, or my small tricyclist's quarter-plate set.

Undoubtedly the best machine for the photographer is the famous Humber type. That is ridden by all the best tricycle riders of the day, because its cross-handle bar serves as a sort of table. Of this type there are several good examples, viz., the Humber proper, the Carver, the Sandringham Club, the Traveller, and others; but the one that unquestionably seems to me to answer best for the photographer is the "Carver," made at the Alfred-street Mills, Nottingham. My reason for thinking the "Carver" the best is that, *while being well made and of the best material, it has a patent automatic brake which, at will, holds the whole machine perfectly rigid and still at any point, either on the slope of a hill or upon the level.* With this arrangement no tripod stand is needed at all, as the body of the camera can be placed on the saddle, and the fore-end rested upon the steering-bar handle, which is on a level with the saddle; and it is surprising how adroit one becomes with practice in placing the machine and the camera in proper position, and how rigid the whole affair is when done. I never carry a tripod at all, as with double swing-backs and a rising and lowering front almost any angle can be attained, and the tricycle can be led *anywhere*.

The apparatus is carried in a wicker basket upon the luggage carrier in front, and really seems to help rather than otherwise, as its weight serves to take much of the pressure from the trailing wheel. The enclosed photographs will show you my arrangement upon the "Carver."—I am, yours, &c.,

River Cottage, Hornsey, N, October 11, 1884. SIGMA SMITH.

[The arrangement shown in the photographs is excellent, but we prefer an open-fronted machine of the same type—that is, without the bicycle handle.—EDS.]

THE SODA DEVELOPER: A CORRECTION.

To the EDITORS.

GENTLEMEN,—On opening the Journal this morning I saw, with a feeling of dismay, that the formula for soda development, in the article to which my name is subscribed, contains a very serious error, which I hasten to correct, and at the same time beg of you to allow me space to apologise for my blunder to those readers, if any, who have been led astray by it.

The formula should be:—

No. I.

Pyro.	1 part.
Sulphurous acid	1 ,,
Water (distilled)	8 parts.

No. II.

Saturated solution of carbonate of soda	6 parts.
Sulphurous acid	$1\frac{1}{2}$ part.
Bichromate of potash (five-per-cent. solution)	$\frac{1}{4}$, $\frac{1}{2}$, or $\frac{3}{4}$,,
Water	18 parts.

It will be seen that the bichromate of potash is largely in excess in the former as compared with the corrected formula, and the sulphurous acid is deficient. This latter error is unimportant; but excess of the bichromate salt would decompose the pyro., and so destroy its developing power.

I may just add that the formula (in my hands) continues to work well, and it has been tested on several varieties of plates; but with one brand of very rapid, which produces a soft image, owing to the thinness of the gelatine film and lack of silver, it has been found needful to add one grain of bromide of potassium to each two ounces of developing mixture, in order to get density. Still the image was wanting in vigour; so the toning with iron was omitted, and the normal colour of the soda image utilised. These plates yield no better result with ammonia, and therefore soda is not to blame.—I am, yours, &c., W. HANSON.

Leeds, October 10, 1884.

A NEW DEVELOPING FORMULA.

To the EDITORS.

GENTLEMEN,—On reading the report of the Edinburgh Photographic Society, in your last issue, I felt somewhat "sorry I spoke," as the developer to which I alluded in my letter is certainly not quite as new in material as I supposed, although somewhat so in the combination. However, I had better say something, and say it as briefly as possible.

The first plate about which I made notes I developed with—

Hydrokinone	$1\frac{1}{2}$ grain,
Liq. potassæ, s.g. 1270	15 minims,
Water	3 ounces,

and got a very dense negative. I continued various experiments, adding carbonate of potash, citric acid, and mixing pyro. with the hydrokinone; but, after all, I found the following answer excellently for a $7\frac{1}{2} \times 5$ plate:—

Hydrokinone	$1\frac{1}{2}$ grain.
Citric acid	10 grains.
Liq. potassæ, s.g. 1270	20 minims.
Soft water	5 ounces.

Mix and filter.

Pour this over the plate and in half-a minute, or thereabouts, return to the developing cup and add from ten to thirty minims of liq. potassæ. The plate ought, on this being poured on, to come out well.

This developer appears to me to allow of great latitude of exposure, and not to sacrifice the high lights while the shadows are developing. Over-development is hardly possible. It gives great delicacy and softness in printing, and, at the same time, printing density, principally from the colour of the negative, which is a red shade, and not so visible by direct light as when viewed at an angle. I have noticed, and attribute it to the more perfect action of the hydrokinone over the pyro., that the white deposit in the hypo. (the free chlorides?) is scarcely present. In my last experiment I exposed two plates, one directly after the other. One of these I developed with Fry's sodic sulphite formula; the other with the above hydrokinone developer. I enclose prints from both. They will hardly, however, compare quite fairly, as the former was exposed thirty seconds and the latter twenty seconds.

I do not find that carbonate of potash in the developer makes any marked difference in the result; but I did not find I could develope without liq. potassæ added, and I like as simple a developer as possible. I venture to think this developer would well repay further experiment, as would also the examination of the active principles of other of the vegetable kingdom as developing agents. Before closing I may mention that I have obtained very pleasing toning results from carbonate of potash, twenty grains to one grain of gold.

In conclusion: I feel I owe your readers some apology for having made a claim in my former letter which a little delay and less enthusiasm would have prevented.—I am, yours, &c., W. T. F. M. INGALL.

Greenhithe, Kent, October 14, 1884.

THE MEDAL AWARDS AT THE PHOTOGRAPHIC EXHIBITION.

To the EDITORS.

GENTLEMEN,—I have just returned from the Photographic Exhibition, and cannot resist writing a line with reference to the recent awards, though I know full well that I lay myself open to remarks such as "the grapes are sour," &c.; but I can honestly say I have the best interests of the Society at heart in calling attention to the awards given.

I can conceive nothing so likely to bring the Society into disrepute as the awarding of medals to inferior work, &c. It will either end in members who can do good work not competing at all, or their sending in their works not for competition.

Take, first of all, the medal given for interiors, where all the lines converge. Surely this is not a specimen to be held up to the public as a sample of good photography.

Then a medal is given for scientific subjects — photomicrographs. Surely better work than this can be done to merit a medal.

Again: no medal is given for pure landscape photography, of which there are some splendid examples. I contend a great deal of skill is shown in the choice of a subject, so as to get it properly lighted, and avoid all movement of foliage, &c., which is not called forth by a mere snow-scene—beautiful as such photographs are.

Lastly: a medal is given for photo-engraving—entirely a mechanical process. This is certainly not photography.

I know there must always be dissatisfaction in the minds of some with the awards, but let us have a little less glaring faults to complain of.—I am, yours, &c., WM. WAINWRIGHT, JUN.

Hoe Place, Woking, October 14, 1884.

Notes and Queries.

W. H. WARNER writes, wishing to know the relative strengths as to restraining power of—1, nitric acid; 2, sulphuric acid; 3, sulphurous acid; 4, formic acid; 5, oxalic acid; 6, citric acid.——We shall be glad to have the opinions of our readers relative to this matter.

JOHN ROBERTSON says:—"I have commenced to make a lantern on the plan of M. Hutinet's for enlargements; but I find I want the information how I am to get ventilation at the bottom to cause the light to burn, and yet not to permit any light to escape. In the description of M. Hutinet's lantern in the JOURNAL and in the ALMANAC I do not find this named. I trust you will kindly give me the information. At the same time, perhaps, you will tell me the simplest method to reverse a negative."——In reply: We cannot anticipate any great difficulty in ventilating a lantern. A few holes covered over with a strip of tin bent at a right angle will prove the means of admitting air without allowing the egress of light.—To reverse a negative in the simplest manner: coat a glass plate with one of the dusting-on compounds to be found at page 227 of our last ALMANAC, expose under the negative, and develope by the application of powdered plumbago with a soft brush.

"1. HAVING constructed a magic lantern, four-inch condensers, I should feel much obliged at receiving your advice, in next issue, as to which is the best paraffine lamp to use to show a picture (sharp) on the screen about ten feet square.—2. Can I obtain better results with three condensers—namely, two plano convex and one double convex—than with the ordinary double condensers.—SOUTHENDON."——In reply: 1. A suitable paraffine lamp for the purpose (that is, giving a sharp image) is one which has a somewhat small circular wick, the flame of which is contracted by the chimney—one, in short, of the best argand form. A greater degree of luminosity may be secured by employing some of those lamps in which two, three, or even four flat wicks are presented with their ends towards the condensers, as in the sciopticon and lamps of the class which have been evolved therefrom. But, as a rule, the sharpest images are obtained when employing a very small flame.—2. We advise the employment of double condensers; but if a triple condenser be properly constructed it is likely to possess advantages greater than the double. Still, there is so much accuracy required in the construction of a high-class triple condenser that it is doubtful if, by any haphazard combination of three elements, such a good result would be obtained as if two only were employed.

ALPHA writes:—"Having a quantity of precipitated metallic silver which I wished to purify from any traces of the zinc with which it had been thrown down, I heated it in a porcelain basin with sulphuric acid. It was left to itself for a short time, and on my return I found the place full of such acrid fumes that I was unable to get into the room to turn off the gas, and had to wait until the whole had evaporated to dryness and the atmosphere had partially cleared itself by way of the chimney. I then found the cracked dish contained a considerable quantity of a yellowish white salt and but very little metallic silver. Can you tell me what this is, and what I have done wrong?"——In reply: It was wrong to *heat* the silver and sulphuric acid. The latter has no action upon silver at the ordinary temperature, but, when heated, converts it into silver sulphate. If concentrated sulphuric acid be employed, and the temperature raised to boiling point, the acid is decomposed and copious fumes of sulphurous anhydride are given off. This is what occurred in your case. During your absence the acid had become sufficiently concentrated through evaporation of the water, and then the evolution of sulphurous fumes commenced. The salt remaining is sulphate of silver, which, owing to its low degree of solubility (1 in 88 of boiling water), is very difficult of treatment. The simplest plan will be to boil it in a considerable quantity of water, adding, at intervals, chloride of sodium or hydrochloric acid until no further precipitate of chloride of silver is formed. In this manner successive portions of the sulphate are dissolved and converted into chloride, and the water left free to dissolve a fresh quantity; and so on, until the whole is converted.

"I HAVE been trying the collodion transfer process and experience some difficulty in getting the film to strip clean from the glass. According to the instructions I have received in writing from one who gives lessons *in absentia*, I have made the glass plate scrupulously clean, and complete the operation by rubbing it with the finest precipitated chalk; but still the film adheres so tenaciously as to produce patches all over the surface. What is wrong?—Yours, &c., FRANK B. WHITE."——In reply: Our correspondent has mistaken the nature of the chalk that must be applied to the plate after it has been made clean. It is not "precipitated" chalk but *French* chalk, which is an entirely different substance. Let this be well rubbed all over the surface, taking care that no part is omitted, and then wipe it all off again. If this be done previous to applying the collodion there is no fear of its adhesion to the glass at a subsequent stage in the process.

Exchange Column.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPHS REGISTERED.—

Thomas Roberts, Bradshawgate, Leigh, Lancashire.—*Photograph of Henry O'Connor, S.J.*

Edmund Eccles, Broad-street, Bury, Lancashire.—*Three Photographs of R. N. Phillips, Esq., M.P.*

Ambrose Copsey, 8, Sepulchre-street, Sudbury, Suffolk.—*Photograph of the Rev. Oliver Raymond, LL.B.*

William Baker, 7, Malva-road, St. Ann's-hill, Wandsworth, London.—*Photograph of Yoke of Oxen and Country Cart.*

Walter Lamb Knott, 68, King-street, North Shields.—*Photograph of the Lifeboat, "Co-operation," stationed at Callercoats.*

W. B. Allison, West-street, The Mount, Stoke-on-Trent.—*Photograph of the Venerable Archdeacon Sir Lovelace T. Stamer, Bart.; Two Photographs of Mr. Henry Broadhurst, M.P.*

VARNISH.—Rather too little body in the varnish.

B. D.—The Exhibition remains open until November 13.

H. JOLY (Lyons).—The subject will be treated in a leading article—most probably in our next.

C. PUMPHREY.—By the American term "sal soda" common washing soda of the oil shops is meant.

JERRY.—Consult our advertising columns. We cannot undertake to recommend any particular manufacturer.

SIDNEY.—Dissolve two or three grains of Castile soap in each ounce of alcohol, and employ that as a lubricant.

T. C. K.—Possibly you have rolled the prints before they were qu dr If not, probably you have employed too great a pressure.

T. J. R.—Write to the firm in question. Possibly they would prepare yo some plates specially—that is, if you order a sufficient quantity at a time

A. Z. O.—So many times as sensitive as "wet collodion" simply means nothing. What number does the plates show on the sensitometer screen That will be a guide as to their sensitiveness.

R. S. BELL.—We are by no means surprised that the dark tent realised so small a sum, notwithstanding its original cost. Indeed, we are more su prised that it sold at all. Who uses dark tents nowadays?

AMATEUR.—The five-inch lens is not sufficiently powerful to cause the rays to converge towards the object-glass in front. Try the effect of employing a second of the same character mounted close to the first.

A.—As you describe it, your method of washing should be sufficient, but, judging from the results, it is clear that it is not. Possibly too many negatives are washed at a time in a trough of insufficient size.

A. R. GILL.—The opal enclosed is not the kind generally used for opalotypes or "porcelain pictures." What you require is that kind which is known as "dead, smoothed pot opal." It is less expensive than your sample, which is "patent plate opal."

A. DENNY.—To copy the same size with your lens the camera must be capable of extending to seventeen and a-half inches. You had better have the cone made eight inches long, then with the sliding body of the camera you will have plenty of latitude.

J. G.—1. The sample of gelatine enclosed appears to be a good one, but without actually trying it it is impossible to say if it will be suitable for emulsion purposes.—2. See leading articles in our issues for March 14, 21, and 28 of the current year.—3. We regret we cannot spare time to accede to your wishes.

L. M. S. R.—1. B. is the more suitable.—2. Expediency must dictate which is the better system to adopt. If the proper effect can be obtained by raising or lowering the lens, it is, perhaps, better to have recourse to this.—3. The toning bath ought not to have become discoloured. When it becomes dark make a fresh one.

AN OPERATOR.—As a rule, so we are informed, the hours of employment are somewhat longer in provincial towns than in London; but yours appear to be unusually long even for the country. Of course there is no rule as to the hours that assistants are generally employed. This is always a special arrangement between the employer and the *employé*.

WM. HEYBRIDGE.—The mealiness or, as you term it, "leathery appearance" of the prints is due to their being over-toned. Some papers will not bear toning sufficiently to reach the purple stage, even if the negatives are of a suitable character to produce such tones. Tone less, and be content with warmer tones, or discard the paper altogether.

R. E. P.—All will depend upon the rapidity of the plates. What you term "medium rapidity" some would call "very slow," and others "rapid." Again: the exposure will be governed by the quality of the light and the amount admitted into the studio. The lens in question is much slower than an ordinary portrait lens, requiring about double the exposure.

ALEX. MCINTOSH.—The quantity of silver recovered certainly seems very small for so large a bulk of residues; but you must bear in mind that unless the metal were thin it could not be recovered. The weight of the residue and the time it took to accumulate is no criterion as to the amount of silver it contained. This can only be arrived at by making an assay.

IGNORANT.—Instead of relying on an intensifier, as you appear to do, you would do better to aim at attaining the requisite density in the development. The cause of the negatives fading or becoming spotty is that you have not sufficiently washed them between the different operations. The intensifier you have been using is a good one, if care be exercised in its employment.

J. WHISTLEY.—White hard varnish is not a good protection for negatives which are subject to hard usage, as it is too soft and pliable. If you require a cheap varnish, which will be more durable, you had better employ brown hard, diluted with methylated spirit. It is true that it is much darker in colour; but in the thin film on the negative it will not materially retard the printing.

LANTERN.—We have no means of knowing if the portrait be copyright or not, except by searching the register at Stationers' Hall. This you can do as easily as we can, as you reside very near. Supposing the picture be copyright, it will be an infringement of it if you copy it as a transparency for the lantern. By so doing you will render yourself liable to a penalty of ten pounds for every copy you sell.

*** Several correspondents' communications and notices are unavoidably left over till our next.

PHOTOGRAPHIC CLUB.—At the forthcoming meeting of this Club, at Anderton's Hotel, Fleet-street, on Wednesday next, the 22nd inst., the subject for discussion will be—*Reversed Negatives.*—All notices affecting the annual general meeting must be given in on or before the 22nd inst.

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1277. Vol. XXXI.—OCTOBER 24, 1884.

THE COLLODIO-ALBUMEN OR THE ALBUMEN PROCESS FOR LANTERN SLIDES.

The lantern season is now fast approaching, and many amateurs will be setting about producing transparencies from the negatives secured during the past summer, so that they can exhibit the results to their friends on winter evenings. Naturally they will be anxious that their work should appear to the best advantage; therefore any information as to the best method of securing this end will just now be most acceptable.

At the last meeting but one of the Photographic Club Mr. Wm. Ackland (a veteran in transparency making) described the collodio-albumen process for producing lantern slides, and also demonstrated certain portions of the process, more particularly those wherein the beginner is most likely to fail. The details of the process, as described by Mr. Ackland, were so simple and the results exhibited by him so perfect that the Club decided, in accordance with one of its rules, that the different formulæ should, with Mr. Ackland's permission, be published.* It may be mentioned that the simplicity of the process appeared to take most of the members by surprise, as they, in common with many others, seemed to imagine the collodio-albumen process was one of considerable complication.

We here propose to offer a few remarks on Mr. Ackland's communication to the Club. Although, unfortunately, we were prevented from being at the meeting, we have the advantage of learning what took place from a gentleman who himself is an experienced worker of the process.

In the first place, it may be well to explain wherein the method described by Mr. Ackland differs from the old collodio-albumen process of Taupenôt. In the latter process the plate is first coated with an ordinary iodised collodion and then sensitised in a silver bath, precisely as in the wet collodion process. It is afterwards washed to free it from nitrate of silver; then, after draining for a short time, it is coated with iodised albumen and dried. It is again sensitised—this time in a bath strongly acidified with acetic acid—washed, and dried. The plate is then ready for use. In the former process the plate is coated with iodised collodion as in the other; but, instead of being sensitised in a silver bath, it is simply washed in water to free it from the collodion solvents and, at the same time, the iodising salts. When the whole of the ether and alcohol is washed away the plate is coated with iodised albumen, and afterwards treated exactly as in the Taupenôt process.

Although this at the Club was entitled the "collodio-albumen process," we cannot avoid thinking that the "albumen process" would be a more correct designation, inasmuch as the collodion acts entirely mechanically and takes no part whatever in the formation of the picture; in fact, it is simply a substratum, as it were, to hold the albumen upon which the image is formed.

It may be remembered that towards the close of last year we directed special attention to the albumen process for producing lantern slides, and subsequently [see page 783 of our last volume and page 3 of the current one] we gave the full working details of the process. These differ in no material degree from those given by Mr. Ackland—at least, in so far as the preparation of the plate is concerned—and very little in the after manipulations.

It may be well to explain the part the collodion plays in the process, so that those who may take it up will the better comprehend its functions. An even film on the plate is, of course, at least as great an essential in the albumen as it is in the gelatine process, and the old method of obtaining this was to pour on the albumen and then place the plate in a perfectly horizontal position—the same as is now done with gelatine. But albumen, unlike gelatine, does not "set" or gelatinise, and, therefore, cannot be reared up on end to dry. Hence, the plate had to be dried while in the horizontal position, and, unfortunately, during the time the film is moist, it has a singular affinity for dust; the most minute particle of which settling on the plate invariably produces a spot or blemish in the finished picture. It was found, however, that this difficulty could be obviated by the following method of procedure:—

The plate is first coated with a collodion of a porous character—such as that yielded by a sample which has been kept for a long period after iodising. It is then washed to free it from the alcohol, ether, and the iodiser; then on this washed film the iodised albumen is applied. The albumen permeates the porous collodion, and sufficient is retained by it, sponge-like, even when the plate is reared on end while drying, to form the image. By this simple expedient an even and uniform coating is secured. But this is not the only advantage gained; for if, perchance, a particle of foreign matter—such as dust—should happen to come in contact with the film, the albumen as it dries appears to force it into the collodion substratum, where it remains practically inert.

After our articles on this process appeared we received several communications from correspondents who had failed in obtaining the albumen in a clear and workable condition. This simply arose from not following the instructions as we gave them. The impression on many minds appears to be that, in order to obtain albumen in a state of limpidity, it is essential that it should be converted into a froth, and the more perfectly this is done the better will be the result. Now, this is precisely what is to be avoided in the preparation of it for this process; for if froth be formed it is sure to give rise to more or less trouble, as several of our correspondents have already discovered. The importance of this fact was, we are informed, strongly dwelt upon by Mr. Ackland.

It may be explained that when the acetic acid is added to the albumen the whole must be gently stirred with a glass rod, so as to mix them without the formation of air-bubbles or froth. As the acid mixes with the albumen a flocculent deposit is formed, which, after standing a few hours, collects on the top in a compact mass, and can then be easily removed, leaving the albumen comparatively clear, and so limpid that it will readily pass through filtering-paper. If, however, in mixing the acid froth be formed, the precipitate will not collect into one mass, but remain diffused in a more or less fine state of division; and it will be found quite impossible to separate it by straining or filtration, so as to render the albumen fit for use. The after addition of the ammonia restores, to an extent, the viscosity which the acid destroyed.

Another matter of importance in the preparation of the plate is that of its sensitising. It should receive but a very short immer-

* Mr. Ackland's communication, embracing the formulæ, will be found on page 680 in the current number.

sion in the silver bath—much shorter than many beginners are inclined to think sufficient. The maximum time for immersion should on no account exceed a minute, and it is only in very cold weather that this time should be allowed; for under ordinary conditions half-a-minute, or even less, will be ample.

The albumen, or collodio-albumen, process—whichever it may be termed—is one which, by reason of the exceeding transparency of the lights and depth, without opacity, of the shadows it yields, is capable of producing transparencies of the highest possible standard of excellence, as witness the admirable productions of MM. Ferrier and Soulier. We shall take an early opportunity of recurring to the subject, and shall add a few remarks on the other details of the manipulations.

ENLARGEMENTS ON CANVAS.

What is the best and cheapest method of producing an enlarged photograph from a small negative on canvas for the use of the colourist in oils? This is a query that comes to us with a certain degree of frequency. The question is one which admits of some latitude. It presupposes the existence of several methods, some of which are cheap; others—irrespective of cost—good. Having a small negative of a portrait, how are we to enlarge it in a cheap, yet good, style?

One of several methods which forces its attention upon us at the present time is that by the transfer of a collodion film from the glass plate upon which it has been taken to the canvas upon which it finds a final resting-place.

Let us suppose that an artist is desirous of having a certain face and bust transferred to canvas. It is first of all necessary that the apparatus for producing a large image of the original be at hand. If daylight be the luminant employed, then the question is reduced to one of extreme simplicity. The negative is erected in such a manner as to have the sky as its background, and at a right angle to it is placed the lens by which an image is to be formed. A screen for receiving this image is erectd at the other side of the lens, and the optical conditions are thus rendered complete.

We will now presume that the enlarged image has been obtained in a collodionised glass plate of any reasonable dimension—such as twenty or thirty inches in length by a proportionate breadth—and that it has been treated in such a manner as to ensure permanence as well as the requisite amount of detail. What then? While the collodion image is being washed let us turn our attention to the canvas upon which it is to be placed as a final support.

Canvas prepared for painters is readily procurable from those artists' colourmen who make a specialty of this department of artistic requirements; and we now take it for granted that a sheet of such canvas has been obtained. The first thing to do with it is to sponge it all over with soda (mono-carbonate) and water until every trace of greasiness has quite disappeared, allowing the water to flow freely over the surface. When this is the case a moderately-strong solution of gelatine, containing a feeble admixture of chrome alum, is sponged over or otherwise applied to the surface of the canvas, and allowed to become quite dry. It is, indeed, better that such canvases should be kept in stock ready for use.

Let us now revert to the collodion image upon the glass plate. When it is found to be well developed and still clear in the shadows, the plate is laid, glass side down, upon a block or tablet which has been erected at one side of the sink at which the development and washing have been effected. The canvas, previously sponged over with water until plastic, is laid face down upon the collodion film, and pressed into close contact by means of the squeegee.

It is, of course, understood that the glass plate, previous to receiving its coating of collodion, shall have been thoroughly wiped over with a rubber charged with finely-powdered French chalk, or with a solution of bees'-wax in turpentine or other solvent. We find in our own practice that French chalk answers the purpose admirably, and, as it is cleanly and easily applied, we commend its use to all who try this process.

The plastic canvas, now quite wet, must be pressed into intimate contact with the equally-wet collodion film containing the image, and the plate is then laid down upon a flat table, a few folds of blotting-paper, backed by a thick pad, being superposed. This must remain undisturbed for a short time, after which a trial may be made at one corner to see if the canvas when raised carries with it the collodion film, which becomes detached from the glass in favour of the textile fabric. If the film be found to attach itself to the canvas the latter should be carefully raised from the glass.

The great advantage of effecting the transfer previous to the canvas and film becoming dry is that the film adheres in a most perfect manner to the canvas—certainly adapts itself more perfectly to the textile character of the fabric—and dries *flat;* whereas, if the transfer be not made until the film has become quite dry, the surface is of a shining and glossy character, being, indeed, then a transcript in regard to mechanical smoothness of the surface of the glass, which from an artistic point of view is somewhat offensive.

When the canvas is stretched out so as to become quite dry the collodion film will, upon being dried, be found to have become "part and parcel" of its surface. There will be no gloss, but the interstices of the textile fabric will be as plainly shown through the thin collodion image-bearing film as if no such pellicle were superposed upon its surface.

THE MEASUREMENT OF EXPOSURES.

We lately received an inquiry from a correspondent in France as to the best mode of ascertaining the duration of exposure when a guillotine shutter was employed; and seeing that, during the present year and its predecessor, the ranks of photography have been recruited by such large numbers of amateurs, it may serve a good purpose if we briefly allude to some of the methods that have been proposed for measuring the times of exposures, the subject having been rather fully treated on various occasions anterior to this period.

At the outset it may be said that the guillotine shutter offers the greatest facilities of any for obtaining the required data, seeing that, theoretically, a simple calculation without the employment of any apparatus will furnish the desired information, the laws of falling bodies being so simple and easily understood. Such a shutter, however, unless made in a manner more nearly approaching perfection than has yet been done, does not in practice move with the rapidity of perfectly-free bodies, and, in consequence, the dictates of theory have to be modified by the logic of facts as indicated by practice. Nevertheless, for comparatively small distances, when the motion is not very quick, it is quite possible by mere calculation to learn the time occupied by the shutter in falling a certain distance.

The shape of the aperture also governs the time the plate is subjected to the action of the light, seeing that it varies from the proportion of a true square to that of an extremely elongated rectangle; hence, any rates of rapidity given must be corrected by finding a mean of the times occupied in passing the lens by the upper and lower edge of the aperture.

Disregarding, as we may safely do for short distances, the resistance of the air, and for the nonce leaving aside the frictional retardation we have alluded to, we may say in round numbers that in a second of time any body falls through sixteen feet of space. At the expiration of that time it would be moving at such a rate as, if continued neither checked nor increased, would be thirty-two feet per second; but in a body falling we know the motion is continually being accelerated. Drop shutters, however, do not fall through such spaces as these, and we may deal with small distances.

But the acceleration continues from the very moment that the shutter begins to drop, so that it would be quite wrong to assume that, because a second of time is occupied by an object in falling sixteen feet, it will fall eight feet in half a second, or four feet in a quarter of a second, and so on, for such is not the case. Of any two consecutive equal periods of time taken during the falling the distance traversed is always greater in the latter. It is thus obvious that to ascertain the time of exposure from the distance fallen through, or *vice versâ*, is not the simple piece of division that at first might be imagined. Still the actual calculation is easily performed, as the ratio is a simple one.

Thus, if we know how far a body falls in one second, for example, we get the distance traversed in a certain number of seconds by squaring that number and multiplying the result by the given distance. Thus, a body will fall, as we have said, about sixteen feet in one second; therefore, in three seconds it will fall not three times sixteen feet, but sixteen multiplied by three times three, or one hundred and forty-four feet, and so on. The same rule holds good for smaller periods than one second. To give a practical character to these remarks, and to save trouble in calculation, we here reproduce a table given in a leading article in this Journal a number of years ago, showing the space fallen through by a freely-moving body in each tenth of a second up to one second:—

In $\frac{1}{10}$	of a second	the object will	fall through	$\frac{4}{25}$	foot.
„ $\frac{2}{10}$	„	„	„	$\frac{16}{25}$	„
„ $\frac{3}{10}$	„	„	„	$1\frac{11}{25}$	„
„ $\frac{4}{10}$	„	„	„	$2\frac{14}{25}$	feet.
„ $\frac{5}{10}$	„	„	„	4	„
„ $\frac{6}{10}$	„	„	„	$5\frac{19}{25}$	„
„ $\frac{7}{10}$	„	„	„	$7\frac{21}{25}$	„
„ $\frac{8}{10}$	„	„	„	$10\frac{6}{25}$	„
„ $\frac{9}{10}$	„	„	„	$12\frac{24}{25}$	„
„ $\frac{10}{10}$, or one second		„	„	16	„

Smaller distances than $\frac{4}{25}$ of a foot—that is, less than two inches—are not likely to be made use of, increased rapidity being gained by a spring, in which case other means for ascertaining its rate would need to be made use of. It has been proposed to photograph a falling weight, but when spaces of a few inches only were in question it may be readily seen that micrometer measures would be required, and these would be undesirable for popular use.

Most of the other methods proposed involve the photographing of moving bodies, and vary as regards the construction of the moving arrangements and the manner of recording them. One general principle runs through the multitude of plans proposed—that is, a brightly-illuminated object moves in a circumscribed path, and is photographed at some stage of its career. The image shown on the plates after exposure and development—whether in the form of a circular arc or a straight line—shows the extent of path traversed during exposure, either with or without calculation. Among the objects recommended are a moving pendulum, its length enabling exact calculations to be made; a hand moved by special clockwork round a dial; the swing of a metronome; a revolving opaque disc, with an aperture through which light passes to the lens; and a handkerchief held at arm's length by an assistant, and moved quickly in circles, a little practice enabling him to do this with a fair approach to accuracy.

Finally: we may name one most ingenious method by means of a vibrating fork. The shutter is blackened by camphor smoke, and while it is falling a hair attached to a tuning fork touches it and thus records the vibrations, which are readily calculated and converted into time measurements.

We may caution those who attempt to carry out any of these ingenious experiments that they usually give equal value to any particular period of the exposure, if it be divided into a number of equal periods, although the moment when a drop shutter is opening, as also that of closing, is of far less value than the central periods. This, however, forms matter for investigation of another class and we believe that the query of our correspondent is fully answered, at the same time that a brief *résumé* of interesting matter is given to our readers in general.

THE PHOTOGRAPHIC EXHIBITION.

[Third Notice.]

Mr. T. M. Brownrigg is, as usual, represented by a number of his well-known landscapes of large size, chiefly woodland scenery. Both in selection and in the rendering of the foliage these are admirable examples of work, though the effectiveness of *A Lane at Waverley* (No. 113) is slightly marred by a trace of halation. *In a Wood at Cobham*, in the same frame, is a nearly perfect composition.

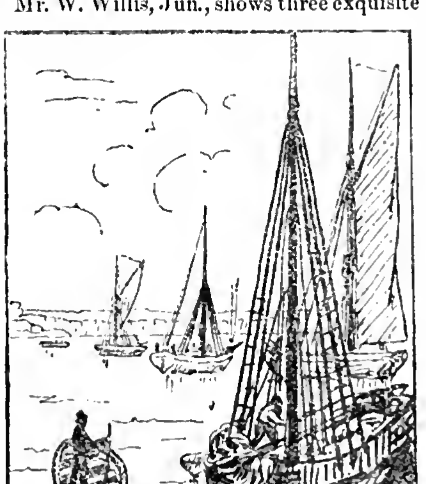
We have so frequently spoken of Mr. W. F. Donkin's Alpine views that it is scarcely possible to say more in their praise. We are probably expressing the general opinion when we state that Mr. Donkin has this year perhaps surpassed his previous efforts, though, in consequence of being one of the judges, he was unable to compete. In addition to the magnificent enlargements, prints are shown from the original $7\frac{1}{2} \times 5$ negatives, and it is interesting to note how little of the quality is lost in the process of amplification. *The Rothhorn, from Lo Besso* (No. 63), an autotype enlargement, gives one of the most marvellous renderings of snow we have ever seen; and a careful examination of the small print of the same subject in frame No. 375 cannot fail to impress one with a belief in the capabilities of the gelatine plate in combining vigour and softness under the most difficult conditions. Where all are so good it is difficult to particularise, but the mammoth proportions of *The Matterhorn, from the Hörnli* (No. 178) single it out for special notice. This is one of the few instances in which the gigantic size of the enlargement does not detract from its pictorial value.

Mr. Luke Berry exhibits a large number of frames of subjects very diverse in character, including portraiture, architecture, and group studies, the last being most noteworthy. With the exception of *Fountains Abbey* (No. 128) none of the first two classes call for special notice, but this is a very fine piece of work. *An Autumn*

No. 213—*An Autumn Morning*. By Luke Berry.

Morning (No. 213), selected for illustration, is a very effective bit from the harvest field. *The Last Load* (No. 349) and *Daddy's Coming* (No. 395) are also good.

Mr. W. Willis, Jun., shows three exquisite little platinotype prints, which have more the appearance of fine mezzotint engravings than of photographs. The best of these, *Shipping, Rochester* (No. 210), is well chosen and admirably executed.



No. 210—*Shipping, Rochester*. By W. Willis, Jun.

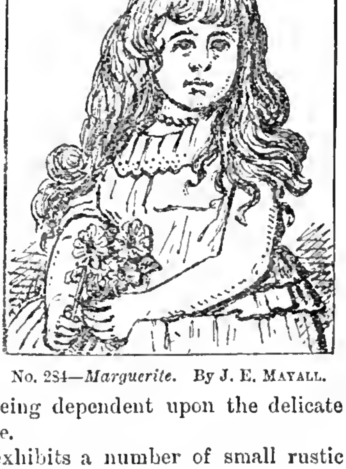
Mr. W. P. Marsh has received a medal for a frame of *Instantaneous Sea Studies* (No. 43), consisting of waves breaking on the beach at Bognor. While these are clever of their kind, there are other instantaneous works on the walls equally deserving.

Lieut. C. E. Gladstone's *Botanical Gardens, Palermo* (No. 50), makes a very effective picture, the style and colour of the platinotype print being eminently suited to the subject. Nearly the reverse of this, however, may be said of his

In Moor Park (No. 80), which appears weak and flat. The remaining exhibit, *Cedar Tree, Moor Park* (No. 439), is a vigorous and well-selected picture.

Mr. F. Beasley's *Studies of Cattle* (No. 55), exhibit all this artist's old power of selection and treatment. The centre picture, a group of cows browsing beside a willow-skirted stream, is a truly charming study. *A Folkestone Fisherman* (No. 74) is good, as is also the little group entitled *A Morning Chat* (No. 73). Mr. Beasley's landscapes are, as usual, remarkable for their delicacy and softness, his *Rydal Water* (No. 84) being specially so.

The veteran J. E. Mayall is to the fore again with several fine works, prominent amongst which at the present time is his *Portrait of Sir Moses Montefiore* (No. 195). *Marguerite* (284), selected for illustration, is a pleasing child portrait, and Nos. 526 and 546, portraits respectively of Mr. Henry Irving and the President of the Photographic Society, are characteristic and successful. From another of Mr. Mayall's photographs of Mr. Glaisher we have taken our supplement of this week.



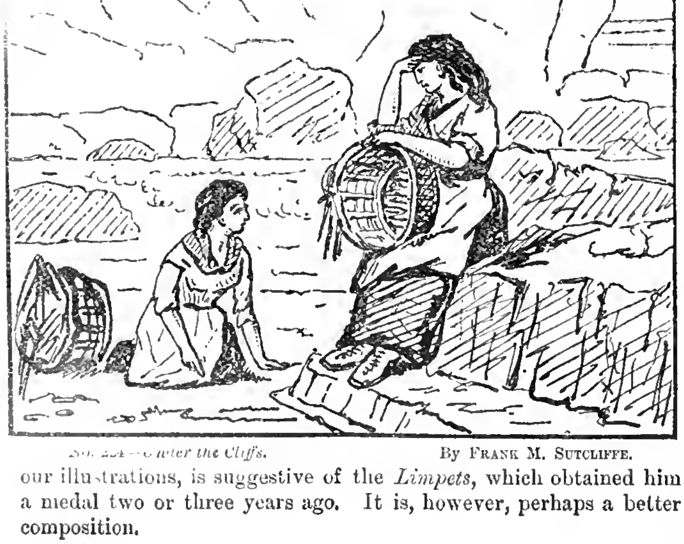
No. 284—*Marguerite*. By J. E. Mayall.

One of the few lady exhibitors, the Hon. Mrs. Holden-Hambrough, exhibits this year pictures of large size (12 × 10), of which the best are the two architectural studies of *Haddon Hall* (Nos. 85 and 86). The two "bits" from *Ashwood Dale* (Nos. 56 and 57) are spoilt by imperfect definition, the whole artistic value of the subjects being dependent upon the delicate rendering of the luxuriant foliage.

Mr. B. G. Wilkinson, Jun., exhibits a number of small rustic studies, of which the best is *Luncheon Time* (No. 76); also a couple of views *On the Mole, Betchworth Park* (Nos. 192 and 193).

Mr. H. Pointer's frame of *Cats and Dogs* (No. 380) contains a class of subject that is becoming rather monotonous, and, as it is now-a-days by no means a difficult one, might well be dispensed with in our exhibitions. No. 78, an enlargement of a white Persian cat, is, however, worth notice.

Mr. Frank M. Sutcliffe is not so well represented as usual—so far, at least, as quantity is concerned—though the quality is up to his standard. His *Under the Cliffs* (No. 224), which forms one of



No. 224—*Under the Cliffs*. By Frank M. Sutcliffe.

our illustrations, is suggestive of the *Limpets*, which obtained him a medal two or three years ago. It is, however, perhaps a better composition.

Mr. J. Milman Brown contributes a few little views of the Isle of Wight, and also a study of landscape and cattle, entitled *Repose* (No. 81), which is good, though the distant landscape is over-exposed.

Mr. C. Allan Ferneley's framed *Views in Surrey* (Nos. 537 and 558), though small in size, contain some very good work. His *Hampshire Cottage* (No. 87) is a pretty picture, the picturesqueness of the subject being enhanced by a judicious introduction of clouds.

Mr. J. Bracebridge Hillditch's *Study of Pampas Grass* (No. 88) is the most noticeable of that gentleman's exhibits; while his *Can I Trust You?* (No. 102) is of such small dimensions that it requires some search ere it can be found. There appears to be but slender connection between subject and title.

Mr. J. Hubbard's *Mother's Love* (No. 282) is a picture which, though it is some years since we first saw it, has lost none of its

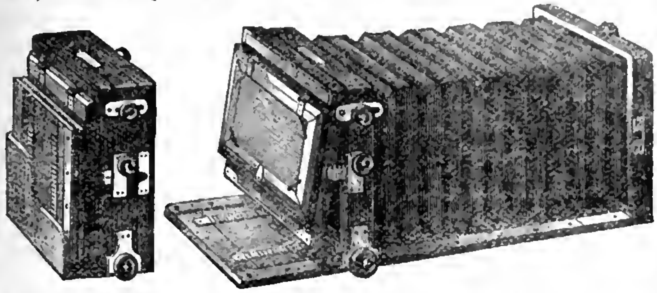
No. 282—*Mother's Love*. By J. Hubbard.

charms. Scarcely equal in result to the same artist's well-known *Stolen Moments*, the conception is a more happy one, and the picture will fairly take rank amongst successful composition work.

APPARATUS.

A departure from the regular routine employed in the construction of cameras has been made by Messrs. J. F. Shew and Co., who exhibit a "camera adapter." This invention, for which a patent has been obtained, has for its object the means of enabling the operator to work a plate one or two sizes larger than that for which his camera is constructed; thus by employing an adapter to a half-plate camera it may be converted into a whole-plate camera. The specimen exhibited effects the conversion of a whole-plate into a 12 × 10 camera—no small boon, it must be admitted, as it enables the amateur of limited means, who commences with a camera the dimensions of which are proportionate to his finances and, perchance, his manipulative skill, to aspire towards greater things with increased experience. With this invention he has only to have an adapter fitted to his camera, which will enable him, by using the single combination of his lens, to take pictures on the one or two sizes larger at a small outlay and with but slight addition to weight and bulk, with the extra advantage of being able to remove and dispense with the adapter and use the camera as usual when found desirable. The adapter is connected with the camera by means analogous to that employed with the dark slide or the lens front.

The long-focus camera of these makers, which we described last year, is again placed for examination in the Exhibition; but it has been improved since our description appeared by a lever clamp, dispensing with rackwork, saving time in opening, and provided with a very short rack which serves the part of a fine adjustment such as we have advocated in the Journal. The back of this camera can be instantly run out to any extent demanded by the focus of the lens, then clamped, and the back placed under the control of the

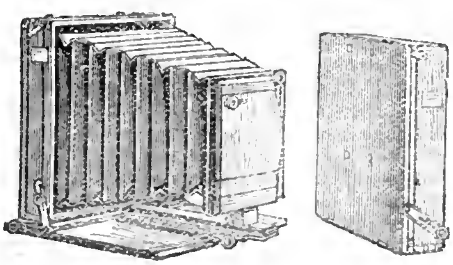


short rack already mentioned, by which the focussing is finally effected. The above diagram represents this camera.

Shew's eclipse shutter, too, comes under improved conditions from those which prevailed last year; for it is now fitted so as to be situated midway between the lenses in a compound objective—an undoubted advantage. Another improvement in the exhibits of last year by this firm is to be found in their small portmanteau or tricycle stand, which, like those pieces of apparatus referred to, has been brought under the influence of evolutionary principles, for it is still better this year than it was at the previous Exhibition. We are glad to report this firm (Messrs. J. F. Shew and Co.) as being the first to manufacture on a commercial basis the reversing camera-stand top, which has more than once been strongly recommended as a decidedly good thing. The idea is of American inception, and its special advantages have been during the past year urged upon the members of the metropolitan clubs and societies. It provides the means of enabling a photographer, after having focussed a view upon the plate lengthwise, to instantly turn the camera upon its end, so as to provide for any tall steeple which might not be got into the view as it originally appeared upon the ground glass, and this without the necessity for undoing any screw.

Messrs. W. W. Rouch and Co. exhibit an elegant little instantaneous shutter constructed of wood, yet so thin and light as to be capable of easily being carried in one's pocket-book. It consists of a flap fitted, of course, in a frame. The flap, when liberated by pressing a button at the foot, flies open, and, similarly to that which we described last week, permits, when open, a shutter to descend and cover the lens. This shutter is propelled downwards by a spring which imparts an initial velocity. The exposure given is uniform in the sense of not being adjustable.—A "war," or "special," correspondent's photographic outfit, exhibited by Messrs. Rouch and Co., consists of a camera and dark slides packed in neat cases capable of being slung over the back when the user is riding. It shows in a striking manner in what way photography may be made to aid the pen by way of supplying a description of interesting scenes.

There is also an excellent specimen of Rouch's patent portable camera exhibited by this firm. It possesses such mechanical features (shown in the adjoining figure) as combine the requirements of rigidity and portability, and and these qualities are conjoined with the extreme of lightness. Our diagram shows it both packed up and extended. When packed, the ground glass is protected



by a hinged wooden cover which folds over it. This cover, when moved upon its hinges, turns right round under the camera and forms the base-board, which can by the action of a screw be clamped either at a right angle to the ground glass or at any desired angle, forming in this respect an efficacious means for swinging the back so as to allow of tilting, for the purpose either of securing sharpness in the foreground of a landscape or accuracy in the delineation of an architectural view. To provide for the extension and focussing of the camera there is a movable central framework, which can be attached without screws to the base-board in a few seconds. This carries a rack and pinion, affording such a degree of extension as to permit of a lens of very long focus being employed, if required.

Leather as a material for the bellows of folding cameras has long held the first place in the estimation of manufacturers of apparatus of the highest class; indeed, they consider "there is nothing like leather." When, however, the expense of the material stands in the way, the substitutes proposed are most numerous. A material that struck us as being most serviceable in use was a "black sateen cloth" which a Manchester amateur had employed for the purpose, and he informed us that he had found it to wear excellently, his camera having seen plenty of service, and still being light-tight and sound at the time of our inspection. Possibly he may have been prejudiced in favour of the staple products of his neighbourhood; but we must say the appearance of the camera belied the existence of any such bias.

"Swing-back, Sir! No such fads for me. I do quite well without!" Upon our mildly suggesting that there was at times a real benefit to be obtained from tilting the back from the perpendicular, we were gruffly informed that he was well aware of the fact and frequently adopted the expedient. A request for an explanation elicited the manner of doing it. The back of the camera, attached, somewhat after the style of the Kinnear, by a pair of loose screws, was first placed firmly, *in situ*, in a vertical position by screwing it up tight; then both screws were loosened, a black lead pencil slipped between the loosened back and the base-board, screws tightened again, and, *presto!* the back had a strong tilt, which could be modified by placing the pencil nearer to or further from the screws. Every end was served and the process was not a long one.

Accounts are to hand from observers in all quarters of the recent eclipse of the moon (which occurred, as our readers will remember, upon the evening of the *conversazione* of the Photographic Society of Great Britain), and they appear to be unanimous in describing it as possessing features of a rather unusual character, particularly in the almost complete invisibility of the orb during the period of totality. Usually the moon is quite visible during the phase of greatest obscuration, but in this instance it was only by a close scrutiny of the part of the heavens where it was known to be that it could at all be found by the naked eye.

It has been suggested that a connection may be discovered between this unusual appearance and the remarkable sky-glows which have several times of late been again observed in the heavens—possessing a brilliancy almost, if not entirely, equal to that which characterised the displays of last autumn.

With regard to this latter suggestion a singular observation of Mr. Lewis Swift, Director of the Warner Observatory at Rochester, New York, which was read at the American Association, may be here referred to. He stated that since the sky-glows appeared last year there had not been a single first-rate clear sky for observational purposes, and his experience, it was stated, was borne out by the generality of other observers.

Nevertheless, it has apparently not interfered with lunar photography at Paris during the eclipse; for our contemporary, *La Nature*, has a series of interesting photo-engravings direct from negatives of the moon taken by MM. Paul and Prosper Henry, who succeeded in securing a large number of negatives of the phenomena at various stages of progress.

Photographers should know something about the working up of residues, although many still persistently reject any mode of treating hypo. residues. We wonder if it be possible for these most conservative workers to be convinced by describing the method adopted at the large mines in Nevada for extracting the silver from some very impure ores. After crushing and drying the ore, and passing it through a pipe lined with magnets to extract the iron, it is mixed with three per cent. of common salt and then roasted—a treatment which converts the silver into chloride. It is then, after transference to a lixiviating vessel, washed with hot and cold water, and afterwards treated with a seven and a-half per cent. solution of hypo., from which it is recovered by the plan despised by so many photographers—that of precipitating with a soluble sulphide. Quantities so large were worked that it pays to adopt measures to collect the sulphur expelled during a final roasting to bring the precipitate to the metallic state.

Bisulphide of carbon is familiar to photographers from its suitability for dissolving india-rubber and gutta-percha, removing traces of grease, resin, &c.; but to employ it as an antiseptic for preserving paste, glue, &c., would be thought as unlikely a purpose as could well be conceived. According to a writer in *Comptes Rendus*, however, it possesses antiseptic powers of a remarkable kind, as its solution in water (which takes it up to the extent of ·05 per cent.) arrests fermentation and kills all microbia. If his statements should prove to be correct it will be difficult to imagine a more useful material for a variety of photographic purposes. Being inert chemically, it could be used in a mountant for the most delicate print without fear of injurious chemical reaction, such as must always be suspected with carbolic, salicylic, or thymic acids, often used for the purpose. Its great volatility would lead to all traces of its presence rapidly passing away as soon as its purpose was served, and the mounting material had parted with all its water.

The important part which the mounting material plays in the permanency of photographs is, usually at least, appreciated by the photographer, and he generally uses materials in accordance with the dictates of science; but with the bookbinder, for instance, to whose tender mercies many hundreds of photographs are confided in the course of a year for mounting and binding into book form, the matter assumes a different aspect. Bookbinders' paste is a most tenacious and highly-adhesive compound; but the materials that often compose it are by no means neutral in the matter of photographic prints. There are pastes *and* pastes, and from alum to bichloride of mercury is a wide leap; yet neither substance is unknown for the purpose, and it is impossible to say what other compounds gain admission. The result of their use upon the back of a photograph it would not be difficult to foretell. At the same time we do not wish for one moment to insinuate a single word against the professional photographic mounter, who makes a business of the work. We only allude to the occasional mounting given to a binder, who does not profess any knowledge of the science.

That our readers may fully understand the possibilities which exist in that direction, we append a recently-published method of making paste, glue, &c.:—Five pounds of potato starch is placed in six pounds of water, a-quarter of a pound of pure nitric acid added, the whole kept in a warm place, and frequently stirred for forty-eight hours. The mixture is then to be boiled until it forms a thick, translucent substance, and is afterwards diluted and filtered, if desired, through a cloth. Our readers can imagine the effect of using such a compound to paste pictures into the leaves of a book; though for ordinary purposes it would be, no doubt, a most serviceable pasting or glueing material.

JAMES GLAISHER, F.R.S., F.R.A.S.

The subject of our portrait this week requires little introduction from us. Mr. Glaisher's long and intimate connection with the Photographic Society has brought him, if not into actual contact, at least within the boundaries of acquaintanceship, with most, if not all, of the leading photographers of the present period and of past years.

Outside photography Mr. Glaisher is best known in connection with meteorology, having been from his earliest days interested in that branch of science. At the age of twenty he was charged with certain meteorological observations in connection with the Ordnance Survey in Ireland. After a brief connection with the Cambridge Observatory he was appointed to the Astronomical Department of the Greenwich Observatory; but on the establishment of the Meteorological Department, in 1840, he assumed the position of superintendent. In the interests of meteorology Mr. Glaisher has gained a name as one of the most intrepid of aëronauts, and has probably been instrumental in adding much knowledge to that science that would have long been wanting but for his pluck and daring. Some thirty ascents, all in the interest of science, were made by Mr. Glaisher, in one of which, accompanied by Mr. Coxwell, a height of nearly seven miles was attained.

In addition to numerous other works, Mr. Glaisher has been engaged, since his retirement from Greenwich Observatory, on the compilation of a series of Factor Tables for the fourth, fifth, and sixth millions—a work requiring unexampled patience, and for which he has received the recognition of the British Association.

What Mr. Glaisher has done for the Photographic Society only those who regularly attend the meetings are aware. Seldom—practically *never*—absent from a meeting the President seems to form a necessary portion of the Society; and we trust that he may long be spared to fill his present post.

Our portrait is from a recent photograph by Mr. J. E. Mayall, of Bond-street.

NOTES ON SILVER PRINTING.

I have to thank Mr. Dunmore for his kindness in telling me how to observe when the chloride of silver has been removed by fixing from albumenised paper. Certainly it was new to me.

I am well aware that albumenised paper, when it is sensitised, becomes impregnated with chloride of silver through the whole of its thickness; but, even at this, the film is a very thin one compared to what we are accustomed to have, for example, in a gelatine plate. The film is comparatively thin, and the quantity of haloid silver salt contained in it is comparatively *very* small. I imagine that if we deduct the free silver nitrate there is not in a given area of albumenised paper more than an eighth part as much silver as there is in the same area of film on a gelatine dry plate. The thin film comparatively weak in silver is, moreover, porous, and of such a nature that it can be attacked by the fixing solution from both sides; whereas a gelatine film may only be attacked from one side.

Taking all this into consideration, we might very naturally assume that a silver print would be fixed in a very much shorter space of time than would a gelatine plate; yet we should be astonished to find gelatine plates—at least such as did not contain a large quantity of iodide of silver in the film—requiring anything like the time to fix that we usually give silver prints in the hypo. bath. Moreover, if I have observed properly the instructions which Mr. Dunmore gives for determining, by ocular observation, when a print is fixed—when, that is, the chloride of silver has been dissolved out of it—a very few seconds suffice.

However, I should be far from wishing to advocate that a shorter time be allowed to silver prints in the fixing bath than is usually given. To wait a quarter of an hour or twenty minutes is no great hardship; but it seems to me that we might, with advantage, use a much weaker fixing bath for our prints than we commonly do. I find that the quantity of hyposulphite usually advocated for fixing prints is from two and a-half to five ounces per pint. With the latter quantity I have frequently found the tone to be degraded, and even with the former, weak prints—which, it is true, should not exist, but which, nevertheless, sometimes do—often lose something.

I am quite aware that a *very* weak solution of hyposulphite of soda used for fixing may produce an insoluble hyposulphite of silver and sodium which may be dangerous to the permanency of prints, but I do not think it is likely that any solution used in practice will be weak enough for this.

Mr. W. M. Ayres, who is well known as a most skilful printer, and against whose prints want of permanence is the last thing that could be urged, has frequently told me that he never uses a fixing bath stronger than one ounce of hypo. to the pint. It seems to me that if there is no danger in using so weak a bath it is a great advantage to do so, if for no other reason than that it reduces the likelihood of there remaining any hypo. in the prints after washing.

We are commonly told that hyposulphite of soda is very soluble in water, but that it clings with great pertinacity to paper, and that from this fact arises the necessity for giving prints so long a washing after fixing. As a matter of fact, I do not believe that hyposulphite of soda clings with more pertinacity to paper than do many other chemicals—for example, nitrate of silver. I wonder how many photographers have tried how much washing it requires to remove the last trace of silver nitrate from paper. I have been astonished myself at the length of time required. I am convinced that the washing usually given to prints after fixing would not be sufficient were it given to them before toning to remove every trace of silver nitrate.

It is most difficult to wash all the free silver out of prints, and it is, moreover, not a very easy thing to reduce all the free silver nitrate to chloride by the action of a weak solution of common salt,

SUPPLEMENT TO THE BRITISH JOURNAL OF PHOTOGRAPHY, OCTOBER 24TH 1884.

JAMES GLAISHER, F.R.S. F.R.A.S.
President of the Photographic Society of Great Britain.

INK-PHOTO, SPRAGUE & Co LONDON

such as many photographers use before toning. I was under the impression until lately that the result of treating untoned prints with a weak solution of common salt was to get rid of *all* the silver nitrate. I found this not to be the case, however, as the following experience will prove.

I had occasion recently to tone and fix half-a-quire of paper in the form of prints. I wished to wash out the greater portion of the silver nitrate; and, for this reason, having no large tub available for washing, I proceeded in the following manner:—The prints were placed in a large, flat dish filled with water. The water was drained off and fresh was supplied. The prints were then removed, one by one, to a second dish of fresh water, and when they were all there the water was drained from this second dish. The operation was repeatedly performed. It will be evident that an excellent test for the complete removal of the silver nitrate is to be found by catching the last small quantity of the water drained off the prints, and observing if there be any milkiness in it or not.

The first washing was continued for an hour. The prints were then soaked for five minutes in a salt solution containing one ounce of salt per gallon. They were kept in constant motion during the soaking. They were then washed in the manner already described for half-an-hour to remove the salt. Even at the end of this washing there were distinct traces of silver in the drainings of the prints. Toning was, however, gone on with. The time taken for the colour to change was very long, which, I think (as the solution was not cold), indicated that there was much less free silver in the paper than there usually is when the toning process is commenced. After toning, half-an-hour more washing was given to get rid of the toning solution. At the end of the last washing there were still traces of silver nitrate remaining in the paper. Be it observed that this experiment was made with ready-sensitised paper, in which the quantity of free silver nitrate is even initially very small.

Certainly, if hyposulphite of soda adhere to paper with even as much persistence as nitrate of silver does, and if it be the case that the presence of a small quantity of hypo. in a print means want of permanence, we may hail with pleasure the idea of using less of it, and, therefore, of having less to wash out.

Concerning a solution of salt: I may say that with one considerably stronger than that mentioned the decomposition of the silver nitrate appears to be complete in a very short time. After treating prints with a solution of salt, containing an ounce to the pint, for three minutes, all free silver nitrate seemed to have disappeared, and the prints refused to tone *at all*. Is it not possibly the case that a *little* free silver nitrate is necessary to the toning process? I think it will be found that without any prints will altogether refuse to tone.

I believe the action of a toning solution is not at all understood yet. We are told that it consists in covering the metallic silver forming the image with a thin film of gold—in gilding it, in fact. If this be so, how is it that no change of colour takes place when a mass of silver—say a silver spoon—is placed in a toning bath, even if the spoon be first dipped in silver nitrate solution?

W. K. Burton.

AN INSTANTANEOUS SHUTTER OF THIRTY YEARS AGO.

[A communication to the Manchester Photographic Society.]

The shutter I have brought before you this evening is probably one of the oldest and, as I think, for absolutely instantaneous work the best form of shutter extant. It was given to me some years ago by my friend Mr. Joseph Sidebotham, but for want of time and opportunity I have never, until quite recently, put it to a practical test.

It was made by Dallmeyer about 1856-7, Mr. Sidebotham having taken part in developing the principle, which is extremely simple. It consists of two light laths of mahogany, in each of which I will say, for simplicity, is a square opening (although in this particular shutter there are two openings in each lathe because it is a double one for stereoscopic work). When the focussing is done and everything ready, the exposure is made by touching a light trigger, when the two laths are instantaneously pulled in opposite directions, one square opening passing across the other, consequently giving the centre of the lens the greatest benefit, as it is there the shutter first opens and last closes.

It will thus be seen that, however quickly a shutter may be made to work simply by a movable opening passing a stationary opening fixed to the front or inside the lens tube, as in the case of the drop shutter, if the stationary opening be converted into a movable one, and in an opposite direction, the exposure in the latter case will only be half the duration of that in the former case. It is precisely analogous to the passing of two express trains in opposite directions. Any slight opening between the trains seen by a person standing on the platform of a railway station at the time will be exceedingly brief as compared with an opening seen between a single train and a stationary object, such as the end of a building which may happen to be on the other side of the line of railway on which the train runs.

My object is not to depreciate any other form of shutter, for there are many excellent and deservedly popular ones now in the market; but I thought it would interest many to see an efficient instantaneous shutter which was made nearly thirty years ago, and I further think it will be admitted that the results I am showing you are sufficient proofs of the value of the principle for what may be called extra-rapid work.

I must, however, point out that the details of construction are bad in two important particulars. The source of motion is an india-rubber band attached to each lath, the elasticity of which, when the trigger is liberated, draws them in opposite directions; and as each elastic band works on its own account, and quite independently of the other, there is a danger, by reason of the difficulty of getting the tension in both cases equal, that one lath may travel quicker than the other, which, in fact, I found on one occasion to be the case, when one half of the plate was better exposed than the other half.

In the first place, therefore, I would have no india-rubber; it is an untrustworthy and perishable material, and liable to break or become useless when one has no chance of renewing it. In the second place, I would connect the two laths in such a way that one source of motion only, instead of two independent ones, would be required. Both of these alterations, I believe, could be readily accomplished by connecting the laths with a strong silk cord passing over a small ivory roller, and using as the source of motion a good watch or small clock spring. The speed of the shutter could, I think, also be altered within certain limits by means of the introduction of a brake action.

It may be asked if there are any examples now in existence of work done by this shutter at the early period above referred to. Regarding this I may say that Mr. Sidebotham informs me he was at that time working hard to perfect a dry process which gave him some encouragement, and by which he succeeded in taking good negatives of such subjects as donkey races and a merry-go-round on the sands at Southport; but the process turned out very unreliable, and in so many apparently unaccountable ways, that he afterwards gave it up in disgust. As that gentleman is at present residing in the south for the benefit of his health, I am unable to show you any of the results of that period, even if they are still preserved. I should, however, imagine that for the most rapid wet-plate work the action of the shutter would be found much too quick, which was probably the reason why it fell into desuetude.

J. S Pollitt.

THE SODA DEVELOPER, &c.

With the indulgence of the Editors I will venture a few practical remarks on the subject of the very able leading article in the last issue of the Journal, with special reference to two points in my former communication to which exception is taken, namely, the alleged restraining power of sulphites in the developer and the probable cause of green fog being a mixture of alkalies.

First, then, the accuracy of my deduction that sulphites act as restrainers is questioned on the ground that pyro. and sulphite of soda alone are capable of developing the latent image of a properly-exposed gelatine plate. But does it necessarily follow, because an image can *slowly* be brought out by the aid of sulphite of soda, that, therefore, it accelerates development when used in conjunction with one or other of the alkalies? Let experiment answer this question to all who are interested in it. To me experiment seems to prove that sulphites not only do *not* accelerate, but positively *retard*, the operation of development.

I confess that this is quite contrary from what would be expected of a reducing agent, but cannot disregard the evidence of facts. When the Editors of the British Journal of Photography first made known the interesting and important fact that pyro. and sulphite of soda were sufficient of themselves for development, I thought it conclusive proof of the accelerating tendency of the sulphite salt; but further experience of its use has induced me to change my opinion concerning its real function in the developer. When things of an opposite character are joined together a medium product is generally the outcome of the union. Now let sulphite of soda be allowed to represent extreme slowness in the operation of development, and ammonia (of the right strength) extreme quickness, then a combination of the two, according to the above general rule, ought to yield a mean ratio of speed depending upon the proportions in which they are mixed. And in practice I find this to be so, for the more sulphite there is present in the developer the slower it works; and this is particularly true of the sulphite of ammonia, which exercises greater restraining power than the corresponding soda salt. I am, of course, speaking of its use in conjunction with free ammonia. In the case of soda development the conditions are not the same, because sulphite of ammonia cannot exist in the society of soda, this latter base having a stronger affinity for the sulphurous acid.

The other objection is against my supposition that the combination of ammonia and soda in the same developer is the cause of green fog; but the Editors are scarcely accurate in saying—"The fact that Mr. Hanson obtained green fog with a *carbonate of soda* developer *containing sulphite of soda* is no more surprising than that an ammonia developer should produce the same result." I did not say, or imply, that I had obtained green fog with that combination, as a reference to my communication (page 648) will show; but that the green fog spoken of resulted from a very different combination, namely, *soda* and *ammonia* in the same developer. It was this fact which excited my surprise, and in the end led me to exclude ammonia from the formula I gave for soda development.

I now repeat, what was clearly implied before, that a developer composed of pyro., carbonate of soda, and a well-balanced proportion of sulphide of *soda*, yields plates absolutely free from green fog; but the same combination, with a little *ammonia* added, induces the fog at once. It matters little whether the required proportion of sulphite be supplied by adding sulphurous acid to the carbonate of soda used in the developer or by dissolving the pure salt, provided a sufficiency of the alkali remain to ensure energetic development.

From the concluding words of the Editors' excellent article I must beg leave to dissent. They are these:— * * * "But so long as either ammonia or soda or both may be used, so long will it be impossible to guard against green fog." I find it quite possible to develope plates prone to fog by treating them in accordance with the theory advocated. If I develope with pyro. and ammonio-bromide I use pyro. kept by sulphite of ammonia, as before described; but when pyro. and carbonate of soda are employed I then use pyro. kept by means of sulphurous acid, as shown in the formula. But sulphite of soda may be substituted, and, on the whole, it is perhaps better, because the salt does not evaporate and has no smell.

The stock pyro. may be prepared as follows:—Dissolve one part of pyro. in (say) nine parts of sulphurous acid (strength nine per cent.); then add saturated solution of carbonate of soda gradually, until the yellow colour of the dissolved pyro. disappears. Should it be found that a larger proportion of sulphite of soda is desirable—a circumstance to be determined by the energy of development and colour of the image—sulphurous acid may be added to the stock solution of carbonate of soda and bichromate of potash. The proportions of the developer must, of course, be adjusted to the particular requirements of the plates used—one make or brand, perhaps, needing a larger, another a smaller, proportion of alkali.

I find for the majority of plates that four parts of a saturated solution of carbonate of soda, instead of six, as indicated in the formula, is sufficient, unless a full dose of sulphurous acid be deemed expedient. W. Hanson.

THE PRODUCTION OF LANTERN TRANSPARENCIES.

[A communication to the Photographic Club.]

In attempting to produce a suitable transparency for the lantern, or for enlargement, the amateur must be under some difficulty as to the choice of what process to employ among the varied published formulæ for the purpose, and he may entirely overlook a process capable of yielding results at least equal, if not superior, to any other. To such I would say try the collodio-albumen process, and in order to aid his endeavour I will give such full particulars as to render success certain and failure impossible. The necessary solutions are—

Iodised collodion.
Iodised albumen.
Aceto-nitrate exciting bath.
Pyrogallic solution.
Silver developing solution.
Fixing solution.
Toning solution.

The iodised collodion may be made as follows:—

Any good soluble pyroxyline	10 grains.
Iodide of ammonium	10 ,,
Tincture of iodine	10 drops.
Alcohol, ·830	1 ounce.
Ether, ·720	1 ,,

The tincture of iodine being made by dissolving thirty grains of iodine in one ounce of alcohol, strict adherence to this formula is not needed. Any old and otherwise useless solution may be used, provided it possess sufficient tenacity to adhere firmly to the plate and bear the subsequent washing.

The iodised albumen requires more careful attention to minutiæ in its preparation, and is best made as follows:—Break any number of eggs, and, having separated the yolks, add to each eight ounces of albumen and twenty-four drops of glacial acetic acid previously diluted with one ounce of water. *Stir gently together* with a glass rod for about one minute, or until the rod when drawn up from the side of the mixing vessel fails to bring up a viscid and unmixed mass with it; then let it rest one hour to separate. This plan of mixing the albumen is important, as what we require for this process is a thin, transparent albumen totally unlike the result obtained by the "beating-up" process adopted when the material is required to coat paper for printing, as for such a purpose a viscid albumen is needed, which is useless in the collodio-albumen process.

The albumen mixture having rested one hour, when properly prepared will be found to have separated into two layers—the upper curdy, white, and glutinous, and the lower bright, clear, and limped. The upper layer is most easily removed by slightly inclining the vessel, and with one finger passed down its upper side withdraw the adherent mass in one solid lump. This, if neatly done, leaves the albumen clear and bright, with but a stray particle or so of the upper scum floating in it. If at this stage the albumen is opalescent throw it away as useless, and try again. Now strain the albumen through muslin to remove any slight white particles that may be present, and to the strained liquid add forty drops of the strongest liquor ammonia, forty-two grains of iodide of ammonium, six grains of bromide of ammonium, and your iodised albumen is complete. This will be found to keep for twelve months provided the ammonia be prevented from escaping by careful corking. I may say that I usually make sufficient in spring to last during the year.

The aceto-nitrate bath is made by dissolving one ounce of nitrate of silver in ten ounces of water, and then adding one ounce of glacial acetic acid.

The pyro. solution is three grains of pyrogallic acid to one ounce of water.

The silver developing solution is nitrate of silver five grains, citric acid five grains, and distilled water one ounce.

The fixing solution is hyposulphite of soda two ounces, water ten ounces.

The toning bath is made as follows:—

Water	10 ounces.
Hyposulphite of soda	2 ,,

Dissolve, and then add to it—

Chloride of gold	4 grains,

dissolved in one ounce of water; and, lastly, add chloride of silver, blackened in the light, sixty grains. The blackened chloride of silver, if not at hand, may be omitted, but it is certainly an improvement in the richness of tone obtained.

This forms the solution necessary, and the mode of proceeding to prepare the plates is as follows:—Coat the glass plate with the iodised collodion in the usual manner, and allow it to set until the drop that forms at the lowest corner is sufficiently dry to receive the impress of the finger; then plunge it into a vessel of cold water, and allow it to soak for about five minutes whilst other plates are being coated and immersed. Now rinse it under the tap or in another vessel of water until all greasiness is removed, and it is then ready to receive the albumen coating.

The iodised albumen requires filtering through a small pledget of sponge pressed into the neck of the funnel before being used. To apply it attach the plate to a plate-holder, pour a little of the iodised albumen at the upper edge, incline the plate so as to cause it to flow over the entire surface, and run off into the sink. A second quantity of iodised albumen is then poured on so as to cover every part, and drained off and poured on three or four times; then drain and stand up with one corner resting on three or four thicknesses of blotting-paper to drain. Dry plates thus prepared will keep for any length of time if preserved from damp and noxious vapours, and are excited when required for use by being immersed for half-a-minute in the aceto-nitrate bath, using yellow light for this purpose. It is found advisable not to exceed this time. The plate being excited, is washed thoroughly in water so as to remove all the aceto-nitrate solution from the surface, and is, after draining, set up to dry in a perfectly-dark room, box, or cupboard, and should then be closely packed to prevent access of noxious vapours, if not required for immediate use. These plates are intended for transparences to be printed by contact, and daylight is preferable to artificial light.

The exposure varies according to the density and colour of the negative, and may be from five to thirty seconds in a moderately-subdued light, or from one to five minutes to gaslight with the pressure-frame eight inches from the gas burner.

The picture may be slowly developed with a saturated solution of gallic acid and the addition of two or three drops of the silver developing solution to each ounce, or, more rapidly, by covering the entire surface of the plate with water to which a single drop of silver developing solution has been added; and, after soaking for two or three minutes, to thoroughly permeate the film, then drain closely and pour on a mixture of four drops of silver developing solution to one ounce of pyrogallic solution, and let it rest for about one minute, when, if the plate has been rightly exposed, the high lights should begin to show themselves. Again pour off and on until the details are plainly visible by the yellow reflected light, but thin and faint by transmitted light. Now pour off the developing mixture (which should still be clear and bright), and add to it half-a-drachm of the silver developing solution. Pour this mixture on and off until the required intensity is gained, which, under ordinary circumstances, takes place in about two minutes, the developing fluid being still moderately free from deposit. Should it become thick, mix fresh quantities of the pyro. and silver developing solutions.

The required intensity being gained, the plate is fixed by immersion in the fixing solution, and when thoroughly clear it is ready for toning; but prior to being toned any surface deposit must be removed by holding the plate under the tap and applying friction with a pledget of cotton wool, and the surface will be found hard enough to remain uninjured under this rough treatment.

The positive is now of a brownish-green tint, and to give it a pleasing colour it is immersed in the toning bath until it changes to a grey tint, which may take from half-an-hour to two hours. On drying it will be found to darken considerably, and, with a little practice, various tints may be produced to suit the fancy of the operator. After toning wash well and dry. The excellence of this process depends on the fact that the picture is made up of stained albumen without the slightest grain.

In most other processes for producing transparencies the formation of the picture is due to an opaque deposit on or in the film, but in the collodio-albumen process the picture is produced by a staining of the albumen; hence its superior transparency, crispness, and brightness.

In conclusion: this process has had the merit of a long trial, having been used by myself for a quarter of a century. W. Ackland.

ON THINGS IN GENERAL.

"To err is human," and picture-hangers and judges have no claim to be otherwise, though, sometimes, we hear them termed "inhuman" when the pet product of some unfortunate's brain is "skied" out of all possibility of examination. At the present Exhibition in Pall Mall, however, I am inclined to think that hangers and judges have met with fewer complaints than is commonly the case, and have managed to hit the general taste with unusual success. There are, as the necessities of the case must always bring about, some lapses in hanging, and some verdicts not popularly endorsed; but that there are fewer grumblers than usual all will admit. Having stated this much by way of commendation, I must give expression to some of my views of which praise does not form a part. I wish to know how it comes that there should be in a conspicuous position, on the line, two large opal busts which are most elaborately painted upon in monochrome, while one of the regulations of the Exhibition distinctly states that such works will not be admitted. It is an accident, perhaps; but if this rule cannot be better carried out it should be entirely expunged. This is not the first time that it has been ignored. The same thing happens on another wall, but in this instance the subject is not a portrait but a study of boats. The whole effect is obtained by unsparing use of the brush.

This sort of thing should not pass unchallenged. I do hope that in another year, if the rule should still remain in force, no one may have occasion to find fault with such glaring disregard of a very proper regulation. Perhaps the hangers were aghast at their own temerity in rejecting so large a number of photographs as they did. I believe the number of massacred innocents is on the present occasion very large. It was whispered that, at least in one instance, the verdict of the judges necessitated a diving into the cellar to bring up a frame that could not consistently with the judges' awards be left out in the cold.

History repeats itself, and such is the case with medalled pictures. The number of yachts sailing about the room was something remarkable; and, as to fair ladies, each with arm elevated to a level with their shoulders and supporting a head, I started at the *conversazione* to count them, but I found my paper was not sufficiently large to hold the marks.

If the managers of the Exhibition arrangements could only have secured the presence of the latest photographic wonder what a crowd they would have had! A sufficient number of spectators would have been drawn from the general public to have paid all expenses, I feel assured. I refer, as my readers may guess, to the photograph of the tiger attacking the buffalo, as narrated some little time ago in the *Daily Telegraph*, which devoted a leader to the incident. The story goes that some natives holding a tiger in a leash were bargained with to let him kill a buffalo, and a photographer arranged his camera within a few yards ready to seize the opportunity. The buffalo was tied to a tree, the camera placed in position, and the tiger loosed. He "went in" for that buffalo, and in the act of striking him down the spring shutter was released and the mortal operation recorded on the sensitive plate. This is all very well so far as it goes, but we are not told how the tiger was carried off again by the "party of natives" when the entertainment was over; nor, further, how the tiger—said to be photographed with his forearms literally embracing the buffalo's neck—was induced to step aside for a moment, as he must have done, if we are to believe the further account of the natives cutting the buffalo's throat to save their conscience. *Si non e vero e ben trovato!*

The papers "have much to answer for." It is only a short time since the *Evening Standard* described the exploits of an American photographer who, being denied the pleasure of photographing at his studio in New York a certain American actress, and, determined to make her sit to him, followed her to "Frisco," chartered a bathing-van, photographed her just as she emerged dripping from the water, and then used the photograph to compel her to sit for a "proper" photograph, which, of course, she did. Cowhides are not exhausted yet in America, if we are to believe what we read, and surely cowhides by the dozen would have been extended towards a brute who disgraced himself in such a manner. Americans are chivalrous to their women, and the life of a man who behaved in such a manner would not be worth a day's purchase. Flatly, I do not believe the story.

Photography on its part has much to answer for. On the one hand I read Dr. Brudenell Carter's remarks on the effect upon the eye of close occupations in a dull light—such, for example, as retouching and dark-room work must necessarily include. On the other hand, I read Mr. E. Cocking's complaint of the effect of ammoniacal fumes upon his physical organisation. Not only do they cause him temporary discomfort—they also induce catarrh in the nose, deafness, and general nervousness to such an extent that he was induced to ask if anyone could suggest a remedy. Mr. Ashman suggested something akin to the old "aromatic vinegar." Mr. Cocking is not the only sufferer. Another gentleman has been taking up his pen upon the same topic, and he also suffered frequently from severe attacks of influenza in the head and chest. His remedy is the use of a snuff-box at intervals during dark-room work. Surely photography is not going to resuscitate this habit. Many photographers indulge in the pernicious habit of smoking; if snuff-taking also is to be adopted, what unpleasant people they will become! Yellow noses and purple fingers! Free Lance.

TRANSPARENCIES.

[A communication to the Newcastle-on-Tyne and Northern Counties' Photographic Association.]

The subject of transparency making is a very large one, and to treat it thoroughly—that is, by a description of all the various known processes—would take up not one evening, but three or four. However, I think, we may limit ourselves to two or three processes, and consider—1st, the carbon method; 2nd, the collodion, wet and dry; and, 3rd, the gelatino-chloride.

Those who have negatives small enough will find the carbon process by no means difficult. Briefly, a special transparency tissue is sensitised with bichromate of potash in the usual way; it is then squeegeed upon a piece of very clean collodionised glass. When dry (which process must take place in the dark) it is peeled off, cut into the proper sizes, and exposed under the negative. The usual circular, dome-shaped, cushion, or square masks, serve very well for the "safe edge" always used in carbon printing. The exposure is rather longer than that given for prints. The exposed tissue is then immersed in water until it softens, squeegeed on to a piece of very clear and clean glass, and developed as for prints. Plenty of time should be taken over this operation, and the water used should not be too hot. Carbon transparencies may be intensified by pouring over the still wet film a solution of pyrogallic acid, followed, after slight washing, by a solution of sulphate of iron.

Wet collodion I have not tried, but I am told that, provided the "bath" be in good condition and ordinary care used, there is nothing to prevent anyone from achieving success in this direction. A "bath" may be purchased ready made and in the best condition. The collodion rather old and high coloured is preferred, as it works cleaner. Mr. Hedley Robinson, whose paper on *Transparencies* will be remembered by most of us, recommends that the "bath" be decidedly acid, and suggests as a developer a solution containing—

Ammonio sulphate of iron	15 grains.
Glacial acetic acid	½ drachm.
Lump sugar	15 grains.
Water	1 ounce.

The older the solution the better. Mr. Robinson also recommends as a toning solution—

Ferridcyanide of potassium	2 grains,
Nitrate of uranium	2 ,,
Chloride of gold	$\frac{1}{10}$th grain,
Water	1 ounce,

which, he says, gives a colour nearly approaching that of a Woodbury slide.

Dry collodion plates will probably be used by some of us. In this case, doubtless, the Beechey emulsion plates will be generally preferred. Their advantages have been summed up by Mr. Robinson as follows:—"Considerable latitude of exposure, good colour of image, perfect control of density, and comfort in developing. They bear forcing with ammonia, and are not easily fogged." The emulsion can be bought ready made, all that is then necessary being to coat properly-cleaned and prepared glass plates.

Good results have been obtained on gelatino-bromide plates. I have one or two samples of work on ordinary gelatine plates, but there is great risk of veil and fog. The ferrous oxalate developer gives about the best results, and the proportion of oxalate of potash solution to that of iron sulphate should be increased slightly, using bromide.

We are now able to get gelatino-chloride plates, and with these we can do all that we require without much difficulty. They are rather slow. If printing by contact five minutes, twelve inches distant from an ordinary fishtail gas jet is not more than enough for a negative of ordinary density. I will show later on a few negatives of varying density, and exhibit transparencies taken from these on gelatino-chloride plates. This will give some idea of the exposure requisite. The developer I succeed best with is one containing carbonate of ammonia, citric acid, and a solution of sulphate of iron. This is Cowan's second formula. The plate should be fully exposed, and the development must not be prolonged. A variety of tones are produced by varying the developers, three of which are given.

I find them very slow when taking transparencies through the camera in daylight, ten minutes being the shortest exposure with a rather thin negative. This was, however, in very dull weather. The lens used was a six-inch Ross' symmetrical, full aperture, the transparency being made from a whole-plate negative. Care must be taken in mixing the developer. The iron solution should always be *added* to the potash or ammonia solution. I use as a clearing solution a mixture containing one ounce of alum and one ounce of citric acid to one pint of water. The developer may be used for several plates, and the same amount of density may be had with the last plate as the first.

J. Pike.

THE PHOTOGRAPHIC PROGRESS OF THE CURRENT YEAR.

[A communication to the Glasgow and West of Scotland Amateur Photographic Association.]

By way of preface to the paper which I now have the pleasure of bringing before the Association, I should perhaps state that those members who follow the course of photographic events, as detailed from time to time in the various journals, will find nothing very new or original in the facts communicated. There are, however, doubtless many of our members who are not quite so well posted up, and to those the different matters touched upon may not be without acceptance.

I do not think that this year, so far as it has gone, can be said to have produced any great photographic discovery. It is more a working up of details that has been going on. Perhaps the most important fact to notice first is Dr. Vogel's method of reproducing colours in their true colour intensity. We all know how, in photographing a blue object, the print from the resulting negative brings that colour out as if it were white in the original, while yellow and red come out more or less dark. A photograph of an oil painting, for instance, does not represent the colours in what may be called their relative tone as seen by the human eye. The addition of a dye to a sensitised film to diminish the action of the blue and violet rays, and increase that of the red and yellow, is by no means a new one. Dr. Vogel himself was working in this direction as far back as 1873. It was only this spring, however, that details which would enable anyone to work out the process for himself were published by Dr. Vogel. Translations of Dr. Vogel's original papers are to be found in The British Journal of Photography for May 30th and June 6th. The dye used by Dr. Vogel for collodion plates is eosine, and for gelatine plates azaline. Through the kindness of Mr. Bolas I am enabled to show specimens of the work done by these plates; and the fact that they have been prepared by Dr. Vogel himself lends an additional interest. The rather formidable term "isochromatic" has been applied to plates treated with the before-mentioned or similar dyes, and already they are an article of commerce.

Passing from the work done by a continental investigator, it would have seemed an anomaly had we had nothing put forward by Captain Abney. He proves from experimental evidence that heat causes greater sensitiveness in a gelatine plate, while cold diminishes it. Should any of our members be contemplating a photographic tour on the continent, or any country where dust is prevalent, he would do well to avail himself of a "wrinkle" of Captain Abney's, namely, to rub the inside and grooves of the dark slide with a glycerine rag, which prevents the fine dust from settling on the plate. A series of six lectures, on *Photography Considered as the Work of Radiation*, was delivered at the Royal Institution last spring by Captain Abney, and, as they have been reported in our two leading journals, all of our members who are interested in the scientific aspect of photography could not do better than read what is given of these lectures. Another very interesting series of lectures was delivered early in the year, under the auspices of the Society of Arts, by Mr. Bolas, the subject being *Recent Improvements in Photomechanical Printing Methods.* The journals do not give these lectures so full as they might have done, but they were to have been printed *in extenso* in the *Journal of the Society of Arts.* However, up to the present they have not made their appearance.

It may interest members to know that a very successful method of photo-engraving is being carried on in Glasgow at the present moment. The process is one devised by an Austrian, Herr Klick, who spent several years in perfecting it. Messrs. Annan, of this town have acquired the right to work the process in this country, and I am indebted to Mr. J. Craig Annan for the numerous specimens shown this evening. I may mention, on the assurance of Mr. Annan, that in no single instance has the tool of an engraver touched the plates from which these prints have been produced. The process is at present a secret one. Under an arrangement with Messrs. Annan, Messrs. Maclure and Macdonald are now producing work done by Herr Klick's method. It says a good deal for the enterprise of our Glasgow men that they have been the first to secure a process giving such excellent results.

Passing from photo-engraving: let us consider for a few minutes what has been exercising a good number of minds these last few years, namely, the production of printing photo.-blocks to be used in letterpress printing. I think the day is not very far off now when our illustrated magazines will avail themselves of some of the processes that have been lately brought forward. The conversion of the gradations of an ordinary photograph into a black and white grain or stipple, with the lights and shades of the same intensity as the original, is perhaps more a mechanical problem than a photographic one. I would especially call your attention to two processes that have been quite recently introduced, namely, Meisenbach's, of Munich, and Ives, of Philadelphia. Specimens of printing by these respective processes are here for your inspection. Judging from the results obtained it seems to me that the days of the wood engraver are considerably on the wane, if they be not about numbered. The starting-point of Ives' original method is a Woodbury relief. This is covered with ink, and a peculiarly-prepared paper is pressed against it. The higher portions of the relief crush down the grain of the paper forming the blacks of the picture, while the gradations—the half-tones of the relief—are rendered by this crushing being not so complete. The print thus obtained can either be photographed or used as a transfer. Ives' latest improvement is to take a plaster cast from the relief picture, and by means of an elastic stamp impress an ink stipple on its surface. Where the relief is highest and the pressure greatest there the ink spots unite and form the blacks, while in the deeper portions of the cast the spots are exceedingly minute. The merit of the invention lies in the application of the elastic stamp.

Let us discuss for a little what has been said and done regarding developers during the period we are considering—a subject that cannot fail to be of interest to us amateurs. Every one has a certain pet formula of his own, and from the enormous number of formulæ published from time to time it would be no invidious task were the amateur to tackle each one in succession. Hence, perhaps, the wisest plan, after all, is, after having a formula giving good results, to stick to it. There is no doubt, however, but that the soda developer has been coming to the front. The negatives produced have a green, unhealthy hue, which would prejudice many against its use, accustomed, as most of us are, to the blacks of the ammonia pyro. developer. The prints are, however, all that can be desired. One of our members who uses this developer regularly has given me some negatives and prints, which will be examined with interest. The formula to be recommended is that of Mr. Bassano, given by him in The British Journal of Photography of May 16th:—

Pyro.	4 grains.
Sodic sulphite	30 ,,
Water	1 ounce.
Anhydrous sodium carbonate	40 grains.
Water	1 ounce.

For every ounce of pyro. solution one drachm of soda solution to be added—best, in my experience, in two portions. The negatives have very much the appearance of the old collodion plate. There are one or two negatives on the table, which have been developed according to the above formula. I developed a good number of negatives this summer with the developer in question, and, with the exception of some plates lost through frilling during the hot weather, I had no reason to be dissatisfied with it. I question if at the time the plates I refer to were developed they would have stood the ordinary ammonia developer.

Solutions in the room showed a temperature of 70° Fahr., and the water from the tap a constant temperature of 60° Fahr. The doing away with the odour of ammonia in the developing-room is certainly an improvement, while a solution of sodium carbonate is much more reliable as to its original strength being retained than a solution of the very volatile alkali ammonia. One thing should be borne in mind when using sodium sulphite: that it is by no means a stable salt in solution. Fresh solutions are indispensable in order to obtain the best results.

Here I should like to bring before your notice some remarkable facts connected with this salt, which the Editors of The British Journal of Photography laid before their readers last April. From experiments they then made it was found that development of negatives could be made by using pyro. and sulphite of soda, ammonia being entirely dispensed with. The development was a protracted one, fifteen to twenty minutes being required, but one thing was distinctly proved by the experiments, namely, that the sulphite acted as no restrainer or retarder of development, as those using this salt had been wont to allege. It is very easy to see how this character had been given to it. In the original formula, where sulphite was used—a formula due to Mr. H. B. Berkeley—citric acid was recommended to be added till the solution showed an acid reaction, sodium sulphite being by constitution a salt showing an alkaline reaction. The result of this was the formation of a definite quantity of citrate of soda—

a substance known to possess strong restraining properties. Another fact brought out in the experiments referred to was that the merest trace of a bromide showed the development to a very great extent. Why this should be I am at a loss to understand. It is clear, therefore, from these experiments that formulæ in which sodium sulphite is employed should have neither citric acid nor a bromide present. Bassano's formula meets this requirement.

Regarding the potash developer, where potassic carbonate replaces sodium carbonate: I am informed by one of our members who has experimented with it that frilling can scarcely be prevented. This is hardly to be wondered at, seeing potassic carbonate is much more strongly alkaline in its character than the corresponding sodium salt. A mixture of the carbonate has also been recommended to be used. I do not know whether any of our members have tried it. I fail to see wherein a combination of these two alkalies should have anything special in itself for it to be recommended.

Hydrokinone as a developer will never, I think, be adopted by professional photographers to any large extent, its action being slow as compared with the universally-used pyro. This fault, if fault it be, is one that does not affect the amateur in the same manner as the professional photographer. Inasmuch as hydrogen does its work without requiring the presence of a restraining bromide it is, *par excellence*, the developer. Mr. Goodwin, who developes largely with hydrokinene, informs me that for some time he was troubled with thin images. This he overcame by giving a second application of fresh hydrokinone when the details were out. With the exception of enlargement work ferrous oxalate does not seem to be much employed, either by professionals or amateurs, in this country. It is, however, largely employed on the continent, where the conditions of light are much more uniform than with us. The ferrous oxalate does not allow the same latitude of exposure. The inky black tones of the image developed by oxalate are all that can be desired.

A word or two regarding our old friend "hypo.:" while developers increase and multiply it remains the photographer's fixing agent. One thing is certain: it will be difficult to find a substance that would act better than hypo. and at such a low rate of cost. The hyposulphite of the photographer, however, is not the hyposulphite of the chemist, and already in several treatises on photography we find its true chemical name given to it, namely, "sodium thiosulphate." It is, therefore, not at all improbable that instead of the familiar hypo. we shall have to accustom ourselves to the use of the term "thio," that being, I take it, the natural abbreviation of "thiosulphate."

In the month of July, in the short article on *Mercurial Intensification*, THE BRITISH JOURNAL OF PHOTOGRAPHY makes reference to a suggestion received from one of its correspondents regarding the employment of a solution of sodium sulphite to the bleached image instead of ammonia. This method of intensifying I have tried on several negatives, and can testify to its excellent character. There is this difference between it and the usual formula advocated—that there are no insoluble products formed in the film; hence the washing to eliminate the mercuric chloride that may happen to remain in the film does not require to be of the usual thorough character. The plate for that part may be taken out of the mercuric chloride solution and plunged directly into the sodium sulphite solution without staining the film. I have brought the necessary solutions so that members may judge for themselves the effect of this intensifier on a thin negative. I should mention that a very convenient strength for the solution of the sulphite is one of ten per cent. It may seem superfluous to state the fact—but for the benefit of our less-experienced members it may be as well to do so—that the complete removal of the hypo. is necessary before commencing this or any other method of intensification, otherwise sulphides are formed with the film and the picture hopelessly stained.

Coming, now, to the counterpart of intensification—that of reduction: the method for reducing an over-dense negative that has found most favour is one devised by Mr. E. Howard Farmer. Two solutions are required—a five-per-cent. solution of ferricyanide of potassium, a red prussiate of potash, and a five-per-cent. solution of hyposulphite of soda. The negative to be reduced is immersed in the hypo., to which a few drops of the ferricyanide solution have been added. Reduction then takes very evenly and gradually, and when carried to the extent desired all that is necessary is to take the plate out of the solution and finish up with a good washing. I purpose demonstrating the action of this very perfect reducer before you. I trust, therefore, that you have, as requested in the billet announcing this evening's meeting, brought forward a goodly number of dense negatives for me to experiment upon. I have brought some over-printed prints, and you will find that these can be made quite presentable after an immersion more or less prolonged in this reducing solution.

W. LANG, Jun.

OPINIONS OF THE LONDON PRESS ON THE PHOTOGRAPHIC EXHIBITION.

THE popular notion of photography is still very generally confined to a predominant sense of its exactness and truth. The photograph was for long accepted as something, beyond all dispute, literal. That a photograph should contain much that is grotesque, or appertaining to caricature, and therefore essentially unliteral, was never a popular view. Truth and photography were almost convertible terms. This view of photography was natural enough in the infancy of the art, and when the method of Daguerre was being displaced by one more perfect, and the future of photography was not less brilliant because it was absolutely undefined. Now that the dry plate, with its intransient developing power, has driven from the field the old "wet" process, photography has become more of an art, even while the method of production is more than ever mechanical. It is now judged from another standpoint than formerly, and we hear less of its truth and literal force than of the artistic qualities—the light and shade and tone values. This combined increase in the perfection of the mechanical process and in sound views of its functions as an art is a singular feature in the history of photography. It would seem that the very facility of production, the perfection to which chemists and mechanists have raised it, has actually awakened the æsthetic impulse, instead of resulting in a dead level of execution and the discouragement of artistic effort.

The exhibition of the Photographic Society of Great Britain, now open in Pall Mall East, is full of interest and suggestion. It is not altogether so striking and representative as the last; it does not include any pre-eminent examples, nor, in the collection of mechanical apparatus, new special features of novelty or invention, but it marks a distinct advance. There is still far too much work that is merely skilful, or experimental, or expressive of dexterity and the feats of the admirer of instantaneous effects; yet there are several exhibitors whose ideals are worthy, even though their achievements are not altogether successful. It is satisfactory to note that, despite the genuine merits of much amateur photography, there is a great gulf fixed between the artist and the man who is content to take a view and give a mere literal transcript. The facility of development does not tend to confuse their diverse aims in one common result. The variety of quality in the Exhibition is one of its chief merits. There is, of course, a fair supply of landscape views, woodlands, and river scenery that are full of the falsity of photographic realism, where the literal quality is an exaggeration of nature, where atmosphere does not exist, and the delicate *nuances* of tone are absolutely lost. In such the excessive detail is brought out with a precision that some photographers admire. There is in some instances a foreground admirably delineated and a distance, but no intermediary tones, no gradations, no true harmonising relations. There is no light and shade, but a uniform distribution of black and white touches, hard and speckly in effect, and far more removed from nature than a bad woodcut. Beyond noting its presence such work need not detain us.

Foremost in technical merit are M. Vittorio Sella's *Views in Switzerland*—four studies of the Lyskamm, the Märjelen See, Mont Blanc, and Monte Rosa. These beautiful examples of science and skill reproduce with exquisite purity of tone and atmosphere the visionary aspect of the Alps, the pure, serene, and boundless vacuity of the scene. The texture of the great sweep of the glacier, the snowy boulders in its sinuous course, the lone shadows and desolate aiguilles are rendered with admirable atmospheric truth. They do not suggest geological studies, nor have they the impressiveness of clouds and storms—effects familiar enough in larger photographs. The impression they convey is more rare, because less conventional. In another class of nature studies that evince the artist's powers of selection are two *Winter Scenes*, by Mr. G. Renwick. Of these No. 167 is a very tender and subtle realisation of hoar-frost and mist. Among works that display a deliberate pictorial intention, that are animated by a *motif*, and are more or less studied compositions, Mr. H. P. Robinson's series of landscapes and figures is prominent. In some of these the effort to compose is transparent, the figures are self-conscious, and do not represent the artless rustics innocent of their picturesque attraction. The difficulty of introducing figures free from conscious pose is well overcome in other subjects by Mr. Robinson. In *He Loves Me—He Loves Me Not* and in *The Cuckoo* the *motif* is very prettily illustrated. In *He Never Told His Love* the group of figures is excellently disposed, and the sentiment is displayed with much force and humour. Another admirable study is *The Gillyflower*, where a girl, in a graceful, natural attitude, is studying a flower with a child on her arm. Allied in aim to these, though distinct in technical quality, are some vivid and pleasing studies by Mr. Lyddell Sawyer. Specimens of platinotype prints are not very numerous; but these by Mr. H. B. Berkeley and Mr. W. Willis, Jun., are of rare excellence, and suggest a great future for this valuable and easily-manipulated process. Mr. Berkeley's *The Thames at Pangbourne* and Mr. Willis's *New Wareham* are two vignettes of remarkable beauty and finish. In the former the effect of dry point is striking. The more mechanical form of photo-engraving is fully exhibited by Messrs. T. and R. Annan, and also in some book illustrations printed in platinotype. The autotype and Woodburytype methods are shown in some fine enlargements from negatives. The enlargement from a negative, by Mr. J. G. Sinclair, *Cattle at Noontide, Ulswater*, executed by the Autotype Company, is a very successful example.

In portraiture Mr. H. S. Mendelssohn shows some refined and highly-finished examples, of which the *Mrs. Duppa* and the beautiful platinotype *The Lady Brooke* are of high merit. Portraiture, in its more conventional aspect, is well represented by Mr. Lafayette, the London Stereoscopic Company, the Autotype Company, and others, though there are few portraits in the exhibition that call for remark. Mr. Gillard's clever character-portrait, *The Miser*, is very expressive of the powers of photography. *A Siesta*, by Mr. Valentine Blanchard, is one of the most distinctly-artistic conceptions in the gallery; the sentiment of lassitude and repose is most happily rendered, and the composition is graceful and poetic. It is impossible to speak in high commendation of the so-called instantaneous photography. The transcripts of sea, whether raging or at rest, are more curious than felicitous, and there is nothing comparable to the really impressive enlargement exhibited lately by the Autotype Company. Mr. C. Grassin shows an *Express Train*, from a plate exposed $\frac{1}{350}$th of a second, which should move no one to admiration; and Mr. W. P. Marsh has a *Series of Instantaneous Sea Studies*, in which the phenomena of breaking and receding waves are curiously caricatured. This must needs be, seeing that the eye cannot perceive the whole phenomena and receive the impression with the swiftness and completeness with which it is fixed in the camera. Among other attractions in the exhibition, which we have only space to indicate, are Mr. Henry Stevens's *Studies of Flowers*, Mr. R. H. Lord's series of the performers in *The Birds* at Cambridge, Mr. Andrew Pringle's interesting studies in the Yosemite and elsewhere, the Alpine views of Mr. W. F. Donkin, the series of yachts under canvas by Messrs. G. West and Son, and some excellent scenes on the Cherwell by Captain Abney, R.E.—*Saturday Review*.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 13,906.—"Photographic Camera." J. V. ROBINSON.—*Dated October* 21, 1884.

IMPROVED METHOD OF, AND APPARATUS FOR, TAKING PHOTOGRAPHS BY ARTIFICIAL LIGHT.

By EUGEN HIMLY, Berlin, Germany.

FOR producing good photographs it is necessary to have the object to be photographed in a light in which it is most distinctly visible and most usually seen.

This light is, as is well known, best afforded by diffused daylight, which may either be afforded naturally, giving more light on the one side than the other, according to the time of day chosen, or artificially by means of screens, blinds, mirrors, and the like, so as to illuminate the object from all sides to a moderately varying extent.

In the same manner that it is necessary to prevent the direct or regularly reflected rays of the sun from striking the object to be illuminated (unless special effects are desired to be produced), it is also requisite to a still greater degree to prevent the direct or regularly reflected rays of light from a powerful artificial source of light from striking the object to be photographed.

For obtaining the irregular reflection of rays from powerful sources of light, so as to produce an artifically diffused light analogous to that of daylight, it has hitherto been customary to employ as the most perfect means attainable intensely illuminated white surfaces, either plane or concave, not acting as mirrors, which reflect the rays divergently in the general direction of the object to be illuminated. These illuminated surfaces can also consist in dulled sheets of glass, through which the rays from a number of sources of light are caused to pass divergently.

The diffusion thus obtained is, however, but little analogous to that of daylight, as the direction of the rays still remains more or less one-sided, and consequently the photographic pictures obtained by these means have easily-discernible strongly one-sided illumination.

Another usual method of a comparatively perfect nature for obtaining an illumination analogous to that of daylight consists in the use of several sources of light, shaded by opal globes arranged round the object to be photographed, which, together with the photographic apparatus, is mounted on a revolving turn-table.

Independently of the question of the expensive nature of this arrangement, requiring specially careful attention to the several sources of light, it is not free from imperfections of illumination, due to the fact that in addition to the rays that are irregularly reflected in the desired manner by the small surfaces, produced by the clouding of a glass globe, many rays pass through the glass which, in consequence of the varying absorbing or refracting powers of the glass, and also in consequence of the want of parallelism of the glass surfaces, produce light and dark spots on the object.

My present invention relates to a method of and appliances for producing artificial illumination as analogous as possible to the action of daylight, consisting mainly in the employment of a mechanically-moved illuminating screen, which reflects the rays from one or more powerful sources of light irregularly in the direction of the object to be photographed, but which entirely diverts the direct or regularly reflected rays of such sources of light from such object, the movement of the said screen being effected during the whole time of exposure either through a certain arc round the stationary object to be photographed, or through a straight line past the same. By this method I obtain, firstly, by means of the construction of the illuminating screen an illuminating effect analogous to the action of diffused daylight, and free from shadows or excessively strong shadows; and, secondly, owing to the quicker or slower advancing motion of the screen regulated according to requirements, I obtain a moderate lateral gradation of the illumination of the object similar to that of daylight. In particular, I am enabled by this method to prevent the too powerful illumination of one side of the object, while another side has to be exposed for a longer time in order to develope deeper shadows.

The appliances which I employ for carrying out my said process consist, firstly, in the illuminating screen, and, secondly, in the mode of applying and actuating the same. (We omit the drawings.) The illuminating screen forms a large semicircular niche with domed top, which is closed at bottom by a semicircular reflecting surface adjustable on a horizontal axis, and in which two separate lateral niches are formed by means of vertical dwarf walls, such niches containing the two powerful sources of artificial light.

Consequently, direct rays or rays reflected from the mirrors do not pass outwards, but only on to the surfaces of the illuminating screen, as also upon the more or less inclined adjustable bottom surface, these surfaces being throughout of a dull white colour so that they can only reflect the rays irregularly.

The exclusively diffused rays of light passing from the illuminating screen consequently surround more or less the object to be illuminated according to its distance from the screen, while there is no central less-illuminated core in such rays of light, such as is produced in illuminating screens of present construction with a single source of light in the axis thereof by the use of a shield or disc for intercepting the direct rays of light, and which causes difficulties in the choice of position of the object to be illuminated.

The number of sources of light employed in combination with my illuminating screen is not limited; there may be only one, or two, or more, arranged in an analogous manner. The adjustment of the bottom surface on a horizontal axis has for its object to distribute the light to a greater or less degree to the lower parts of the object to be illuminated.

The object to be illuminated is situated near to and underneath the centre of motion of the crane, so that the illuminating screen is caused to move in a circular path round the object by means of any suitable mechanism. Or, according to the arrangement, a semicircular rail is suspended from the ceiling of the studio, on which rail the screen is made to run by means of rollers being moved to and fro by cords. The path in which the screen is caused to travel may be of a variously-curved or more or less straight or inclined form.

For particular purposes I also employ an arrangement by which the illuminating screen, while moving along its path, also has a motion round a vertical axis imparted to it, so that it may maintain a parallel position at every point of its path.

I also in some cases employ as an auxillary to the above-described method and appliances a lateral reflecting screen of a conical or concave form, mounted so as to turn on a vertical axis, which is employed to assist the action of the travelling screen in causing that side of the object on which such lateral screen is situated to be more strongly illuminated. As only diffused rays fall upon this screen, it may consist either of actual mirror or of a deadened surface for irregular reflection.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—

1. The method of illuminating photographic objects during the exposal by means of irregularly reflected rays of light from one or more moving sources of artifical light, substantially as herein described.

2. The construction of the illuminating screen such as shown in the drawings, operating in combination with one or more sources of light, arranged behind lateral screens, whose direct rays of light, or whose rays regularly reflected from mirrors, can only pass by irregular reflection from the illuminating screen to the object to be illuminated; also, in combination with the said screen the use of a flap with irregular reflecting surface, adjustable on pivots and forming the bottom surface of the screen.

3. The use of a rectilinear, or semicircle, or otherwise curved path or rail upon which the illuminating screen is moved by mechanical means during the time of exposure.

4. The use of a crane or swinging arm for imparting the required motion to the illuminating screen.

5. The use, in combination with the method of illuminating set forth in the first claim, of a stationary adjustable lateral auxiliary screen, having a perfectly or irregulary-reflecting surface, and which is caused to reflect more or less of the irregularly-reflected rays of the travelling illuminating screen according to the momentary position occupied by the latter.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
October 28	Bolton Club	The Studio, Chancery-lane.
" 29	Photographic Club	Anderton's Hotel, Fleet-street.
" 30	London and Provincial	Masons' Hall, Basinghall-street.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AT the meeting of this Association, held on Thursday, the 16th instant, the chair was occupied by Mr. A. Mackie.

Dr. Schleussner, of Frankfort-on-the-Maine, was introduced to the meeting, and it being understood that he was engaged in the manufacture of gelatino-bromide plates, some questions were asked of him relating to the employment of these plates in Germany. In reply to a question as to whether Warnerke's sensitometer was adopted as a standard for speed on the continent, and, if so, what was the register number which plates were expected to show?—

Dr. SCHLEUSSNER replied that it was used, and that the number registered by the plates that he manufactured was 22. He further stated that that was the number given with the ferrous oxalate developer, which was almost exclusively used in Germany. With pyro. developer there was less sensitiveness, but for the colour given to the negative he preferred pyro., which gave an image more resembling that of collodion. In making oxalate developer he used seventeen parts of sulphate of iron and forty-five parts of oxalate of potash.

Mr. A. L. HENDERSON said, with reference to the speed of emulsion plates, that if gelatine were added in large quantity to emulsion without first neutralising or washing away the acid that most gelatines contained the emulsion was very much slower.

Dr. SCHLEUSSNER, in answer to further questions, said that he did not use iodide in his emulsion, nor was it employed in the manufacture of Monckhoven's plates. He also stated that it was no use to compare two emulsions with different sensitometers, as these were made of varying strength, and one would register a higher number than another.

Mr. BELL'S experience with sensitometers was similar to that of Dr. Schleussner's.

Mr. HENDERSON said that he had been experimenting in a new direction, which he believed would be a very useful one, with the manufacture of emulsion. The idea was to use as little water as possible, and to substitute the greater part of this solvent by alcohol. So little water was employed that the gelatine would only dissolve when hot, and on cooling would separate from the solution, taking the water with it. The alcohol could then be poured off and used again in the manufacture of a subsequent batch. A great portion of the soluble salts, the nitrates, would be found crystallised on the top of the cake of precipitated emulsion, from which it could be washed off, and the remainder was removed by washing in the usual way. The actual formula he had employed was as follows:—180 grains of bromide of potassium and five grains of gelatine were dissolved in half-an-ounce of water. This was heated and made up with hot alcohol to five ounces. 240 grains of nitrate of silver were also dissolved in half-an-ounce of water and made up to five ounces with alcohol. Half the silver was converted into ammonio-nitrate. The solutions were then mixed and placed in water at 120° Fahr. Half-an-ounce of dry gelatine was next stirred in. For a little time the flakes were crisp and brittle, but then they dissolved and the solution was allowed to cool, when the emulsion would be found to be precipitated as mentioned.

Mr. A. Cowan had been experimenting in another direction with emulsion by the boiling method. He had found that if an emulsion were made slightly acid during mixture it might be neutralised with carbonate of lime, and then, although neutral, it might be boiled for a long time without fogging. He had gone up to three hours' boiling without having a trace of fog.

Mr. G. T. Grammer was elected a member of the Association.

MANCHESTER PHOTOGRAPHIC SOCIETY.

The first meeting for the present session of this Society was held in the Manchester Technical Schools on Thursday, the 11th ult.,—Mr. John S. Pollitt, President, in the chair. The minutes of the previous meeting were read and confirmed.

The Chairman made reference to a subject that had been under discussion at the Council meeting, namely, the scarcity of papers that were being read by members. In response to his call Mr. A. Brothers, F.R.A.S., volunteered a paper, and gave a practical demonstration of the daguerreotype process.

Mr. Alan Garnett exhibited a charming collection of small landscapes taken during a recent tour in Normandy, and showed a mask which he introduced in his camera, enabling him to make four exposures on one plate; also a series of four or five prints, forming a panoramic picture, in which the joinings were scarcely perceptible.

Mr. Wilson exhibited some prints from negatives, taken at the outdoor meetings of the Society.

Mr. S. D. McKellen showed a fine series of photographs taken on the occasion of the Society's visit to Kirkstall Abbey.

The Hon. Secretary exhibited a new lantern carrier, made by Mr. Steward, of London, by which slides of various sizes were automatically registered.

The meeting was brought to a close by a lantern exhibition, by Mr. J. A. Chadwick, consisting of Parisian and other views.

The annual meeting of this Society took place in the rooms of the Society, at the Manchester Technical Schools, on Thursday, the 9th instant,—Mr. John S. Pollitt, President, in the chair. The minutes of the previous meeting were read and confirmed.

The Hon. Secretary read the following

Annual Report.

This being the twenty-ninth annual meeting of the Society, your Council have to congratulate you upon the very successful year we have just passed through. It is satisfactory to be in a position to state that, notwithstanding the heavy calls which have been made upon our exchequer this year by the Exhibition in December last, our funds have increased beyond all expectations, our present position being better than has ever been known since the Society first came into existence.

Although we have had 32 new members added to the list, we have to record several resignations, our numerical strength being now 130 against 113 last year. It is satisfactory to find that the average attendance at our monthly meetings has increased to 59 against 51 last year. We are, however, sorry we cannot boast of the number of papers read during the present session; but it is with pleasure we reflect upon the general interest which has pervaded our gatherings.

Undoubtedly, the principal event of the year was the exhibition in December last, being chiefly the work of our own members, together with the choicest work of the leading photographers in Great Britain, and supplemented by a unique collection of photographic work collected from all parts of the world by our esteemed member, Mr. Charles Harris, F.R.G.S., who also contributed to the interest of the exhibition by a short recital of his experiences of the photographic brethren in America, India, China, and Japan.

Not the least interesting event of the year was the presentation of a testimonial to the Hon. Secretary, Mr. W. I. Chadwick. That gentleman having filled the office for the past seven or eight years with so much ability and tact, besides having some time previously matured and carried into effect a scheme for placing the finances of the Society on a much sounder basis than had ever before existed, it was thought by many of the members that some substantial recognition of such long-continued, active, and purely voluntary services should be made. It was not intended, however, from the first that the funds of the Society should be drained upon for the purpose; nor was it intended, beyond the mere sending out of circulars to members apprising them of what was proposed to be done, that any solicitations for subscriptions should be made or any canvassing resorted to. The matter was entertained in a spirit of great liberality by a large proportion of the members, and the testimonial took the form of a very handsome gold watch and guard, which was presented by the President, on behalf of the subscribers, on the occasion of the *soirée* by which the December exhibition was inaugurated. The ceremony took place in the presence of a large and select company of visitors, and Mr. Chadwick, labouring under some emotion, made a graceful acknowledgment of the gift.

On the same occasion our valued friend and old member, Mr. John Holding, artist, presented the Hon. Secretary, on his own account, with a beautifully-executed water-colour drawing from his own pencil.

We must not omit mention of our old member Mr. W. B. Woodbury, who came down from London specially to exhibit to us and demonstrate the working details and manipulation of the stannotype process.

We have also to record amongst the papers read one from the President, *On The Attitude of Our Society, Past, Present, and Future*, and another from the Hon. Secretary, being a series of suggestions of subjects that might be advantageously taken up by most of the members for research and demonstration at our meetings.

Mr. Rishton read an interesting paper *On Swing-Backs and Swing-Fronts*, illustrating his remarks by an ingenious model of a camera in section, which he afterwards presented to the Society.

The Hon. Secretary gave another short communication *On Landscape Lenses and Diaphragms*, with a few elementary remarks for the benefit of the younger members of the Society.

Mr. Greatorex gave an interesting and highly-amusing paper, entitled *A Summer Holiday*, consisting of notes taken during a recent tour in Switzerland.

Mr. Edwards followed by a paper advocating the importance of rising-fronts, and exhibited several negatives intended to demonstrate the superiority of rising-fronts over swing-backs.

The President dealt very ably with the same subject in another communication, and conclusively proved to the members that the rising-front was a more valuable addition to a camera than a swing-back.

Besides the above, many other subjects of interest have been brought before the members, including a demonstration of the manipulation of gelatino-bromide paper, by Mr. McKellen.

The lantern has upon more than one occasion been successfully handled by the Hon. Secretary and his brother, Mr. J. A. Chadwick, and generally the meetings have been well supplied with novelties in apparatus and members' work, amongst which may be mentioned a series of large pictures, by Mr. McKellen, and some charming smaller studies by Mr. Alan Garnett.

Mr. A. Brothers, F.R.A.S., also exhibited some fine microphotographs, taken by the aid of the electric light.

Before closing this retrospective survey of the past year's proceedings, we must acknowledge the unprecedented success of our outdoor meetings, which have been with few exceptions well attended and enjoyed by all present.

And now, in resigning our respective offices, we again congratulate you on the satisfactory condition of the Society—not only in its financial status, but also upon the harmonious feeling which has characterised the whole proceedings.

Mr. Wm. Watts said he thought a very important event had been omitted from the report, namely, the presentation to the Hon. Secretary of a testimonial for his past services.

The Hon. Secretary acknowledged that it had been omitted, but, being a testimonial from the *members* of the Society, and not really a gift of the *Society as a body*, he did not mention it in his report. However, as so many of the members expressed a wish that the subject should be included in the report, the Hon. Secretary said he would prefer that the President receive the report from his hands as it now read, and that he (the President) might add whatever he thought best. With this understanding the report was accepted.

A printed copy of the annual balance sheet was next handed round to the members; and, in proposing the same be accepted,

Mr. Wm. Watts complimented the Council upon their able management of the Society's affairs during the past year.

The election of officers next took place by ballot, resulting as follows:—*President:* Mr. J. S. Pollitt.—*Vice-Presidents:* the Rev. Canon Beechy, Dr. C. P. Bahin, Mr. A. Brothers, F.R.A.S., John Dale, and J. W. Leigh.—*Council:* R. Atherton, Alan Garnett, Jos. Greatorex, Charles Harris, F.R.G.S., John Kershaw, S. D. McKellen, E. Openshaw, John Schofield, John Warburton, and N. Wright.—*Hon. Treasurer:* W. G. Coote.—*Hon. Secretary:* W. I. Chadwick.

During the scrutinising of the voting papers,

Mr. J. Greatorex exhibited a negative much fogged, with patched, dense markings. This was one of a batch of excellent (commercial) plates and the only one found defective. No explanation was offered, but many members said they had met with similar experiences.

Mr. W. Blakeley exhibited a number of excellent prints, the work of a friend, who was desirous of becoming a member of the Society, and whom he would propose at the next meeting.

Mr. Livesey exhibited a number of splendid photographs, 10 × 8, very neatly mounted. They composed a series of views in Scotland.

The Chairman exhibited an instantaneous shutter, made more than thirty years ago, and read a short paper describing the same. [See page 679.] He also exhibited some charming stereoscopic views and lantern slides from instantaneous negatives taken by the aid of this shutter.

Mr. Alfred Brothers exhibited a portrait taken about 1856 or 1857, and which he supposed was the second *carte* portrait taken in Manchester.

A general discussion took place on shutters and instantaneous exposures, in which the Chairman, Messrs. John Chadwick, Sen., S. D. McKellen, Schofield, and others joined, resulting in the general approval of shutters of the Noton type.

Mr. Wm. Watts exhibited a walking-stick camera tripod stand, which opened out to five feet three inches in height, and was so firm and rigid that it supported easily a weight of thirty pounds. When closed it resembled a bamboo walking-stick, with buckhorn handle, silver mounted. Its weight was one pound to one pound seven ounces.

Mr. Jos. Greatorex exhibited a number of lantern slides by the wet collodion process, Cowan's plates, and collodio-bromide.

Owing to the lateness of the hour the lantern was not used, but the Hon. Secretary said he would arrange to have the lantern working at the November meeting, and hoped all members who intended to send slides would confine them to the standard size, namely, three and a-quarter inches square, accompanied by a list of number of slides and exhibitor's name. He desired that members would send up their slides before the *last minute*, in order to ensure their safe return, as it was extremely perplexing for a lanternist to have slides put into his hands during the exhibition by two or three different people, ensuring each a safe return.

The next meeting will take place on November 13, at which, besides the lantern exhibition, Mr. Alfred Brothers will demonstrate the daguerreotype process.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.

The first ordinary meeting of the session was held in the College of Physical Science, Newcastle, on Tuesday, the 14th inst., at 7.30 p.m.,—Mr. J. P. Gibson in the chair.

The minutes of the previous meeting were read and passed, and Mr. T. G. Gibson and Mr. Ruddock, of Tynemouth, were elected members of the Society.

Mr. J. Pike (Hon Secretary) said:—A notice with reference to the exhibition has been issued to members, and you will observe that mention is made of the transparency competition. It has been very wisely decided to postpone the holding of this competition until December or January. This will allow us to devote our whole time to the arrangement of our pictures for the exhibition next month, and will then leave ample time for the preparation of slides. It has occurred to me (more especially as no paper has been formally put down for this evening) that we might very profitably have a discussion on the best methods of making transparencies, and that those of us who have had any experience of this branch of the photographic art might be induced to allow their information to circulate amongst their less favoured brethren. He (Mr. Pike) then read a short paper on *Transparencies* [see page 681], with special reference to the forthcoming competition. Hints were given and remarks made on the preparation of carbon transparencies and those prepared on gelatino-chloride plates, samples of which were shown, together with the negatives from which they were taken. Speaking of the wet and dry collodion methods, he (Mr. Pike) said he had had no practical experience, but he had asked Mr. Templeton, of Gateshead, to bring a few samples of wet-plate work, and that gentleman very kindly gave his experience of this method, remarking that he used the developer and toning solution mentioned in his (Mr. Pike's) paper.

Several questions were asked and replied to.

Mr. Pike recommended intending competitors to read Mr. Robinson's paper; also a full description of various processes in The British Journal Photographic Almanac of this year.

Mr. Downey, of South Shields, showed a large number of stereoscopic pictures and slides, which were highly appreciated.

Votes of thanks were passed to Mr. Pike and to Mr. Downey.

The Chairman said he hoped that all members would be able to send pictures to the exhibition next month, not only for competition but for decorative purposes.

The Society's exhibition this year, of members' work only, will be held in November, at the Art Gallery. A presentation print is to be selected and the medal and prize, offered by Mr. Borrow and Mr. Gibson respectively, competed for. The transparency competition is postponed till December or January.

GLASGOW AND WEST OF SCOTLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

The usual monthly meeting of the above Association was held at their rooms, 180, West Regent-street, on Tuesday, the 14th inst.,—Mr. Hugh Reid, President, in the chair.

After the approval of the minutes the following new members were admitted:—Messrs. William Orr, Henry Leask, H. M. Fraser, William Leiper, John McKissack, and George W. Gray.

It was agreed to hold weekly informal meetings each Tuesday during the winter.

Mr. W. Lang, Jun., then read his paper on *The Photographic Progress of the Current Year.* [See page 682.] Mr. Lang's interesting paper was illustrated by a number of specimens of the various methods of photo-mechanical printing, kindly lent by Mr. J. Craig Annan and others. Mr. Lang afterwards demonstrated the value of some of the new methods, and reduced and intensified a number of negatives in a completely successful manner.

After some general conversation the meeting was adjourned.

Correspondence.

TRANSFERABLE ALBUMEN FILMS ON PAPER.

To the Editors.

Gentlemen,—I notice in your issue of this date an inquiry, from a member of the London and Provincial Photographic Association, "whether anyone can tell how a certain paper was prepared that was introduced more than twenty years ago, but for many years past had not been in the market. This paper was albumenised and had to be sensitised in the ordinary way. After the usual treatment, upon removal from the hypo.-fixing solution into water, the film of albumen separated from the paper and could be transferred to anything required. He thought that lantern transparencies might be very satisfactorily produced by such a paper."

As an old amateur of more than thirty years' standing I think I can throw a light upon this subject. In plain sensitive paper it was found that a coating of whey before the floating of the silver solution greatly increased its sensitiveness, and one of the continental manufacturers of albumenised paper thought it would add value to his albumenised paper. Under that conviction he manufactured a large quantity for the English market. When the paper came to be immersed in the hypo. bath the film separated from the paper, and then was discovered a twofold impression, namely, one of a very foggy appearance on the plain paper and another on the albumenised film. This was always more faint than the paper impression, but much finer in its delineation (the print had to be somewhat over-exposed to obtain the finest results on the albumen). I bought some of this paper, and the failure of the manufacturer caused me to consider if this circumstance could not be advantageously utilised. Finding the film remarkable for its cohesion whilst the print was in the hypo., I transferred the film on to opal glass, and the effect was very much admired; but amateurs did not think it was a field sufficiently attractive to follow up. At that period transparencies were not the fashion, and hence it fell away.

I may state that I have specimens by me that were made twenty-five years ago, and still show not the least sign of decay. I would further remark that I used a substratum ot gum before placing the film on the glass. I carried this out whilst the film floated on the water, the glass being placed under the water and tho film stretched over it, and then taken out to dry spontaneously. This could be easily done upon carbon transfer paper or paper made transparent.

I shall be glad to find that some enterprising amateur will again take up this interesting branch of the art-science.—I am, yours, &c.,

Liverpool, October 17, 1884. Jas. Alex. Forrest.

MARKINGS ON DRY PLATES.

To the Editors.

Gentlemen,—Since I wrote to you in July, as to the markings on the negatives caused by the American leather cloth used for the hinges of the slides, I have again used the cameras, believing that the leather must have become seasoned, but have been again troubled, although I took every care to keep the slides cool and to leave the plates in them as short a time as possible.

I believe the whole plate is affected, and that in slight cases one end of the plate is simply more or less dense or fogged. It is curious that with Swan's plates the bar is transparent or nearly so, while with Wratten's and other plates it is more or less opaque. It would be interesting to know what it is that has an entirely opposite effect with different makes of plates.

I am pleased to find my experience confirmed by Mr. J. D. England, as I failed to convince the maker of the camera or the readers of your Journal. I note that it is only in hot weather that any effect is produced, and think that, if investigated, it might be utilised.—I am, yours, &c.,

Silvermere, Woodberry Down, N., October 20, 1884. D. W. Hill.

MR. BANKART'S CAMERA.

To the Editors.

Gentlemen,—I was much interested in reading Mr. George Bankart's ideas on *The Camera of the Future* in your last issue.

According to the description his proposed camera is, in the main, very much like the one patented by Mr. George Smith, except perhaps that the latter has a rack and pinion for focussing, and a swing-back which can be clamped in any position.—I am, yours, &c., H. Arnold Bemrose.

Irongate, Derby, October 21, 1884.

PHOTOGRAPHIC BRASS-WORK.

To the Editors.

Gentlemen,—Recent utterances show what a field there is for firms who will execute desirable photographic brass-work.

Mr. A. Pringle's design for fixing lenses expeditiously is one example. Another is that mounts which allow front and back lenses by different makers to be interchangeable, and to be placed at any desired distance from each other, will give great extra pictorial power to the photographer, with no more extra expense than the cost of the universal mount.—I am, yours, &c., A. B.

October 21, 1884.

MEDAL AWARDS AT THE PHOTOGRAPHIC EXHIBITION.

To the Editors.

Gentlemen,—I entirely agree with the criticisms made by Mr. W. Wainwright, Jun., in your last issue. I also note the stale sarcasm of calling the grapes sour.

I made a special visit from my parish in Cheshire to the Photographic Exhibition last week, and gave the most accurate and conscientious attention to most of the exhibits hanging in its gallery, and I hesitate not to say that the adjudication of medal awards was not at all satisfactory; and, even at the risk of being called a soured and disappointed amateur exhibitor, I stoutly affirm that work of the highest merit has been ignored. What could the judges have been thinking about when they elected to overlook the *landscape* works in the Exhibition. Some of them are the most beautiful and clever compositions it has ever been my lot to see. It would be almost impossible to produce more splendid examples of really artistic work.

Mr. Wainwright has referred to the medal given for interiors as an award given for inferior work. I suppose this was done in spite of the straits the artist's camera was put to to get such a wonderful display of converging lines. I have always understood that a fault of this kind was a *cardinal* one, and that even under the manipulation of a mere tyro' hands was entirely inexcusable; but as the judges have decided otherwise I presume I must be in error.

And, may I ask, who is responsible for the *hanging* of the pictures? Here there has been to my mind the most ridiculous "miscarriage of justice." If (by what obtains in the Royal Academy) special honour is always supposed to be attached to works which hangs "on the line"—if this be the rule which was supposed to guide the decisions of the Council, it certainly, to my mind, was "more honoured in the breach than in the observance." By the merest accident and at considerable bodily inconvenience I found a very clever frame of first-class work, placed not "on the line," but very far indeed *below* it. I do not hesitate to mention both the number and the name, namely, *Interiors* (No. 293), by Edwin Fox. Anybody who has made a speciality of studies of this nature must know how difficult it always is to get full harmony of illumination and detail. Either there is too much illumination, causing halation in the highest lights, and too great density in the shadows, or other eccentricities of an equally inartistic kind. In this example there is nothing of the kind. And where, think you, was this frame placed by the judges? Well, right behind a large heap of tripods, &c., sent by Messrs. J. F. Shew and Co. for exhibition purposes, and certainly blocked out from the public view effectively. This is only one out of many instances. I will not say it was intentional mismanagement, but it was unfortunate, and unjust to the exhibitor for all that.

Again; may I ask if the judges considered that the work shown by Mr. W. P. Marsh, and awarded a medal, had any special claims on their selection because it bore all the distinct traces of very indifferent retouching? At least it fixed that full impression upon my mind.

May I again ask why was Mr. G. Renwick awarded a medal for his snowscapes, and the exhibits (No. 369) by Mr. B. Wyles overlooked? *Why* was No. 362 medalled? Why was No. 440 placed on the line and No. 443 placed off it, and very much off it? Why, in the name of art, were Nos. 406 and 407 not medalled? These are just one or two instances of what I would venture to call very hasty and immature decisions on the part of the authorities.

I envy Mr. Forsyth his genius and resignation. My own studies of "outdoor portraiture" were placed as near the carpet as they could possibly be; but this was because they richly deserved it, the exception in this kind of just treatment proving the rule.

Just one point more. It is a very significant fact that scarcely any amateur has this year secured a medal. The Council is composed of both amateur and professional judges—the latter in a *majority*. Now I do not consider this fair, when the majority of the exhibitors are amateurs. I think that there ought to be a sharp distinction drawn between the two, and no professional worker should be allowed to compete with the amateur, and *vice versâ*. Either let there be two separate classes or do away with medals altogether, and let the Exhibition be worked on the same lines as our Royal Academy. The present state of things is most unsatisfactory, and sooner or later must be remedied.—I am, yours, &c.,

The Vicarage, Cheadle Hulme, Cheshire, H. VICTOR MACDONA, M.A.
October 20, 1884.

Notes and Queries.

D. E. F. wishes us to recommend a special form of lens; but we make a point of declining to do so. He must read the various advertisements emanating from manufacturers of and dealers in lenses, and use his own judgment in making a selection.

SELF TAUGHT inquires if a *carte* lens can be utilised for reproducing a few small photographs for pasting on Christmas cards.——Certainly it can. The photographs may either be copied the size of the original or be reduced. In reply to a second query, the distance in the enclosed photograph is well rendered.

"BY what means can I produce a red or reddish-brown colour in a photograph, such as characterise some very old engravings which I have often seen?—OLD EBOR."——In reply: Try silver printing on plain paper, without any toning. Or try the uranium and red prussiate process, exciting the paper with a solution of nitrate of uranium, and developing with a solution of ferridcyanide of potassium.

W. A. WALKER writes:—"I have a complete and successful zinc-etching apparatus, used in combination with transfers from drawings upon lithographic stones. I am told that photographs can be transferred to stone, and then a transfer from that be obtained, so as to use it in combination with the zinc-etching process. Could any of your readers oblige me with details as to this photolithographic process, particularly as to how the photograph is transferred to the stone?"

"A LONDON AND PROVINCIAL PHOTO." inquires by what means the true focus of a combination of lenses can be ascertained when it is composed of one of the spectacle glasses of which some mention has been made of late united with an achromatic such as the front of a portrait lens.——In reply: Having ascertained the focus of each of the lenses, and determined upon the distance at which they are to be mounted apart, multiply the focus of one by that of the other, and divide by the sum of their foci less the distance of separation. This gives the equivalent focus of the combination.

C. F. B. writes:—"Could you kindly tell me if there is any process by which I could print Woodbury prints on to paper and then transfer them from the paper to glass or wood? I have been trying a collodionised glass, but it will not leave the mould without breaking away in places. I have been endeavouring to accomplish it in several ways, but cannot get anything to work right. If you could give me any assistance through the Journal I should be very thankful."——We publish this query in order to elicit the experience of any who may have worked in this direction; but would remark that Woodbury lantern slides and transparences, of every class, are usually, if not invariably, printed upon the glass direct.

"CAN you inform me if there is in the market any emulsion or plates that will take a positive picture? Would prepared porcelain plates do? I have no silver bath, and printing from a negative when only one copy is required takes up a good deal of time. It would be a great boon to most, especially to amateurs, to be able to purchase plates for positives, and a large sale might be expected.—J. CLARK."——In reply: If our correspondent desire a plate upon which to take a positive direct in the camera, nothing of the kind can be had ready prepared. The plate—whether porcelain, glass, or metal—must be black, so as to form the blacks of the photograph. Let our correspondent try his hand at coating ferrotype plates with an iodised collodion emulsion and see what amount of success will reward his efforts.

S. HYAMS writes:—"Can you kindly give me a reply to the following:—I wish to take a group in a room which must be lighted by artificial light. Will you tell me the best to use? Electricity is out of the question. I find magnesium likely to drop and go out; and how to convey the fumes from white fire composition I hardly know. Can you enlighten me on the subject? Do you think a Ross' rapid symmetrical suitable for such a subject? I have tried the oxymagnesium, and have failed through the ribbon breaking off and going out."——In reply: A common stove pipe, or one formed of calico kept distended by wire, will suffice to carry off the fumes from the white-fire composition. With respect to the lens: we would recommend one of the portrait form for employment in preference to the rapid symmetrical.

Exchange Column.

No charge is made for inserting these announcements; but in no case do we insert any article merely OFFERED FOR SALE, *that being done at a small cost in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a* NOM DE PLUME *be thought desirable), otherwise the notice will not appear.*

What offers in exchange for 100 10 × 14 ferrotype plates?—Address, PHOTOGRAPHER, 21, Bartholomew-street, St. Olave's, Exeter.

What offers for cabinet burnisher, Hunt's *Photography and Silver Sunbeam?* Wanted, anything useful in photography.—Address, A. ATKINS, 61, Ainsworth-street, Mill-road, Cambridge.

Wanted, a large, heavy rolling-press, if out of condition will do, in exchange for microphotographic apparatus, lot of electrical affairs, printing-frames, &c., &c.—Address, C. R. TRUEMAN, Southwold.

I will exchange a set of nine Victoria lenses on one brass plate, perfect instruments, or a thorough good *carte* lens, by Burr, for any useful accessory or scenic background for studio, posing-chair, &c., &c.—Address, S. HYAMS, 5, Pollet, Guernsey.

I will exchange a posing-chair with four changing-backs, exterior background, ditto (Bull's) and rustic chair, rolling-press, for 12 × 10 pictures, by Knox, of Glasgow, nearly new, for a whole-plate camera and lens.—Address, W. WESTOBY, Goole, Yorks.

Wanted, a quarter-plate tourist camera with lens and stand, in exchange for a whole-plate folding camera, with three double slides and stand (by Billcliffe), with whole-plate view lens by Grubb.—Address, A. B. BARLOW, Cornbrook Works, Chester-road, Manchester.

I will exchange a stereo. camera, $6\frac{1}{2} \times 4\frac{1}{4}$, and two lenses, double combination, for same, all equal to new, for half-plate square bellows-body camera and good lens; must be in good condition.—Address, FRANK COLBOURNE, *Journal* Office, Lansdown, Stroud, Gloucestershire.

I will exchange a long-focus half-plate camera, swing-back, rise- fall- and slide-front, leather bellows, screw focus, very light, complete with three double backs, only used a few times, for a $7\frac{1}{2} \times 5$ Dallmeyer's rapid rectilinear lens or offers.—Address, H. RICHARDS, South-terrace, Broadwater, Worthing.

I will exchange a second-hand portable 12 × 10 Kinnear camera, of Spanish mahogany, brass bound, bellows-body of morocco leather, brass-bound dark slide and carriers, size when closed $14\frac{1}{2} \times 14\frac{1}{2} \times 4$ inches; also a mahogany 15 × 15 square sliding-body camera and dark slide, 14 × 12 carrier. Wanted, a studio camera, with repeating-back, for *cartes* and cabinets, with screw focussing arrangement, must be in good condition. Will also exchange backgrounds, some by Seavey, for coloured and other backgrounds of different designs, photographs on applications: send particulars.—Address, W. W. WINTER, photographer, Derby.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

NOTICE.—*Each Correspondent is required to enclose his name and address, although not necessarily for publication. Communications may, when thought desirable, appear under a* NOM DE PLUME *as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.*

PHOTOGRAPHS REGISTERED.—

Abraham Squibbs, Wembdon-road, Bridgewater.—*Photograph of Sir James Dalrymple Elphinstone; Photograph of the "Flying Dutchman" going at full speed.*

WM. COLES.—Received. In our next.

E. V. B.—Mr. Warnerke mentions ten as being equivalent.

Geo. A. Rushton.—It is not necessary that the condensers be achromatic.

W. C.—Mr. J. J. Ayling, Crane-court, Fleet-street, E.C., will supply what you need.

F. W. W. B.—Messrs. Marion and Co., Soho-square, will, no doubt, furnish the mounts.

Lime Light.—Messrs. Lancaster and Son, of your town, will be able to meet your requirements.

T. Pool.—Without knowing your requirement, and the space at your disposal, it is impossible to afford you any useful information.

Amateur.—The Council of the Society, having on previous occasions duly considered the question, arrived at the conclusion that the present system is the best.

Photolitho.—The paper is not an article of commerce in this country. Dr. Liesegang, Dusseldorf, will, no doubt, supply it. Silk velvet: you will have to make them for yourself.

Positive.—The only plan is to dissolve off the varnish with benzole. But we fear that you will not be able to remove it without injury to the film, particularly if the picture be an old one.

F. E.—1. About the same proportion as in the preparation of plates.—2. Not suitable, unless the albumen be coagulated.—3. Why not make the experiment?—4. The usual iodide of starch test is the best.

T. M. Lowcock.—All will depend upon the number of prints you wish to wash at a time. Better have the trough too large than too small. There is no objection to washing *carte* and cabinet prints at the same time.

Silver.—1. The spots on the prints do not appear to be "metal spots," but are caused by something in the preparation of the paper. Without knowing more of this we are unable to account for them.—2. If the bath be too alkaline it may cause a dulness in the prints.—3. Should the bath be too alkaline neutralise it with nitric acid.

E. S. D.—Either will answer. If your camera have a sliding front the extending one may be made to slide in the rabbets. If it have not, the opening in the front will have to be made larger, as the less aperture will not be sufficiently large. The pressure does not produce the blisters. All so called "doubly-albumenised papers" are more or less prone to blistering.

Rev. A. Malan, M.A.—Make the toning solution as you do at present, and add gold from time to time as required, without a further addition of acetate of soda. Occasionally a little fresh acetate may be added, but it is not necessary with each fresh addition of gold. The gold should be added some hours before the bath is required for use. Thanks for the cutting, which is highly amusing.

Ferrotype.—It is somewhat doubtful if you will succeed in converting your old printing bath into a "first-rate" sensitising bath for collodion plates. However, the best method for you to pursue is to dilute it down to the proper strength and then add carbonate of soda until a decided precipitate remains after well shaking. Now expose it to strong sunlight for several days; after which filter, and make decidedly acid with nitric acid.

Northampton.—1. According to the formula the developer should keep very well. Perhaps you have been over-exposing your plates; hence the lack of density.—2. One ounce.—3. This is purely a legal question. However, we know that such agreements are made, but generally only for a stipulated time. We question if an agreement phohibiting you from taking other employment for an indefinite period would be a legal one; but if it were stipulated that within a certain limited time you should not, then the case might be very different. Better consult a respectable solicitor.

Received.—H. N. Atkins; Herbert S. Starnes; John Nicol, Ph.D.; "X.X.X." In our next.

Photographic Club.—At the forthcoming meeting of this Club, at Anderton's Hotel, Fleet-street, on Wednesday next, the 29th inst., the subject for discussion will be—*On Reversed Negatives.*

Photographic Society of Great Britain.—The next monthly technical meeting of this Society will be held in the Gallery (Exhibition), 5 a, Pall Mall East, on Tuesday next, the 28th inst., at eight p.m., when the apparatus now in the Exhibition will be brought forward and fully explained.

A Dark Slide.—At the present period much attention is being directed towards the improvement of the camera and its slide. We, therefore, direct attention to a specimen of the latter, which we have had submitted for examination by Mr. S. Sidey. Instead of there being a draw-shutter to admit the light to the plate, the same purpose is here effected by a flap-door which, when closed, prevents the ingress of light. By means of a short metallic arm, which projects outside, the door is opened after the slide has been inserted in the camera. The examination of this slide suggests that of Daguerre's camera, in which a pair of doors that closed over the plates in front were pushed open by a slip of brass after the slide had been inserted in the camera. There are some ingenious points about Mr. Sidey's slide.

Audra's Blue Intensifier.—Husnik's Iodine Plates.—In the *Correspondenz* Dr. Eder calls attention to the fact that the universal intensifier, which Herr Audra seeks to patent, is substantially the same as that published by himself eight years ago in the *Correspondenz*, after he had described his lead and uranium intensifiers. Dr. Eder's blue intensifier gave the reaction:—Ferridcyanide of potassium + silver = ferrocyanide of potassium + ferrocyanide of silver

$$(2\,K_6\,Fe_2\,Cy_{12} + 4\,Ag = 3\,K_4\,Fe\,Cy_6 + Ag_4\,Fe\,Cy_6).$$

The whole of Dr. Eder's elaborate article was reproduced at the time in The British Journal of Photography, and anyone who may have a fancy for blue intensification may there find full directions how to proceed, and may mix his own intensifier at less than three shillings a litre. Dr. Eder's formula was briefly:—100 to 300 parts water, 6 parts red prussiate of potash (ferricyanide of potash), 4 parts of iron alum.—The same gentleman also reports that a short time ago Professor Husnik began to prepare gelatine emulsion containing ten per cent. of iodide as a commercial product. Herr Scolik did the same more than a year ago, but gave it up again on account of the difficulty most practical photographers found in getting powerful negatives with it when using the ferrous oxalate developer. Professor Husnik tries to overcome the fault of slowness of development and fixing by using as little gelatine as possible in proportion to the iodo-bromide of silver and developing with ferrous oxalate. Dr. Eder feels bound to correct the opinion expressed by Professor Husnik that the Monckhoven plates now prepared contain ten per cent. of iodine. They are free from iodide, or, at least, if they do contain any the trace of it is so slight that Dr. Eder has been unable to detect it. Dr. Eder, also, in the course of his remarks, reminds his readers that though the varnish may be removed from collodion plates by a solution of caustic potash, alcohol, and water, that mixture is not suited to gelatine plates, as it is apt to cause blisters. He says it is much safer to lay the plate from which the varnish is to be removed in alcohol of 94°, to rub it with a soft linen rag, and then to wash it again in pure alcohol. He also recommends that, after the varnish has been removed as well as may be by the alcohol, the plate should be flooded for a few seconds with a mixture of one or two parts of a concentrated ley of caustic potash to 100 parts of alcohol, and then thoroughly rinsed in water. The object of this last application is to free the plate perfectly from any remainder of adherent varnish that might cause spots when the plate was subsequently intensified or reduced.

LONDON GAZETTE, *Friday, October* 17, 1884.

Partnership Dissolved.

George Taylor, Andrew Taylor, and George Marshall Scammel, trading as A. and G. Taylor, Baldwin-chambers, Baldwin-street, Bristol, and the Arcade Studio, High-street, Newport, Mon., photographers; as regards G. M. Scammel, who retires.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician,

For four Weeks ending October 22, 1884.

These Observations are Taken at 8.30 a.m.

Sep.	Barometer.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max. Shade Tem.	Min. Tem.	Remarks.
25	30·20	W	55	53	97	67	59	Cloudy.
26	29·98	SW	60	56	90	66	52	Overcast.
27	29·98	SW	57	54	85	62	49	Cloudy.
29	30·11	W	63	50	80	65	57	Cloudy.
30	30·22	SW	50	48	80	64	46	Foggy.
Oct. 1	30·06	W	57	55	91	64	49	Raining.
2	30·11	SW	53	49	67	62	46	Hazy.
3	30·07	W	54	50	94	62	50	Cloudy.
4	30·48	N	49	45	99	60	42	Hazy.
6	30·59	NE	55	52	72	61	48	Cloudy.
7	30·22	NE	55	52	91	62	51	Overcast.
8	29·86	N	51	49	79	58	49	Cloudy.
9	29·54	S	49	45	80	54	40	Overcast.
10	29·43	WNW	46	45	—	47	45	Bright & Clear.
11	29·67	N	41	37	74	49	37	Raining,
13	30·09	NW	41	39	81	52	38	Hazy.
14	30·10	W	47	46	79	58	30	Raining.
15	30·31	W	50	47	—	56	45	Hazy.
16	30·33	W	57	55	—	64	48	Cloudy.
17	30·36	W	57	55	—	61	54	Overcast,
18	30·39	WNW	57	54	—	60	53	Overcast.
20	30·37	NW	51	47	—	54	46	Hazy.
21	30·39	SW	50	47	—	55	47	Overcast.
22	30·23	SE	52	49	—	58	48	Hazy.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1278. Vol. XXXI.—OCTOBER 31, 1884.

THE COLLODIO-ALBUMEN OR THE ALBUMEN PROCESS FOR LANTERN SLIDES.

At the conclusion of the leading article on the above process last week we intimated that on some future occasion we should recur to it for the purpose of offering some further remarks on the manipulations. At that time it was not our intention to do so thus early, but, as Mr. W. Ackland's communication to the Photographic Club is now before the public, and the time is rapidly approaching when amateurs will require their slides for exhibition, we lose no time in redeeming our promise.

It will be remembered that our previous observations were principally directed to the preliminary stages of the operations, namely, to the preparation of the plates, the object of coating with collodion, the preparation of the albumen itself, the method of its application, and its afterwards being made sensitive. We shall here assume that the plate has already been prepared according to the instructions given by Mr. Ackland at the Club (or in accordance with our former articles on the albumen process, for in practice there is really no material difference between the two), and that it is now ready for exposure. This may be made either by contact printing or by camera printing.

If camera printing be adopted lenses of large angular aperture, such as the so-called "quick-acting" portrait combinations, must be used. Even with them in good daylight a very prolonged exposure will be necessary; for it must be clearly understood that the albumen process as compared with the gelatine is an exceedingly slow one, and if this method of printing be adopted an exposure of from eight to fifteen minutes, according to the intensity of the light and the aperture of the lens, will be necessary. In our own practice we prefer contact printing, as, apart from the tediousness of the long exposure, we have noticed that the tones we obtained when working with the camera were not so satisfactory as with contact printing. Therefore, it is the latter method which is to be recommended in practice.

The exposure may be made either to diffused daylight, or to the light from a gas flame or a paraffine lamp. On the whole, perhaps, artificial light is the one to be recommended to the beginner, on account of its being more constant than daylight, which is ever varying. As a rough guide to the exposure it may be mentioned that, with a moderate light from a fishtail gas burner at (say) a foot from the flame, and a negative of medium intensity, from three to eight minutes will be necessary. If diffused daylight be employed, from five seconds to half-a-minute will generally be sufficient. We mention these times only as a very rough guide; for, as we have already said, the collodio-albumen process as compared with the gelatine is an exceedingly slow one, and the beginner, who may only be familiar with the latter, might imagine that it is less slow than it really is, and thus be misled as to the time actually required to get a fully-exposed transparency.

Although we have intimated that the beginner may possibly get on better by working with artificial light, yet as he gains experience he will probably prefer diffused daylight. At least we do so ourselves, because we have noticed, and we believe it is a general opinion, that whenever the time of exposure has been long the tones of the resulting transparency are not so satisfactory as when an equally-exposed print can be obtained in a shorter period; that is, by printing in a more actinic light.

We now come to the development of the image. The method we described in our article in the first number of the current volume differs somewhat from that given by Mr. Ackland, inasmuch as that gentleman recommends the solution to be used cold, while we suggest that it should be employed warm. Yet, after all, there will be but little difference in the finished result; only, in using the solution warm, the development is more rapid, and, as a rule, the colour of the image partakes less of the olive tint. However, by using the developer cold, as Mr. Ackland does, a greater latitude in the exposure is allowable; for, should the plate prove to be under-exposed, it may sometimes be saved by throwing off the cold solution and immediately applying warm. Furthermore: with the cold solution certain portions of the image (which may be over-dense in the negative) may have the detail coaxed or forced out by applying heat locally to that portion, either with the flame of a spirit lamp or a hot iron placed beneath the plate. Before now we have utilised a heated kitchen poker for the purpose. The light from the spirit lamp will not fog the plate when once the image is fairly brought out.

A particular feature in connection with the albumen or collodion process is that during the development, particularly if it be prolonged or it has to be much forced, a veil or stains of a marbled character may make their appearance on the film. However, they are of little moment, as they are entirely confined to the surface and can easily be removed by rubbing them off with a pledget of cotton wool, holding the plate under a running tap at the time. The novice need be in no fear of injuring the film by this operation, as it is hard enough to resist any moderate amount of scrubbing—at least with cotton wool.

The image, as left by the developer, is of a very unpleasant colour, partaking more or less, according as the development was prolonged or the solution used cold or warm, of an olive-brown. Hence, to get the pleasing tones seen in albumen slides by the best makers, the pictures must be toned. Mr. Ackland prefers to fix the image and tone it afterwards. We, in our previous articles, recommended fixing and toning in one operation, as was customary in the old method of fixing and toning paper prints.

It may be well to mention that while the image is fixing the film may blister. This arises from employing a collodion which is too new, or one which is made with a cotton of too horny a nature. However, the stock of plates already prepared need not be wasted if, previous to sensitising, they be made thoroughly hot over a spirit lamp or in front of a fire, and afterwards allowed to cool. Unless the collodion be very unsuitable indeed this will be an effectual remedy.

The method of development described above differs materially from the one with which many amateurs are alone familiar, namely, the alkaline. But this method *may* be used with the collodio-albumen process, though it is not to be recommended, inasmuch as it impairs to some extent the transparency of the lights, which is one of the great charms of an albumen transparency when projected upon the screen.

In concluding this notice of the albumen or collodio-albumen process, we may add that if plates, ready-prepared could be purchased commercially, as gelatine plates can, we feel assured that, owing to the simplicity of working, together with the latitude allowable both in the exposure and development, this process would soon supersede all others for making lantern slides amongst amateurs.

Although the plates may not be procurable in commerce the amateur need not be deterred by imaginary difficulties from preparing them for himself. It involves but little trouble or inconvenience, as up to the sensitising all the operations may be performed in broad daylight. If the instructions which have been given are carefully adhered to, very little practice will ensure success in the production of slides which cannot be surpassed by any other process extant.

SULPHUR TONING.

Among the numerous topics arising, as side issues, in the course of the discussion on the lecturette on *Toning*, delivered by Mr. W. M. Ashman, at the meeting of the London and Provincial Photographic Association last week, was that of sulphur toning and the liability to fading of prints which have been so unfortunate as to have been subjected to the action of this powerful toning agent.

But sufficient attention was not then, and never has been, paid to the fact that, in addition to gold-toned and sulphur-toned prints, there is a third class, namely, those which have never been toned at all, and yet the colour of which is not by any means bad or inartistic. No one who examines the prints in a fairly good copy of Talbot's *Pencil of Nature*—the first work ever issued which was illustrated by photography—will undertake to say that the tones of these prints are bad; nor, subject to an exception, will they venture to say that they have faded—at least in any appreciable degree. Yet they were produced at a date long anterior to gold toning, and even to the recognition of any toning action at all being required.

We have referred to an exception: that is to be found in the margins of the prints by which they were attached, by ordinary bookbinders' paste containing alum, to the mounting boards. It would appear as if Talbot had a premonition to the effect that the paste might prove a deleterious element in the mounting of silver prints, and that, therefore, the less used the better. It is on record that so disgusted was he at the action of the paste upon his prints that he decided upon discontinuing silver printing entirely, as far as was practicable. This example proves that to ensure either good tones (in particular those of a brown hue) or a reasonable degree of permanency, toning, as a distinctive feature in or portion of the photographic process, is not absolutely necessary, more particularly when plain-salted and well-sized paper is employed instead of albumenised paper.

The case as we have described it is applicable to plain printing upon plain paper. By "plain paper" here we mean that which has been sized by starch, gelatine, or any other agent usually employed for such purpose, with the exception of albumen. But we are by no means certain that when upon such paper a print is toned by sulphur—in the ordinary acceptation of the term as understood by the image having been converted into sulphide of silver—it is not entitled to be considered, if not quite permanent, at least as permanent as the majority of the so-called "gold-toned" photographs of the present time. We possess sulphur-toned prints twenty-seven years' old which are still quite presentable, and we do not imagine that they will undergo much further change for a long period.

We recollect that, in 1857, a former editor of The British Journal of Photography, Mr. George Shadbolt, brought before the notice of the Photographic Society a process of printing, in which was recognised the well-understood stability of sulphide of silver. Seeing that excellent results have been obtained by this process we append details.

Plain paper is floated for about a minute upon a solution composed of one grain of gelatine and ten grains of ammonium chloride in an ounce of water. This, after being dried, is excited on a bath of nitrate of silver. The printing is carried on until the shadows are well bronzed and the half-tones much darker than they are required. After removal from the frame the prints are washed for five minutes, so as to effect the removal of the free nitrate of silver. Now comes the special novelty. The print while still wet is placed in a deep dish, and a dilute solution of ammonia (one part of ammonia to four of water) poured upon it, a plate of glass being then laid upon the dish so as to cover it completely. This, by rocking the vessel, is caused to flow over the print backwards and forwards for about a minute, after which it is poured off and the print subjected to a thorough washing with plain water, this being changed two or three times. The print at this stage is of a bright, brick-red colour. To tone it, the same dish in which it was fixed having been washed, the print is introduced, and a sufficient quantity of sulphide of ammonium diluted with five times its volume of water is poured into the dish and the effect noted. The staring red colour is superseded by one of rich blackish-brown; and, although this change is effected in a few seconds, yet no harm occurs if it be not removed for a minute or more. The print is now rinsed in a few changes of water and dried. No hitch will occur unless the fixing has been imperfectly effected, in which case the lights will be destroyed by becoming browned.

At the meeting to which reference has been made at the commencement of this article, the Chairman said that he had transparencies on glass which had been toned by means of potassium sulphide more than twelve years since, and they were quite as good and brilliant now as when first prepared. This also speaks well in favour of sulphur toning when properly carried out.

But the toning of a transparency in the way indicated must not be confounded with the system of first bleaching by means of bichloride of mercury and *then* subjecting them to treatment with an alkaline sulphide. In the latter case the image is wellnigh certain to fade sooner or later, no matter how well it may be protected by varnish.

BACKGROUNDS.

A comparison between a collection of photographs of the present day and one of a score or even a dozen years ago, would reveal a vast stride in the direction of artistic taste displayed, particularly in the point to which we are now directing especial attention.

In the earlier days of the *carte*, as many of our readers will remember, it was considered almost a necessity for the photographic artist to be provided with a "set of backgrounds," as they were then termed; and very painful, elaborate affairs they were. The first photographers of the period adopted them, and with one or, perhaps, two notable exceptions their use in a photograph entirely did away with any artistic excellence, though, otherwise, the posing, illumination, and general execution left nothing to be desired. The two establishments we allude to, however, produced photographs with pictorial backgrounds which, in many instances, were in correct taste and drawing; and they found many imitators—we might almost say servile copyists—who copied without a knowledge of art, and produced in consequence very ludicrous effects. We are bound to say, also, that the whole of the pictures sent out by those two firms were by no means free from glaring faults in the composition of background and figure. There are at the present time many of "Silvy's" pictures in old albums with which this whilom illustrious foreigner would have blushed to own his connection.

Gradually, however, a better taste has been evinced, in the cultivation of which we are happy to think The British Journal of Photography, by its advice and strictures, has played an important part. Those dreadful arrangements—those discords in pillar and paint—were banished to fifth-rate studios, and a plain background became the commonest form adopted. But to carry off with success a perfectly flat surface, as the background of a portrait requires, the highest skill combined with great taste in posing is essential, while even this is apt to lead to a disagreeable monotony of effect.

This fact has probably been seen and appreciated; but whether it has been so, or other causes have had their share in bringing about a revolution, the fact exists that a few years ago an entirely new class of backgrounds were placed upon the market from an American source, and they at once seized the fancy of photographers. Painted in monochrome with a light touch and with great dexterity, conceived upon an entirely new *motif*, and dealing with subjects never before attempted—trees, foliage, leafy bowers—the new backgrounds were to be seen in almost every first-class studio in the kingdom, though the price was twice or three times as much as had hitherto been obtained. Direct copies and feeble imitations, as a matter of course, soon sprung up; but the New York backgrounds to this day have kept their price, and, we are given to understand, are still sold. The harshest critic would not object to them—so cleverly are they painted, so harmoniously arranged, subdued in the proper place, yet broad and powerful in parts, while obtrusive details are softened and toned down in a most graceful fashion.

Given the best background in the world, thought must be expended in its application, or its beauties are lost and its excellence becomes a stumbling-block. Accessories must be cautiously used, and with due regard to the exigencies of the scene and its relative perspective. A cabinet dexterously painted in the background as though placed against a wall slanting away from the spectator would ill accord with a table placed exactly across the picture as if resting against the cabinet; yet such crudities may frequently be seen. Bad as such arrangements may be made, still worse may be done when the movable scenes (equivalent to the set-scenes of the theatrical property man) are employed. Considerable skill and knowledge is required to make them carry out the appearance of reality, so that no trained eye could at once detect a falsity.

In the present Exhibition we remember a water picture, which we did not pause to closely criticise, with boat and children that made an excellent *tout ensemble*. A boat-piece from the studio had been taken and fitted into a view of a lake with swans taken out of doors, the deception being so complete and the dexterity of design so clever that it would be quite possible to pass by the picture and not notice the trick, though, as we have observed, we have not further examined it to see whether any law of perspective was really broken.

What can be more absurd than a picture such as we lately saw of a flowing stream spanned by a rustic bridge—most prettily built, be it said—with a two-years' old child and a dog carefully posed upon a hair-rug balanced on the middle of the bridge immediately over mid-stream? Perhaps the dog was an afterthought to suggest the safety of the child should it fall into the water. In any case a more preposterous arrangement of what in itself is capable of picturesque treatment could scarcely be imagined; and our chief aim in this article is to point out how necessary it is to use these extremely clever backgrounds and accessories with thought and judgment.

Among those which have been special favourites may be mentioned the sea-pieces; yet of all others they most offend artistic propriety. A good sky—not too conspicuous—a faintly-delineated distance, and rolling, breaking waves in the foreground, form a picture really effective, but which when criticised is found lacking in an essential point—the position of the horizon. In a wooded scene the horizon may be anywhere; in a sea-piece it is only where cloud and sea join, whether seen from the top of a mountain or lying upon one's back on the sands. The horizon in a picture represents the level of the spectator's eye, and hence in a view containing a standing adult figure of average proportions—unless he be poised on a brick or a footstool, or elevated in some manner—cannot be truly represented in any way but on a level with the eyes of that figure, a slight deviation being fairly allowable.

In the painted scenes of which we speak this horizon is usually about two feet only from the base of the picture, and though it will in a photograph appear higher—say about on a level with the hips—no argument will make it correct, and it will always offend the artistic eye.

A little artistic licence may allow of the horizon being (say) as low as the shoulders, but not further; while with children it ought to show high above their heads, and thus nothing but sea form a background.

Let anyone spending a day at the seaside to whom this effect is unfamiliar observe any figure between himself and the sea, and upon the same level as himself. He will notice that the sea horizon is always on a level with the head, whether the figure be seen from a mountain side or the sands, providing only he and the spectator are of average heights. This is so important a point and one so universally departed from that we give full prominence to the error in the hope that future views of the same sort may be more correctly designed. It is easy to imagine a scene painter falling into the error; for his stage, at the back of which a seascape would be placed, is so much higher than the front that the horizon though low on the canvas would be high to the audience, who also are usually supposed to be seated, which naturally lowers the level of the eye and, as a consequence, the horizon.

We will conclude by noticing one more point about the management of a sea background. It is the custom of many photographers to have their backgrounds so mounted that they can turn them at any angle to the light, and thus obtain variety of illumination and consequent difference in depth of shade in the background, which at one time may appear light and at another dark. This slanting cannot be carried out with a sea-piece when the horizon is not absolutely on a level with the eye, as a low horizon placed at a slant would not be at right angles to the figure, so that the consequence would be, if the figure were upright, that the water would appear higher at one side than the other—an effect the ludicrous nature of which would be palpable to the most uncritical eye. We trust that we have made it clear that our sympathies are quite with the occasional use of a "painted background," provided it be a good one and used with thought and discretion.

THE PHOTOGRAPHIC EXHIBITION.

[Fourth Notice.]

Mr. H. J. Godbold shows a number of pictures, many of which give evidence of a more than ordinary degree of skill having been exercised. Undoubtedly the most sensational, even in these days of instantaneous work, are *To the Rescue* and *Rescued* (Nos. 226 and 260), in the former of which a vessel has been driven ashore, and the lifeboat not having arrived a rocket is being fired over the wreck. The flight of the rocket, its trail of smoke as well as the line, are clearly and sharply defined, forming one of the most extraordinary photographs ever exhibited, and a picture withal. In the other the lifeboat is depicted on its return from the wreck with the rescued crew. Surely realism can be carried very little further. *Break, Break, Break on thy Cold Grey Stones, O Sea!* (No. 40), shows thoroughly artistic conception, and *Old Hastings During a South-West Gale* (No. 237) gives an excellent idea of the roughness of the sea on our southern coasts. The exposure has been much shorter than in the case of the medal pictures of the same class, but there is no want of detail in even the darkest portions.

Mr. P. H. Emerson, B.A., M.R.C.S., exhibits several very praiseworthy *genre* studies. His best work is, however, *A Study of a Head* (No. 324), in red carbon, the subject a rugged-featured fisherman in "sou' wester," forming a picturesque object. *Walberswick* (No. 548) is a happy rendering of a quaint fisher village.

Mr. Matthew Whiting has two frames—*Views on the Thames* (No. 112) and *Views in Scotland* (No. 564). In the former the views about Richmond and at Greenwich and Sheerness are specially noticeable. Amongst the Scotch views two pictures of Loch Marec and Ben Slioch should be mentioned first. *Towing Home the Wreck, Leith*, exhibits a good, natural sky.

Mr. F. Hollyer is chiefly represented by his floral decorative studies, so well known in previous exhibitions. *A Lily Dado* of five panels (No. 307) makes a very handsome appearance; but for exquisite artistic delicacy and truth we must select *Dandelions* (No. 136). A series of reproductions from paintings by Burne Jones, representing *The Six Days of Creation* (No. 145), will have attractions for the æsthetically inclined.

Mr. F. W. Broadhead's two pictures, *Watching* (No. 305), and *Contemplation* (No. 311), are clearly executed—the former owing more of its excellence to the subject and the latter to the posing. The artificial backgrounds employed in both cases rather detract from the general effect. *Contemplation* forms the subject of one of our illustrations. Two frames of views in North Wales by the same artist exhibit good points, both in selection and manipulation; but we must deplore the taste which placed two pictures of Conway

No. 311—*Contemplation.* By F. W. BROADHEAD.

Castle, four of Carnarvon Castle, and two of Bettws-y-Coed in the same frame (No. 493), and, by the way, under the misleading title of *Views of Snowdon.* The views of Snowdon in No. 510 are really fine, and must have been taken after much labour in climbing.

Mr. Seymour Conway's interiors of *The Vyne, near Basingstoke,* and *Bramshill, Hants* (No. 107), are very fine examples of their class. The perfect rendering of both sunshine and shadow, without the slightest loss of the elaborate and beautiful details, is most noticeable. Amongst his landscapes the best and brightest is

No. 326—*Llyn Crafnant.* By SEYMOUR CONWAY.

perhaps *Aberglaslyn Pass* (No. 326), but as a composition we prefer *Llyn Crafnant,* which we have chosen for illustration.

Messrs. York and Son exhibit a frame of *Views in London* (No. 124) of large size, which fully sustain their reputation. Their lantern slides are also of high quality.

Mr. J. G. Horsey's landscape studies are, as a rule, over-printed, and present a somewhat heavy appearance—not due to the negatives. The first in the catalogue, *Early Morning* (No. 118), is the best. *The Meeting of the Waters* (No. 121) passes but a poor compliment upon the famous Wicklow scene, representing, as it does, an insignificant stream running into another of scarcely greater importance, and with no particularly striking surroundings to call attention to the spot. His *Farm in Surrey* (No. 182) is a good picture, taken evidently with an extremely brief exposure; and the *Cattle* (No. 184) are also well caught.

Mr. F. Whaley's *Thoughts Far Away* (No. 127) is a pleasing figure study of a young lady seated at the spinning wheel, but whose thoughts have for the moment wandered far away from the work in hand. *Waiting for Nursie* (No. 319), and *This Little Pig Went*

No. 340—*This Little Pig Went to Market.* By F. WHALEY.

to Market (No. 340), are cleverly executed, their titles sufficiently describing them. The latter forms one of our illustrations.

Mr. W. Cobb's two frames of *Street Views* (Nos. 139 and 218) contains work of the same character as that which obtained him a medal last year, namely, instantaneous street scenes photographed from the top of an omnibus. In quality, however, they seem to us far superior to last year's. His other picture (No. 495) is a veritable bit of nature—if nature can be supposed to exist in such classic neighbourhoods as the New Cut.

Mr. Adam Diston's medal picture, *Out of Sorts* (No. 330), is full of quaint humour, and fully sustains his reputation as a master in

No. 330—*Out of Sorts.* By ADAM DISTON.

genre work. It is the clock that happens to be out of sorts, and the careful housewife is ministering to its requirements with a pair of bellows—a primitive but by no means uncommon mode of treatment in country parts. The arrangement of figure and accessories is admirably carried out, and an idea of the composition may be gathered from the accompanying illustration.

Mr. Andrew Pringle exhibits—though not in competition, as he was on the list of judges—a couple of frames of landscapes, some of which were shown last year. His views in the Lake District are, however, new and present some noticeable features. Especially worthy of attention are *Rydal Water and the Rothay*, and *At the Foot of Rydal Water* (No. 200).

Mr. G. Renwick sends three *Winter Scenes*, which, however, are but repetitions of his previously-exhibited work in the same class.

Whatever complaints may be framed against the interiors of Signor A. Tagliaferro on the score of want of correctness in the perpendicular lines, there is no denying the admirable delicacy of their details. *The Interior of St. John's Church, Malta* (No. 234), is without doubt the best, but in view of the defects which have been mentioned the question of the justice of the medal award is an open one.

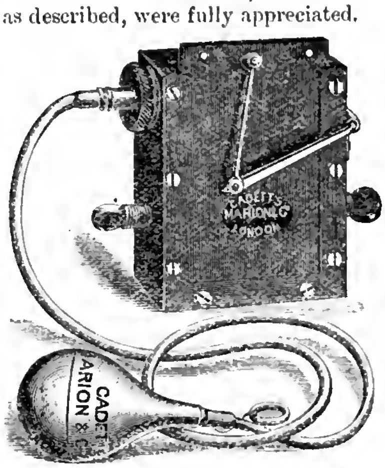
Mr. G. H. M. Whish's frame of *Studies* (No. 358), of which the centre one, which we have chosen for illustration, is a pretty and

No. 358—*Studies*. By G. H. M. Whish.

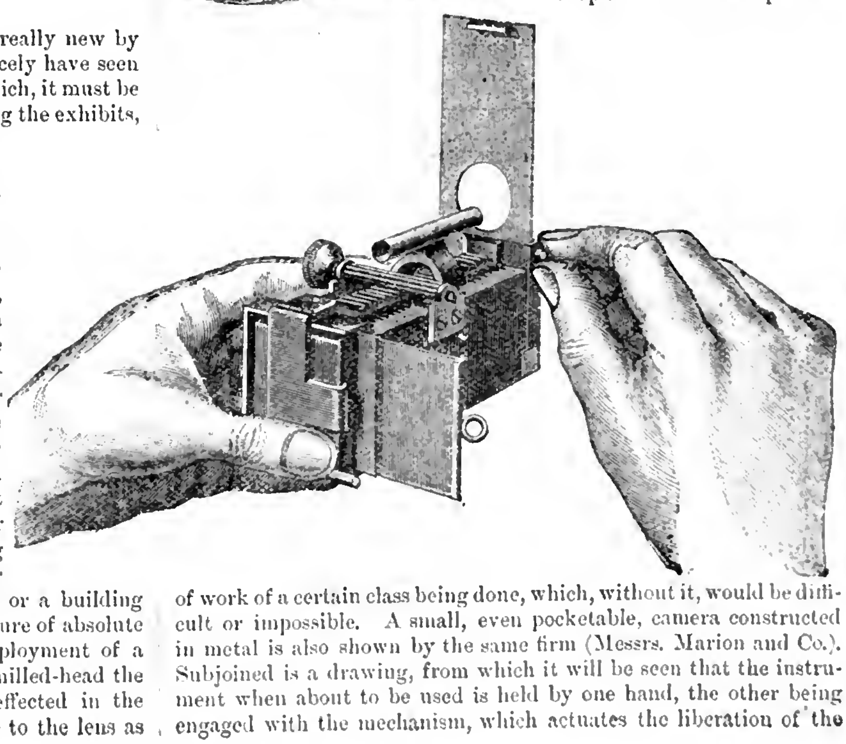
effective grouping of children at play. The small views on the Thames, with steamers in motion, and especially an excellent study of sheep, deserve notice.

APPARATUS.

Those who say, or have said, that there is nothing really new by way of camera production in the Exhibition can scarcely have seen the camera of Mr. S. D. McKellen, of Manchester, which, it must be admitted, was somewhat late in finding its place among the exhibits, owing to a business accident ludicrous enough in itself—an *employé* of the manufacturer having sold to some urgent customer the camera which was laid out to be packed and transmitted to Pall Mall, thus necessitating some delay in having a substitute provided. The features which upon a cursory glance strike us as noticeable in the McKellen camera are, *inter alia*, the following:—When folded up the camera is very thin and light. There is no tripod head, the functions of this hitherto useful and indeed necessary appendage being usurped by a circular plate or ring of brass sunk into the base-board. After the camera has been placed upon the tripod it can be erected by means of two motions of the hand; and we may here say that there are no loose screws about the camera, which is no small boon. The back or front may be swung to any desired extent if tilting of the camera be considered necessary, either for the purpose of getting a foreground in sharp focus or a building presented without converging perpendiculars. A feature of absolute novelty, so far as we are aware, consists in the employment of a double-pinion system for focussing. By means of a milled-head the racking-out of the front which bears the lens is effected in the usual way; but, when this has been brought as near to the lens as the pinion permits, then the traversing action of the centre board may be brought under the operation of a second pinion situated close to the body of the camera, by whose instrumentality the whole length of the sliding portion of the base actuated by the rack is once more brought into operation, and the focus shortened up or down to within an inch or two of the ground glass. Mr. McKellen, in a circular which accompanies the camera by way of explanation, lays down certain principles with which every practical photographer will be inclined to agree readily, namely, that a camera to be perfect must have the following properties:—It must be as light as possible, as a heavy camera only wearies the amateur and detracts from his enjoyment. But it must be not only light; it must also be rigid, as a shaky camera cannot, with certainty, produce the best work. It must be easily erected and folded, and must fold into a minimum of space. It must allow of the use of the shortest-focus lens, and permit the use of a lens with focus at least twice the length of the plate. It must be simple, so that it can be made or repaired at a reasonable cost; and must have swing back and front, so that in using the swing back the front may be adjusted parallel to it. In the camera now under notice these requirements are amply fulfilled. The reception given to Mr. McKellen at the technical meeting of the Photographic Society of Great Britain on Tuesday evening last, at which he exhibited and explained the details of the construction of his camera, was of an enthusiastic character, and showed that its various adjustments, as described, were fully appreciated.



Messrs. Marion and Co.'s exhibits include a camera fitted with one of Cadett's recently-introduced shutters, which have won golden opinions from all who have had occasion to use them. The diagram shows the nature of the shutter. It is fixed upon the lens, and upon pressure of the pneumatic ball the shutter, which slides in grooves in the frame attached to the lens, is raised, and remains so until the pressure is relaxed, when it instantly drops. This shutter permits



of work of a certain class being done, which, without it, would be difficult or impossible. A small, even pocketable, camera constructed in metal is also shown by the same firm (Messrs. Marion and Co.). Subjoined is a drawing, from which it will be seen that the instrument when about to be used is held by one hand, the other being engaged with the mechanism, which actuates the liberation of the drop shutter in front of the lens. There is a small piece of tube erected just over the camera through which the operator views the scene or subject which he desires to photograph, and at the fitting moment the shutter is liberated and the scene secured. The new patent syphon plate-washer of this firm appears to be a highly-effective instrument for the purpose for which it is intended. The water charged with the hyposulphite is rapidly withdrawn in favour of a supply of pure water.

Mr. Leon Warnerke exhibits two cameras invented by Professor Ezutchewsky, of Moscow. These, at first sight, are suggestive of a camera invented and patented by Mr. Cook, of London, several years ago, in which a number of sensitive plates were stored away in one portion of the camera ready to be brought to the front in rotation by the operating of handles, which were drawn up and down. In one of the Moscow cameras that we examined the plates are changed by reversing the apparatus. It is very gratifying to be afforded an opportunity of examining the inventive and mechanical ingenuity of our Russian brethren.

Messrs. Watson and Sons exhibit several cameras, of which one for 15 × 12 plates presents a very imposing appearance. It is well fitted and beautifully finished. It has a double swinging back and long focal range. There are two other cameras of different sizes, but equally effective as regards construction. One of their snap shutters, of which we gave an account (with a drawing) last year, together with a drop shutter, are also to be found among the exhibits of this firm. A small camera possessing certain novel features was shown by Mr. Watson at the technical meeting on Tuesday evening last, but we defer a description of it till next week.

As the Exhibition in Pall Mall draws towards its close we may remind our readers of the immediately-succeeding one at Northampton, the announcement of which appears in our advertising columns. Exhibitors in Pall Mall can, we believe, arrange to have their exhibits forwarded direct if so desired; but all information can be obtained from the Honorary Secretary, Mr. H. Manfield, Northampton.

The meetings of the various sections of the Society of Chemical Industry, London, Liverpool, Manchester, Birmingham, Glasgow, and Newcastle, are about to commence. The president of the Society is Dr. W. H. Perkin, F.R.S., while the chairman and officers of the local committees are well known in the regions of chemical enterprise. In December, Mr. J. M. Thompson will read a paper on *Photography for those Engaged in Commercial Pursuits*, which will doubtless attract much attention in the circles interested. The General Secretary's Office is now at Palace Chambers, 9, Bridge-street, Westminster, S.W.

Under the title of *Photography for Everybody* our contemporary, *La Nature*, describes an apparatus devised by Mr. Bauer of the *XIXe Siècle*—an amateur devoted to photography—who has conceived the idea of offering to the subscribers of the above-named journal a really good set of apparatus at a low price. Judging from the description and the accompanying illustration the price is sufficiently low; though whether it is worthy of the appellation "the very height of cheapness" it is impossible to say—in the face of the wonderfully-cheap and good apparatus manufactured in this country—until we have seen the apparatus itself. The set comprises camera with double dark slide and achromatic lens, tripod, treatise on photography, three bottles of chemicals, funnel, glass stirrer, filter papers, dry plates, sensitised paper, graduated measure, printing-frame, two porcelain dishes, and a packet of dry plates—the whole contained in a wooden case with hinged lid. To the subscribers of the journal the price is twenty-four shillings, and to outsiders thirty-six shillings. M. Davanne considered it efficient and cheap enough to be worthy of being brought before the notice of the Photographic Society of France. In doing so he described it in detail, and explained its parts and the performances of the lens. This, he said, might be larger with advantage for outdoor work, though he had taken a view in less than a second, and a copy of a plaster cast in his studio in two seconds. The lens, he explains, should be blackened in its interior, seeing that as at present made it fogs the image with a bright light outside; and though it gives slightly-curved lines at the margin it is, he truly says, in this respect not any worse than other single lenses.

Photography is to be employed in illustrating *Quaint Old Norwich*—a work now in preparation by Mr. E. P. Willins. It is not, however, photography from nature, but photolithographs from pen-and-ink drawings that are chosen. We cannot perceive why this should be.

Photographers who sometimes fail to see the cause of the great price of lenses of large diameters may gain some idea as to why large lenses should be dear by reading an account of the progress of the great Lick telescope. The order was given for the instrument in 1861, the diameter fixed upon being only thirty-six inches; but this "only" indicates the largest instrument in the world. Messrs. Alvan Clark and Sons have the work in hand, and they had but two firms in the whole world to choose from to cast the rough glass discs from which the lenses were to be fashioned. The flint lens was cast in an unexpectedly short time, but they have never yet received the crown glass. Messrs. Feil and Co. have made nineteen attempts, without being satisfied. At last it is stated that they have made two discs which they believe will be perfect, and which will shortly be on their way to California. Thus the completion of the whole observatory has been delayed by the difficulties in casting one slab of glass; for until it was finished and in the optician's hands, so that its refraction index might be determined, it would not be possible to calculate the focus of the instrument, upon which had to be founded the dimensions of the dome and mounting.

The Russian astronomers made great preparations to observe the recent lunar eclipse; but according to a letter from Professor M. Nyrén, Director of the Pulkowa Observatory, near St. Petersburg, not a vestige of the moon could be seen during the eclipse. At Helsingfors, however, the moon could be discerned through the stars, though at Dorpat, the second great Russian observatory, nothing could be done.

We alluded in our last issue to the importance of bisulphide of carbon as an antiseptic, and its value is continually being recognised. M. Pasteur has been making further investigations into its properties. He anticipates that it will become the most efficacious of all antiseptics, as it is also the cheapest, costing but a fraction of a penny per pound in large quantity. It is also the best insecticide known, and for this purpose may, perhaps, be useful to preserve wood-work in tropical countries. Some idea of the use it is already put to may be gathered from the fact that over eight million pounds of the substance are used annually to check the ravages of phylloxera.

Carbon bisulphide, as first produced, is about as foul-smelling a compound as it is possible to find; but it is capable of purification till all offensive odour is removed, and it is sufficiently pure in smell almost to mix with a perfume.

A very interesting note on the colour of chemical compounds, referring to the properties of its constituent elements, was recently given by a correspondent in a continental journal. Premising that the colour depends on three conditions—the temperature, the quantity of the electro-negative element present, and the atomic weights of the constituent elements—he gives details of the particular changes. Thus he states that in the chromium compounds the application of heat causes a regular sequence of changes in colour following the order of the colours of the spectrum. In many compounds he shows that increase in the electro-negative elements involves a change of colour to the red end of the spectrum. The influence of atomic weight is shown in the fact of the elements, as arranged in Mendeleef's tables, changing from white through violet, indigo, blue, green, yellow, orange, red, brown, and black as the weights increase. A long table is given showing the effect produced upon the colour of a compound by the atomic weight of its constituents. His rule had 426 cases and 14 exceptions. We do not know how he would treat the varying colours of bromide of silver. If an exact determination of the modification the bromide undergoes as its colour changes, a most useful light would be thrown upon the physics of emulsion making.

SODA DEVELOPMENT AND OVER-EXPOSURE.

There is to the careful observer something very puzzling in the opinions expressed by photographers respecting every novelty proposed in the treatment of plates. For example: we have had put before us in the Journal of August 1st, by Mr. A. F. Genlain, a clear description of the mode of developing by carbonate of soda, using one grain of pyro. to each ounce of developer.

The article in question treated the proposed change of development so lucidly that I at once made up a quantity of the alkaline solution—soda one ounce, water ten ounces, bromide of potassium eight grains—and resolved to give it a fair trial. The thermometer at the time was exceedingly high, and as soon as my first plate had developed to greater density with *one grain of pyro. to the ounce* than I had previously been able to get with three grains I dropped it, after washing, into hypo., and beheld a most glorious specimen of frilling. Alum was instantly tried, and the plate saved.

Since then I have used the above formula with "Britannia," Wratten's, and Fry's plates, with instantaneous exposures and exposures of ten seconds, and I must say that with all the plates I have had the most perfect printing negatives I have ever had during three-and-twenty years' experience (as an amateur). I find that with this mode of development I get transparencies on ordinary plates perfectly fit for the lantern, with clear glass, and with some plates of a beautiful black tone.

The puzzle I alluded to above may now be mentioned. I recommended this developer to a friend (of experience), and he instantly replied—"Oh! it is too quick; I cannot do with it." I open the Journal, and the first person who mentions it says it is too slow for him. I find half-a-dozen persons referring to it as producing a nasty yellow colour, which in my case is conspicuous chiefly by its absence, and under the circumstances one can only "give it up" as a conundrum, or one of those things that "no fellah can understand."

I received from a friend, a short time since, two undeveloped negatives (out of a batch taken at the lakes) for development at home, and which had all turned out over-exposed. I thought it was worth while trying an experiment I had been planning; and accordingly, having citric acid at hand in case my idea should fail, I diluted the developer with an equal bulk of water. The picture appeared slowly and developed up to printing density without any need for any restrainer, and the citric acid was not needed. This I thought was very satisfactory, considering that I had no idea what exposure the plates had received.

A couple of nights since I resolved to test the principle of dilution still further. I took a quarter-plate negative—a figure subject, with every gradation of tint from black to clear glass—and, taking an ordinary commercial plate, I exposed it for a transparency four feet from a No. 4 burner for six seconds, and with an ounce and a-half of the above-mentioned developer. I obtained a perfect transparency—quite fit for the lantern. I then exposed a second plate out of the same box *twelve* seconds, poured over it a fresh dose of developer, watched carefully for the first trace of an image, and as soon as it appeared I put the plate under the tap, diluted the developer with an equal bulk of water, and completed the development, retaining *clear* glass to the end. This transparency was not quite as dense as the first, but it was of good colour and "rounder," with more delicate shading and half-tone. I then repeated the experiment with a third plate, exposing this time *thirty* seconds. I first placed the exposed plate in water, then poured on the ounce and a-half of developer, and when the first trace of an image appeared I diluted the developer to four ounces in bulk, obtaining a transparency, to my mind, quite equal to the second.

It seems that this experiment suggests a simple mode of meeting over-exposure. It is easily tried; and, if confirmed by the experience of others, will prove another reason for banishing ammonia from the dark room. I find that the combination of ammonia with this developer produces photographs in colour. Red fog appears of the most vivid kind, and ruins the result. H. N. Atkins.

P.S.—As every variation in formulæ affects the result in some degree, it may be necessary to state that I use the pyro. *in solution* as follows:—Pyro. one ounce (437½ grains), citric acid sixty grains, water forty-three and three-quarter ounces; then giving a strength of ten grains of pyro. to the ounce of solution, and introducing citrate of soda into the developer to a very minute extent.

COATING PLATES WITH GELATINE EMULSION.

About six months ago I promised to publish a description of a little machine (of which I had showed a sketch) for rapidly coating plates with emulsion, suitable for amateurs or others who do not require complicated and expensive machinery. On trying it, though it worked very well, there was still one point which I wanted to improve upon before publishing the details of it in the Journal. Your readers will find that the little piece of apparatus I am now about to describe will coat plates (large or small) quite equal to those supplied by professional makers, and better than those of some of them.

To coat plates perfectly I found the following points were necessary:—

1. That a certain quantity of emulsion should be flowed in one even stream all over the plate, instead of pouring the emulsion in a pool in the centre of the plate and then dispersing it over the whole surface; because in the latter mode of coating large plates the gelatine is apt to commence setting before it is equally distributed, and an unequally-coated plate is the result.

2. The plate ought to be put on the levelling-table before coating, and not be moved before the gelatine is set; because in the dull light of the dark room it is so difficult to prevent the emulsion running off the plate when putting it down on the levelling-table.

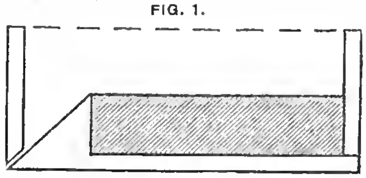
3. I found that if the emulsion be rubbed (so to speak) on to the glass there is much less chance of frilling, &c., than if it were poured on. I think it is because in the former case the gelatine is in firmer contact with the glass. When the gelatine is poured on to the plate the cold glass instantly chills it, and by the time the emulsion has reached the edges of the plate it has so far set as to have partially lost its power of adhesion to the smooth surface of the glass.

Two or three years ago, when it was the practice to warm the plates before coating, I found from a series of experiments I then made that when a plate was warmed before being coated the emulsion commenced setting on the surface of the film, and of course in setting contracted, thereby leaving a partial vacuum between the film and the glass. On development frilling was the consequence. I found, however, that, when pouring the same emulsion on cold glass, on the portion of the plate where it was poured on the film instantly chilled and commenced to contract on to the glass, and it never frilled there; but towards the edges of the plate, as the emulsion had commenced to chill before they were covered, the film was not in such perfect contact with the glass. Any person can try the experiment by first coating a plate in the ordinary way, and on the second plate just pour a small pool of emulsion on the centre; let both dry, and he will then see after exposure which frills the easier on development.

After a series of experiments I found that by brushing a substratum of emulsion on to the cold plate (with a brush made by binding a strip of wash-leather at the end of a strip of glass), and then pouring the full quantity of emulsion on to the substratum (for quarter-plates I used a small silver teaspoon, which held sufficient to cover that size of plate), I found I could coat plates far better and quicker and as easily as when coating with collodion, and I got over the difficulties of having frilling plates.

When only a few small plates are required—such as for experimental purposes—I believe this method is as quick and good as any;

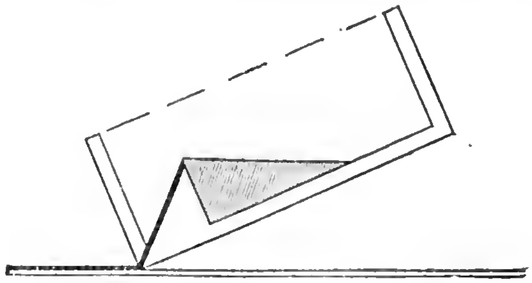
FIG. 1.



Showing melted emulsion in coater ready for coating.

but when several dozen plates are wanted any plan of coating them separately takes a long time. With my plate-coater I can coat a dozen plates in about the time I formerly took to coat one. When coating a number I thought it would be best to lay them in rows on the levelling-shelves and draw the receptacle containing the emulsion over them, rather than keep the latter a fixture

FIG. 2.



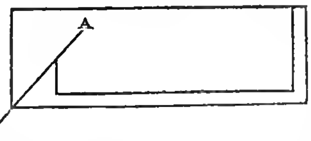
Showing emulsion flowing through the slit on to the glass.

and run the plates under it either on an endless band or sliding shelves; because by the first mode the plates can be fixed close together and the emulsion is less likely to get between them.

The coater is a species of wooden tray (of which the diagrams show the section), having a small slit in one of the bottom edges through which the emulsion passes in one even wave the whole width of the plate. The width of the coater is the same as that of the plate, though one six and a-half inches wide can be used for either half- or whole-plates.

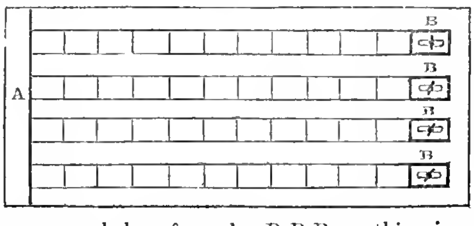
I find the best way of making it, so as to get the slit an equal opening the whole length of it, is to put the back, bottom, and two sides together first, as in *fig.* 3. Then by putting a piece of very thin paper (A B) on the angle piece, when the front piece of wood is put tight down on the paper and fixed in its place, and the paper is drawn out, it will be found that the slit is very even. In one coater I made I had the slit a little too wide an opening, and to reduce it I glued a piece of muslin over it. This I found was a great improvement, as it not only acted as a strainer, but it checked and caused a more even flow of the emulsion over the plate. I varnished the wood and muslin (except over the slit) with black Japan.

FIG. 3.



To coat the plates I put them close together in rows on the levelling-shelf, as shown below :—

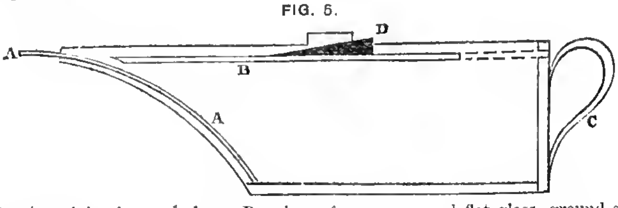
FIG. 4.



A is a thin, narrow ledge of wood. B B B are thin pieces of wood, in the centre of each of which is a small slot and thumb-screw. The plates are pressed against A by the pieces of wood B, and the thumb-screws are then fastened. The plates are thus kept from slipping about. All this, of course, can be done in ordinary white light. The light is then made non-actinic; the melted emulsion is poured into the reservoir of the coater, which is put to the left hand edge of the outer row of plates. It is then lifted up on edge, as in *fig.* 2, and drawn slowly over the row of plates, and so on until the whole of the rows are coated. Of course when not coating plates it is kept in a horizontal position, as in *fig.* 1. The emulsion on the plates is allowed to set without being disturbed ; the shelf is then slipped into the drying-box until the plates are dry, so that they are not touched from the time they are coated until they are dry and ready for packing.

I am at present engaged in making a modification of this coater to hold a much larger quantity of emulsion at one time, when a large number of plates require to be coated. It is something the shape of a flat teapot—

FIG. 5.



A A is a piece of curved glass. B a piece of coarse ground flat glass, ground side uppermost, sliding in two grooves in the wooden sides. C is the handle fixed to the wooden back.

A piece of thin paper is placed on the curved glass, and the ground glass pushed close up and fixed by two small wedges, D. The paper is then slipped out, leaving a narrow, even opening between the two glasses. The width of this opening can be varied by using thicker paper if the plates require to be coated with a thicker film. By using this form the coater can be more easily cleaned, as the ground glass can be slipped right out at the back, and probably in passing from the opening to the plates over the curved glass the wave of the emulsion will be equalised as well as when passing through the muslin. HERBERT S. STARNES.

CANVAS ENLARGEMENTS.

REFERRING to your excellent article in last week's Journal anent the making of enlargements on canvas, I should be obliged if you would insert the following as being my usual practice in making these enlargements.

Presuming, of course, that the reader is acquainted with the ordinary collodion transfer process, I will begin by saying that before the plate (say 15 x 12) has been French chalked, pour a well-diluted solution of sulphuric or hydrochloric acid over it, and then rinse well with water. After wiping well dust with French chalk in the usual way, and prepare for exposing.

When the plate is well washed after fixing (say half-an-hour at least), place some fairly-surfaced white paper (ungelatinised, of course) on the film, and squeegee carefully. Test the corner of the plate to see if the film be likely to come off with the paper ; if so, strip it from the glass, the paper being the support. This being done, the canvas on the stretcher is the next consideration. First wash the whole canvas with soap and hot water until all greasy marks disappear ; rinse well under the tap, and apply a hot solution of gelatine, very thin (say four flakes of French gelatine to twelve ounces of water), and as quickly as possible place the transfer on the canvas in its proper position ; squeegee, and carefully raise the paper, leaving the film adhering to the canvas.

There are one or two things to be attended to in all this, namely, wash the canvas equally all over and see that it is thoroughly soaked, or there is a likelihood of contraction of the canvas after the film is dry.

Presuming a quarter-plate negative is taken of a sitter, and a head and breast enlargement (24 × 20) is required on canvas, my mode of procedure is to throw the image on the canvas exactly to the size and form wanted. I then draw the outline roughly on the canvas, and next take a 15 × 12 collodion transfer in the manner stated above, getting the head and collar, &c., to nearly fill the whole plate. When putting the film on the canvas I have, therefore, a good guide as to its exact position from my outlined sketch, and the artist may easily draw in the coat, &c., from the print off the original negative.

Always use a thin collodion for this class of work, or contraction of the film and canvas will take place, and especially so if the canvas be not well washed as above stated. It is, of course, unnecessary to gelatinise the whole canvas—only such part as accommodates the film ; but in spreading the hot solution on be mindful that it does not get cold, or a lumpy surface will result.

If these hints are of any use to the readers of your excellent Journal I shall be only too glad to have assisted in following up your article. DAVID M. LINLEY.

BOTTLES *VERSUS* GAS BAGS.*

APPARATUS FOR STORING GASES : ITS COST AND DANGERS.

BOTTLES.—The Adams condensed gas bottles, introduced in 1865-6, supplied to me (filled with oxygen or hydrogen) by Mr. Orchard, were made of iron, and though having the disadvantage of being heavy, on the other side, as "per contra," was the great advantage of their occupying little space compared with gas-bags, whether full or empty. These bottles were of two sizes—one for oxygen having seven and a-half feet capacity, the other for pure hydrogen fifteen cubic feet capacity. The dimensions of the smaller bottle were two feet three inches long by four and a-half inches diameter; the other considerably larger, both as to length and diameter—so much so that I soon adopted the plan of using two small bottles "coupled up" for the hydrogen, so that the three bottles *all of one height* could be packed in one case. These bottles were tested before use by hydraulic pressure up to sixty atmospheres, or 700 lbs. pressure on the square inch, thus ensuring safety to the filler and user, as the pumping pressure employed in filling never exceeded thirty atmospheres.

At the present day the smaller bottles are pumped to hold ten cubic feet of gas, and the larger bottles twenty cubic feet, under a pressure of forty atmospheres, and with perfect safety. In America the bottles, or "tubes," as they are there called, are much lighter, being made of copper and steel, and the system of filling is different. These vessels are larger for an equal quantity of gas, and are filled at a lower pressure than in our country. Thus a tube of ten cubic feet capacity measures about two feet six inches long *by seven inches diameter* (in place of four and a-half inches), and is filled at as low a pressure as fifteen atmospheres. Some Americans, however, are advocating the employment of oxygen and hydrogen in bottles of smaller sizes, under higher pressure than thirty atmospheres, as with nitrous-oxide gas—employed extensively in dentistry and surgical operations, both for anæsthetic and local chilling purposes, *with perfect safety.*

Gas bottles present this very important advantage over gas bags—that gas may be kept therein *for any length of time without the slightest deterioration*, and, consequently, be ready for use at any required moment—a matter of grave consideration for those who employ the

* Continued from page 650

lime light in the lecture room, laboratory, or photographic studio at uncertain times. But the most important advantage of the condensed gas system is the increased light to be got thereby. When I look back upon the *light* we students "before the fifties" got out of a pair of Pesy's gas-holders with water pressure, and a "safety jet" with its delivery tubes bunged up with bundles of fine wires and partitions of fine wire gauze, I laugh outright to think we should have considered *that* "powerful light" a thing to boast about as being produced by anyone less than a lecturer or professor of chemistry. It is like calling to remembrance the solemn rushlight of our childhood as compared with the latest manufacture of night-lights, or of the argand oil "Sanumbra" of the old-fashioned drawing-room with one of Deitz's most perfectly-constructed petroleum or of Sugg's patent gas burners. In 1856 I flattered myself that *I had got a light* for my diagram lantern. *That* "Herapath's jet" I should now laugh to scorn and desire it to "be blowed"—a little stronger. The last time I manipulated the lime light in public was at Dr. Carpenter's lecture on the microscope at the Society of Arts. After the lecture a member of the optical trade asked me *how* I got such a light upon the screen. My answer was simply—"By pressure." I had used the gas bottles with the rubber tubes, not "sprung on," but with metal union connections, for the reason that if we take full advantage of the light-giving power condensed gas places at our command we must have strong tubing and metallic connections; for "sprung on" tubes, such as we have used with gas bags loaded with one hundredweight or more, would be blown off with a snap sufficient to alarm an audience. This fact speaks volumes as to the difference of the pressure we are dealing with when we used bottles pumped up to only twenty-five atmospheres on the square inch. Again: with bags it is a comfort—not an absolute necessity—to employ a lime clock to keep your "hard lime" rotating, without having to open your lantern door or bother your head about periodical rotation by hand. But with condensed gas *it becomes a matter of absolute necessity* to employ something to keep the lime always slowly on the move, for the reason that the gases impinge upon it with such force as to pit it into holes so deep that the point of light is soon out of focus.

Again: the fair wear and tear of gas bags—without reckoning upon the rough usage they get from cabmen, railway porters, nails, splintered wood, mischievous youths of an inquisitive turn of mind, and empty-headed folks, such as those who could turn a bag into a pincushion—makes it necessary that travelling lecturers having brisk business should have a new pair of bags every season; but the first outlay on a pair of bottles will be the last for any number of years. The question as to relative cost I will leave till final summing up. I always employed pure hydrogen, as house gas when condensed gave off an unpleasant smell when used; but, through the greater purity of the carburetted hydrogen of the present day, that gas is practically good enough, and so one bottle instead of two will suffice. As the all-sufficient pressure is *self-contained*, pressure boards are not wanted, nor have weights to be hunted for in strange places or carried about, nor is there any fear of their being shifted off on to the toes of those around. Then as to floor space: a pair of bottles packed in a case occupy only one foot by six and a-half inches, as compared with three feet six inches by three feet, with the extra guard-space of at least two feet around them, which must be devoted to gas bags and boards.

There is no deterioration of the inner surface of the receptacle, as with oxygen bags, or where hydrogen has not been freed by washing and neutralising from watery sulphuric vapour, for the first coat of rust formed acts as a protective surface, as far as present experiences go. Then there is no dread in the lecturer's mind of loss of gas from leakage, knife thrusts, nail or splinter punctures, or brooch pins. So far for the economical aspect of bottles. Now, *per contra:* I have already said that *some* arrangement for keeping the lime on the move is necessary. Although I have always manipulated with the lever, working the screw conical valve alone and with the greatest ease, others, not tyros in the use of scientific instruments, have whisked out their seven cubic feet of gas in twenty minutes, or produced a series of "up lights" and "down lights," which would have secured a character for promptitude to any "gas-man" at a theatre; so I have come to the conclusion that an arrangement supplemental to the lever valve, and corresponding to the fine adjustment of a microscope, is really necessary; but the space at my disposal will not allow of my describing the arrangement I have designed. I see that some such arrangement has been "catalogued;" but, as no price is affixed, I take it that, like my own, it is a thing of the future.

On June 4th an advertisement appeared in the daily papers, offering the sale of the English patent for an "Automatic Condensed Gas Regulator" for the sum of £1,000. A few days afterwards Mr. James Bowie, the inventor, favoured me with an inspection of his very ingenious arrangement, but, never having seen it in action, I will not here offer any opinion upon its practical merits. Suffice it that the patent has been taken up, the regulator is being prepared for sale, and it will be shown in action before a public meeting in London during the forthcoming winter session.

Then, though not absolutely necessary, it is a great comfort to have a pressure gauge—first, to know for certain that your bottle, as sent in from the condensed gas engineer or chemist, *does* contain the quantity of gas requisite for an entertainment or lecture; secondly, to know how the gas is going during a lecture, especially towards the end, so as to bring it to a conclusion in a manner the index of the gauge indicates. If the condensed gas system got into full swing the filled bottles would be brought to our doors in the same manner as aërated waters, and the "empties" taken back "in exchange," and this at a price as cheap, if not cheaper, than we could make the gases at home, free from trouble, risk, and cost of the necessary generating and filling apparatus and its wear and tear. This applies to the cost of oxygen and hydrogen where the bag system is followed; for, under either system, at the present day these gases may be obtained ready-made for eight pence per cubic foot, and on a larger scale would be cheaper.

Now for the dangers of the gas bottles: honestly, without bias *to the exhibitor*, I believe *none* exist or can be anticipated. Whatever danger there may be pertains to the filler, and, with all ordinary care, *none* for him. The man who wishes to mount a horse with safety to himself must learn to ride. The boating man, the cyclist, or the gunner must learn the construction of what he is going to use, and from some experienced person how to use it; *then* there is little fear of his coming to grief. So with lime-light apparatus, whether under the bag or bottle system. It is the self-sufficient folks who are entrusted with dangerous tools by the dealers with fear and trembling—not so much lest parties should injure themselves—but trade! When gas bottles are tested under hydrostatic pressure, if there be a weak point in the metal it does not burst with explosive force; but rends at the side, or the bottom may be forced out quietly and pleasantly, water being an inelastic body. Very different would it be if the tubes were tested with elastic gases.

Having been thus tested up to two or three times the pressure that will afterwards be used when filling, danger is hardly to be anticipated. Should there be a burst it will be during filling, and the filler will be the sufferer, if anyone. Should a bottle be filled with a mixture of oxygen and hydrogen, as long as there was a forward pressure—even a lowered pressure—I do not believe there would be any danger of a "run-back" on a light being applied till zero point was reached, and the gases were in equilibrium with the atmosphere. Then I think that the small bore and mass of cold metal in the valve would prevent the lighted explosive mixture from passing inwards. Such faith have I, from what I have seen and tried, that I would unhesitatingly sit upon a bag filled with the mixed gases, if placed between pressure-boards and properly weighted, as long as I had control of the jet. At first this may look like foolhardy braggadocio; but let old lanternists call to mind how long Dr. Woodward employed both gases mixed in one bag and comparatively under low pressure, as described and figured in his book on *Polarised Light*, published by Van Voorst. I should like to learn the exact circumstances under which Dr. Procter's assistant in America managed to kill himself. Probably in a drunken state he mixed the gases, lighted up, and when the pressure sunk to zero point there was a fatal explosion.

I know of a case where a workman who was not drunk had to repair a bottle, and, without emptying it of its contents or opening the valve, placed it on the forge fire. Of course the heated gas expanded to bursting point, and the operator was blown over to "the majority." Who could have anticipated that a skilled workman, used to the work, would have been capable of such reckless carelessness? The only danger that could befal the bottle manipulator at a lecture, &c., is the possibility of the thick glass of the pressure-gauge being blown out in bits on the gas from the bottle being turned full on to see what the contents registered. But all fear of injury from this cause can readily be anticipated by a very simple arrangement of the apparatus without diminishing its full utility.

And, now, as to cost:—

A 7 to 10 feet bottle with lever, value	£2	2	0
A 15 to 20 ,, ,, ,, ,,	3	3	0
A lime clock of recent construction	2	15	0
A pressure-gauge	2	2	0
Rubber tubing with metal connections	0	15	0
Travelling case	0	14	0
Total	£11	11	0

Samuel Highley, F.C.S., &c.

NOTES FROM THE NORTH.

Summer holidays, well planned and properly managed, are always very pleasant and sometimes very profitable, but are generally attended with some drawbacks. Not the least important of these is the fact that the holiday maker is apt to fall behind in his attention to current literature: and if he be a photographer in the habit of giving diligent attention to the literature of his favourite hobby, he is likely, during those happy holiday times, to miss many items that are worth more than a passing thought. This, at least, is the case with myself at present, as, having been a good deal from home during the past few months, I was unable to give the usual exhaustive attention to The British Journal of Photography, and it is only now, when the ordinary routine of home life has been resumed, that I notice several items that seem to require special attention.

First in order, perhaps, comes the amusing theory, expounded at page 501 of the number for August 8th, by Mr. Herbert S. Starnes, as to the formation or nature of the invisible image. Several writers, with some pretension to chemical knowledge, and something like method in their system of experimenting, have, pretty nearly at least, shown that the sub-bromide theory is correct; but Mr. Starnes has, on the ground of the alleged fact that lapse of time—"putting the (exposed) plate away in the dark for a time," he calls it—destroys the impressed image and renders it ready for another exposure, developed a new theory, which teaches that silver bromide is not affected by light at all, but that each atom or particle is enveloped in a little gelatine bladder, which, by getting a good shake from the light becomes ruptured, and so allows the developing solution to reduce the salt.

I need not follow him in his curious experiments—as he somewhat naïvely confesses that, just as he might have expected, the plates were fogged—but will simply say that the bogie he has set up, and invented a theory to account for, is merely "a man of straw." In other words, lapse of time, or putting an exposed plate away in the dark, under such conditions as would preserve an unexposed plate, does not destroy the invisible image. Anyone conversant with photographic literature knows that this has been a long-established fact, and one corroborated in a recent number of the Journal (Oct. 17th), where an "admirable print" is stated to have been sent to the Editors from a negative developed four years after exposure.

Some of my readers may remember that more than a year ago I recorded the fact that by adding fresh gelatine to an emulsion which by decomposition had become as thin as treacle, and acquired a very disagreeable smell, it gave plates, not only in every sense first-rate, but very much more rapid than those prepared with it when fresh. Several of the plates exposed at that time were simply wrapped in coloured paper and laid at the bottom of one of the drawers of my writing table, where they lay till a few days ago, when one of them, on development, yielded a clear, crisp, good negative without speck or flaw. While I would be the last to dissuade any one from publishing his experiences in photographic matters, I feel strongly inclined, in the interests of those who feel that they must read all that is said on the subject, to recommend close attention to Montaigne's advice, viz., "I would have every one write what he knows, and as much as he knows, but no more."

There has recently been a good deal of discussion on the ever-interesting question of development, and several of our friends have amused themselves by reducing the directions given by the various plate-makers to a uniform system of "grains to the ounce," with a view to saving those who use plates of various brands from the necessity of keeping a lot of unnecessary bottles in the dark rooms. At the risk of being "sat upon," I wish to ask *cui bono?* No doubt some of the makers believe the formula that accompanies the plates they send out is the best for that brand, while others are simply anxious to recommend something different from their neighbours; but good plate-makers are not necessarily good photographers, and a good photographer who "developes with brains" is more likely to make better work by the exercise of his knowledge and experience than by anything like a slavish adoption of the maker's recommendations.

In my temporary home in town I have no convenience for the preparation of plates, and therefore during the whole of the present season have been drawing my supplies from commercial sources, including almost every maker of repute. Some of each batch were developed strictly according to the method recommended by the makers, and the rest by what I call my own, simply because I have employed it for several years, and never saw any reason to change it; and while in most cases fairly good results were obtained by the makers' formula, in every case equally good, and in many very much better, work was produced by my own system.

I never quite understood why "ten-per-cent. solutions" are not universally employed. They are handy, keep well, and the only calculation required is to add mentally a nought to the number of grains to be used per ounce. Thus, the plates I generally employ require three ounces to cover them properly. Into a measure graduated to drachms I put one drachm each of the ten-per-cent. solutions of bromide, ammonia, and pyro., fill up to three ounces, and pour over the plate. If the exposure has been about right the image begins to appear in from thirty seconds to a minute, and goes on slowly but surely till a fine negative is obtained, while in cases of under- or over-exposure a few drops of bromide or ammonia respectively readily bring about the desired effect.

I notice, in a recent number, a correspondent recommends a method of preventing the loss of the screw of the tripod head that I had thought was already in general use, viz., tapping the tripod head so as to fit the screw, and filing away a portion of the threads of the screw at its neck, the thickness of the head. All the old Edinburgh-made stands by Bryson, Davidson, Lennie, &c., were so made, and I have used one for twenty-five years without losing a screw.

In reply to my observations in last *Notes* on canary medium, I have to thank Mr. G. D. Scorah, of Bradford, for sending me several sheets very much evener than those I had previously seen; but I am sorry to learn from him that there is not much chance of the manufacturer turning his attention to the wants of the photographer. It is used to the extent of some tons per week for wrapping foreign piece goods, and is made from manilla; hence its strength and also its clouded appearance. I may add that the longer I use it the better I like it, and the more I regret that prejudice and foolish faith in the dismal dark ruby kept me so long from making its acquaintance. JOHN NICOL, Ph.D.

ON TONING.

[A communication to the London and Provincial Photographic Association.]

UPON the previous occasion, when I had the honour of appearing before you in January last, it will be remembered that the subject of *Silver Printing on Albumenised Paper* engrossed our attention through the various stages which led up to a printed result; and here it was decided to stop, partly because sufficient had been said to occupy a longer time than was originally set down as convenient for the delivery of these lecturettes, and partly because it appeared to me presumptuous on my part to attempt other processes connected with the system of finishing, when so many practical photographers of long experience and members of this Association were far more capable of dealing with such subjects as toning, fixing, washing, and finishing, either together or separately, than the information I could gather or my meagre ability would justify.

I must apologise to you for the imperfect manner in which my previous lecture was brought before you, and I trust you will pardon me when I say that I cannot help thinking its very incompleteness has proved beneficial. Whether I am right in my conjecture or not remains to be admitted. One thing must be evident: the older societies laid hold of the subject again soon afterwards with renewed vigour, and, in very able papers from Mr. John Spiller, F.C.S., and Mr. E. Dunmore, thoroughly thrashed out the most important details, so that we have cause to congratulate our Curator on the wisdom he has displayed in selecting suitable subjects at the proper time—operating, as it did, in a manner calculated to set the older machinery in motion, providing, as he has, much useful discussion and practical information in this country, besides reopening the field for further research upon all the subjects on which the lecturers treated, as evidenced by the foreign journals.

As one of the many professionals who regularly practise the perfected researches of others—namely, those photochemical scientists, whose names have become as familiar to all students of the art as that of Galvani, Volta, or Faraday to the students of electrical science—it will be readily understood that I cannot say anything which is new; and if I understood our Curator's intentions correctly it was his object, when establishing these periodical discourses, to make them of such an elementary nature as would enable the younger, and particularly the amateur, members to gain enough knowledge of the details and antecedents of each process as might become interesting to them, and benefit the Association at the same time by a general improvement in the character of the discussions, rather than the establishment of a higher technical style, suited only to advanced students. Premising this to be the case, I shall endeavour to show the *raison d'être* of the various processes to be hereinafter described, and to whom we are indebted for their discovery. Should it turn out that the sources from which the information has been gathered are unreliable, then I shall be glad of the necessary corrections when discussion takes place.

I have already in the previous communication dealt with the means employed in preparing a suitable paper to receive a photographic image, including the methods of albumenising, sensitising, and fuming. Preserved papers were also spoken of, and many useful hints were gathered in the discussion which followed. As it will be necessary to refer to these papers in the remarks which are to follow, it will be found more convenient if we distinguish the preserved paper from freshly-prepared by the cognomen of "preserved" and "ordinary."

Beginning with ordinary paper, printed under a negative somewhat deeper than it is desired to have the prints when finished, we should have a print which, although beautiful to look upon, possesses a charm of only a transient nature—due to the gradual decomposition that takes place when organic substances such as albumen are long in contact with free nitrate of silver; hence the necessity of the processes I have to describe.

In the case of alkaline toning with borax or acetate of soda: the first consideration is to free the paper as much as possible from the excess of silver nitrate remaining therein over and above the quantity used in the production of the print; this is termed washing away the free silver. That operation is satisfactorily performed by soaking the prints in a few changes of clean soft water—usually four, or until the water is no longer opalescent when tested with a few grains of salt. The washing water so obtained is collected in the manner described to you by Mr. F. W. Hart, and precipitated with dilute hydrochloric acid. The vessel employed should be scrupulously clean, either earthenware, porcelain, or wood answering the purpose.

Experiment 1.—The treatment of the prints is sometimes followed by passing them into a dilute solution of sodium acetate or ordinary common salt—about one per cent., such as here shown—and stirring them about for five minutes, when it will be seen they have assumed a brick-red colour, the object of which is threefold:—Firstly, the fibres become charged with a substance which acts as a chlorine absorbent—a necessary property to be mentioned further on. Secondly, a definite colour is ensured to start with, thus obviating the possibility of mistaking fresh prints in the toning bath for those which have become purple by reason of the deposited gold—an important consideration when dealing with fumed paper. Thirdly, the last trace of free nitrate of silver is removed, thereby preventing a too rapid decomposition of the toning bath.

Theoretically considered, it is proper that the last trace of silver nitrate should be removed; but those who are engaged in the daily practice of commercial work do not insist upon the strict observance of such a rule in all cases. An especial exception is permitted and advocated when dealing with prints from weak or under-exposed negatives, this class being found to yield richer tones by not washing any of the free silver out.

The plan of soaking prints in a solution of sodium acetate was originally recommended, in lieu of washing, by a member of this Association, Mr. A. L. Henderson, as long ago as 1861, the following being an outline of the method suggested by him:—Slightly over-printed proofs were soaked in a bath composed of—

Sodium acetate	210 grains.
Water	10 ounces.

The unwashed proofs were moved about in this solution at least ten minutes, in order to convert all the free silver nitrate into acetate of silver. After slight rinsing in clean water the proofs were toned with—

Gold terchloride	4 grains.
Sodium acetate	240 ,,
Water	10 ounces.

Among the advantages claimed was an entire absence from mealiness—a defect, you will remember, we now avoid by the adoption of ammoniacal fuming.

Guide-books to the practice of printing usually recommended three rapid washings; the decomposing action thus set up by the quantity of free silver remaining in the paper materially quickens the speed of toning. To prevent a too rapid deposition of gold some printers prefer adding a small quantity of common salt to the toning bath, which turns the prints sufficiently red and acts in some respects equal to an intermediary bath.

Preserved papers—containing, as they generally do, a certain proportion of free acid—are liable to give some trouble in toning, owing to the retarding action of the acid present. When this occurs it is in a great measure overcome by the use of an intermediate bath of an alkaline character and sufficient strength to neutralise the acid. Either the carbonates of ammonia or soda are found useful for this purpose, and I cannot do better than quote the one mentioned by Mr. Frederick York, which, it will be remembered, is composed of—

Washing soda	1 ounce.
Water	1 gallon.

Prints treated in the manner described are ready for toning by the alkaline method to be dealt with later on.

This brings us to the consideration of toning baths generally. The properties of toning baths vary somewhat according to the mode of preparation. The term "toning," as we understand it, implies a certain change of colour brought about by chemical means, such as the deposition of a stable metal upon one that is easily affected by the atmosphere—electrolysis, in fact.

Evidently Mr. W. H. Fox Talbot was the first to use the toning bath in connection with paper photography, although he does not seem to have made much headway with his process at first; for it is recorded that from January, 1839—the date when Mr. Talbot communicated his discovery to the Royal Society—until 1845 very little improvement took place. These early paper pictures, be it remembered, were designated "photogenic drawings." Talbotype was not patented for some time afterwards.

In the year 1845, however, it was found that steeping the paper in terchloride of gold vastly improved the results. It was not until 1853 that albumen took any part in the production of prints, the honour of its introduction being ascribed to Mr. Henry Pollock, although it seems that M. Le Gray, of Paris, about that time was producing stereoscopic pictures on albumenised paper. To M. Le Gray is due the credit of introducing gold toning in lieu of sulphur. The first toning then was performed by the decomposition of hypo. and known as "sulphur toning," by which fine black tones were obtained upon the addition of an acid, such as acetic, sulphuric, or other suitable oxidising substance to the hypo., gold taking no part in this process. Unfortunately, prints so treated are said to be the least permanent of any; but of that I can bring no actual proof, never having employed the process.

Experiment 2.—Toning by Sulphur.—We have an unwashed silver print here in a twenty-per-cent. solution of hypo., and to that we now add a few drops of slightly-dilute sulphuric acid. It will be seen that a straw-coloured substance is immediately liberated, which is sulphur in an exceedingly fine state of division, and this becomes attached to the print. Toning action goes on, through the silver image being tarnished, or, more correctly, converted into sulphide of silver. This liberation of sulphur may be expressed by the following equation:—

Hypo. + Sulphuric Acid = Glauber Salts + Water + Sulphur Di-oxide + Sulphur

$$Na_2S_2O_3 + H_2SO_4 = Na_2SO_4 + H_2O + SO_2 + S.$$

With respect to the reaction which takes place when toning a silver image with sulphur, I will quote a few lines from the parent work of reference for nearly all recent writers, namely, Hardwich's *Photographic Chemistry*, wherein we find the following paragraph:—

"It is well known that articles of silver plate become darkened by exposure to the fumes of sulphur, or to those of sulphuretted hydrogen, of which minute traces are always present in the atmosphere. If the stopper of a bottle of sulphuretted hydrogen water be removed, and a simply-fixed photographic positive suspended over it, the picture will lose its characteristic red tone, and become nearly black. The black colour is even more intense than an experienced chemist would have anticipated, because analysis teaches us that the actual quantity of silver present in a photographic picture on paper is infinitesimally small; and it is well known that sulphide of silver, although of a deep brown colour, approaching to black when in mass, exhibits a pale yellow tint in thin layers, so that a mere film of silver converted into sulphide possesses very little depth of colour. To explain the difficulty it has been suggested that the toning action of sulphur on a red print is probably due to the production of a sub-sulphide possessing an intense colorific power, like the sub-oxide and sub-chloride of silver. When the toned picture is subjected to the further action of sulphur it is converted into the ordinary protosulphide of silver, and becomes yellow and faded."

The toning baths following the sulphur method were principally mixtures of gold terchloride and hypo. This latter substance was found to be a solvent of certain silver compounds by the Rev. J. B. Reade, in 1839, Mr. Talbot having previously fixed his prints with common salt. Prints, too, were fixed first in some cases, and toned afterwards, washing away the free silver being more or less practised in the mixed hypo. and gold and the sulphur toning processes. When fixing was employed before toning, it was usual to soak washed prints in a twenty-per-cent. solution of hypo. for a period of ten minutes, or until the soluble silver salts were removed, the resulting colour being a disagreeable yellowish-brown. To improve the result so obtained the prints were passed into a solution of—

Gold terchloride	10 grains,
Water	20 ounces,

when toning action quickly followed, the yellow colour giving place to that of a dark sepia tint. From this stage to that of mixing these two substances together was only a natural sequence, and effected a diminution of gold to the extent of one-fourth, as will be seen by the following recognised formula:—

Hypo.	7 ounces.
Water	20 ,,

When dissolved, add—

Gold terchloride	5 grains.
Dissolved in water	20 ounces.

After mixing, a clear solution should result.

The *sel d'or* process followed, and was expected to give still better results. It was found, however, that the solutions would not keep, and as a considerable quantity of the gold salt was needed it caused experimenters to search for a less expensive method. One decided point in its favour was the circumstance that prints suffered no loss of intensity during the operation, as they do in the case of all other toning methods. Briefly: the prints were well washed to extract free silver, and, after soaking five minutes in salt and water, they were passed into an alkaline solution composed of—

Liquid ammonia	60 minims.
Water	20 ounces.

Here they became very red. After washing in clean water the surface was flooded with a toning solution composed of—

Double hyposulphite of gold and sodium *(sel d'or)*	½ grain.
Hypo.	1 ,,
Water	1 ounce.

Upon the print assuming a purple-grey colour it was withdrawn and fixed in a sixteen-per-cent. solution of hypo. to dissolve the unacted-upon silver chloride. Gold, when in a fine state of subdivision, is of a rich purple colour. The layer obtained by deposition upon a silver image is very finely divided; hence the colour. The only object in continuing the toning action beyond the stage at which a good surface colour has been reached is to obtain a deposit of sufficient density to completely neutralise the red colour of the organic silver image beneath; therefore, it is preferable, in forming a judgment of toning action, to examine proofs by transmitted light rather than by reflected only.

Before dealing with the various formulæ for alkaline toning I should like to step out of the golden track to say a few words on platinum tetrachloride, $Pt.\ Cl_4$.

Experiment 3.—Platinum Toning.—The value of a platinum salt as a toning agent for silver images has been thoroughly demonstrated before you by Mr. Henderson, when he initiated us into the secrets of ceramic photography. My trials with this salt as a toning agent for paper proofs have only been partially successful. By that I mean that toning does take place when a dilute solution is employed, but the action is too tardy for demonstration here tonight, since anything like a black tone could not be obtained under half-an-hour. You will observe that the surface becomes covered with chloride, showing the necessity for copious washing. Yellow or discoloured prints are bleached when toned in this bath, the whites becoming very pure. The formula here given is capable of producing a very good shade of brown in less time and should be permanent, since platinum is a metal practically unaffected by the atmosphere; and I think there is good reason to suppose that if a thin coating of platinum could be deposited on the silver image the protection offered would be more economical as well as stable. Something has already been done in this direction, but not in recent years.

The following is the composition we are now using:—

Platinum tetrachloride, syrupy solution, colour of old East India sherry	5 minims.
Hydrochloric acid	150 ,,
Water	20 ounces.

Wash away the free silver thoroughly, warm the toning solution to 70° Fahr., and fix in a twenty-per-cent. hypo. bath.

Mr. A. Watt, in the second volume of the *News*, gives a formula which runs as follows:—

Solution of platinum	30 minims.
Hypo	3 grains.
Hydrochloric acid	5 minims.
Water	5 ounces.

This bath is said to act instantly, but I have not had an opportunity to test it. The strength of the platinum solution here given is indefinite, but any of our experimental members can soon ascertain the amount of dilution necessary to obtain the most favourable results.

Alkaline Toning.—Owing to the bleaching action which occurs in toning silver prints with gold, which is slightly acid, certain experiments were made, and it was found that bleaching increased in proportion to the quantity of hydrochloric acid added. Now, in the action of toning chlorine is disengaged, and in order to render this powerful bleaching agent inert it has been proposed to introduce a substance capable of combining with it, and thus, in absorbing it, prevent undue loss of vigour. To obtain this a slightly alkaline toning bath became a necessity, and to Mr. Waterhouse we are indebted for the introduction of the alkaline salts (Hardwich).

Here is an example:—

Experiment 4.

Sodium carbonate ($Na_2\ H.\ Co_3$)	5 grains.
Auric terchloride ($Au\ Cl_3$)	1 grain.
Water	10 ounces.

Instead of the dry bicarbonate we will use a saturated solution. In this as well as the following experiments we shall tone three prints of the same subject, namely, ordinary, fumed, and preserved.

Mr. Maxwell Lyte has written on and investigated the properties of toning solutions a great deal more than most men, and we find the following emanating from Mr. Lyte:—

Sesquichloride of gold	15 grains.
Phosphate of soda	300 ,,
Distilled water	1¾ pint.

And in the same communication it is mentioned that 180 grains of borax may be substituted for the phosphate with a like result. Therefore it will be seen that a borax toning bath is not of recent discovery, although it does not appear to have been quoted in many formulæ for at least a dozen years after its publication.

After the publication of Mr. Lyte's formulæ it was found that other salts behaved similarly; and among the first suggested we found sodium acetate, the qualities of which, extolled by the introducer, Mr. Hannaford, have since been verified by the whole photographic world. Here is one of the ordinary formulæ:—

Experiment 5.

Gold terchloride	1 grain.
Sodium acetate	10 grains.
,, chloride	10 ,,
Hot water	20 ounces.

Mix twenty-four hours before use. Neutralise with chalk or whitening (carbonate of lime).

The name of M. Le Gray must be mentioned as the originator of the lime and gold toning bath; although the original formulæ differ somewhat from the one now used the results are identical. The original formulæ consisted firstly in washing away a portion of the free silver by soaking the proofs for a few minutes in two changes of water, then submitting them to the action of an auriferous bath, composed of—

Terchloride of gold one-per-cent. solution	1 part.
Hypochloride of lime (white powder)	3 parts.
Distilled water	1,000 ,,

The action was complete in ten to fifteen minutes, when the prints required washing in two changes of water to free them from the chloride of lime remaining in the fibres previous to fixing in one to six of hypo. If the tone were satisfactory at the expiration of fifteen minutes the ordinary washing could be proceeded with; if not the proofs were submitted to a final bath composed of—

Gold terchloride	2 parts.
Hypo.	200 ,,
Distilled water	1,200 ,,

M. Le Gray says:—"The proof ought not to be left in this bath less than fifteen minutes, as that is the minimum time necessary to ensure the permanency of the picture; but it may be allowed to remain in it for as much longer as is requisite for obtaining the desired tone." Efficient washing in warm and cold waters completed the operation. Should any of our provincial members experience a difficulty in obtaining calcium chloride for their experiments, it can be easily made by causing dilute 7 : 3 hydrochloric acid to react on common whitening, and when neutral filter and set aside for the crystals to separate out.

Experiment 6.—The uranium and gold toning bath has many friends. The tones are said to be richer and to economise gold, whilst it is very easy to work. I am unable to give the author's name, but I can present a formula which has worked well in my hands. After washing away the free silver tone in the following mixture:—

No. I.

One-grain acid solution of gold terchloride	1 ounce.
Water	7 ounces.

Neutralise with sufficient of a twenty-per-cent. solution of sodium carb. (Na_2HCo_3).

No. II.

Three-grain solution of uranium nitrate	1 ounce.
Water	7 ounces.

Neutralise as in No. 1. Warm each to 70° Fahr., and mix. The bath is then ready for use. It can be used repeatedly if desired by acidifying with citric acid and neutralising before use; but nothing is gained by using it a second time.

There are methods of toning which resemble more or less those which have occupied our attention tonight; among them may be mentioned the tungstate bath, likewise citrate of soda. The vermilion bath, too, might afford sufficient matter alone for a lecturette. If some one experienced with it could be induced to bring it before us I am sure it would prove interesting.

My experience with toning is so limited that I find I have become exhausted, so (*nem. dis.*) must conclude; but before doing so allow me to express a desire that one of our able members will, when opportunity occurs, gather up my disjointed remarks and shape them into a paper, which may also include the processes I have omitted. W. M. Ashman.

Our Editorial Table.

Blanchard's Durable Sensitised Paper.

We have had an opportunity of trying the new durable sensitised paper prepared by Mr. Valentine Blanchard, whose name has been for many years intimately connected with the subject of the preservation of albumenised paper after sensitising. In richness of tone and brilliancy of surface it is unsurpassed by any in the market, while the toning operation is entirely free from those difficulties so frequently found in connection with ready-sensitised papers. But the feature which will specially recommend it more particularly at this time of the year is its wonderful rapidity in printing. We have tested it against some of the leading papers in the market and find it decidedly the quickest of all—an important quality in winter.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
November 3	West Riding of Yorkshire	Godwin-street, Bradford.
,, 4	Sheffield	Freemasons' Hall, Surrey-street.
,, 4	Halifax	*Courier* Office, Regent-street.
,, 4	Bolton Club	The Studio, Chancery-lane.
,, 4	Glossop Dale	Glossop Coffee Palace, High-street.
,, 5	Benevolent	181, Aldersgate-street.
,, 5	Edinburgh (Annual Meeting)	Hall, 5, St. Andrew-square.
,, 5	North Staffordshire	Town Hall, Hanley.
,, 5	Photographic Club	Anderton's Hotel, Fleet-street.
,, 6	London and Provincial	Masons' Hall, Basinghall-street.
,, 6	South London	Society of Arts, John-st., Adelphi.
,, 6	Bolton	The Baths.
,, 6	Leeds	Philosophical Hall.
,, 6	Glasgow	Institution Rooms, Buchanan-st.
,, 6	Dundee	Lamb's Hotel, Reform-street.
,, 6	Coventry	Coventry Dispensary.
,, 6	Yorkshire College	College, Cookridge-street Leeds.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

At the technical meeting of this Society, held on Tuesday, the 28th inst., the proceedings consisted of the display and explanation by the several exhibitors of the apparatus upon the tables in the Exhibition now being held at the Society's rooms in Pall Mall,—the chair being occupied by Mr. Payne Jennings.

The first exhibitor called upon was Mr. Watson, who explained at some length the characteristics of the work shown by his firm.

Mr. C. Sands showed a camera, in which there was an intermediate frame or "cradle" between the base and the upright parts. He also exhibited a shutter in which the moving plate worked up and down, so as to give longer exposure to the foreground than to the sky.

Mr. Samuels showed the camera exhibited last year with some alterations, particularly in the front. The back had been found to work well continuously, and would, he thought, be advantageously employed in studio work, where it was frequently desirable to expose another plate, or several fresh plates, rapidly after the first one. The swing front with which it was now fitted did away with the necessity for a swing back.

A Member inquired whether a swing front would answer the same purpose as a swing back.

Mr. Samuels replied that Mr. Debenham had some time since demonstrated that the effect was identical.

The Chairman observed that, no doubt, the most valuable feature of this camera was the means supplied of rapidly changing the plate.

Mr. Herbert S. Starnes showed a combined camera and changing-box. There was no dark slide, but the ground glass was laid against a frame about the middle of the camera box. The back of the box and a sort of sleeve behind it served to darken the ground glass, and enabled the operator to dispense with a head cloth. When the focussing was accomplished the hand was inserted by the sleeve before mentioned, and the ground glass removed. Its place was then taken by a plate lifted from one of two receptacles or "wells" found in the bottom of the box. After exposure the plate was removed to the second well. Both of these receptacles were kept covered by lids, except during the time of actually changing the plate. As the plate was pressed against the same frame as the ground glass, perfection of registry was ensured.

The Chairman considered the latter point an important one. Of the cameras sold he believed that one half would be found imperfect in respect of registry, and this was very important when using quick-acting lenses.

Mr. A. Cowan inquired whether there was any protection for the films as the plates lay upon one another in the wells.

Mr. Starnes replied that paper could be laid between if desired, but he found that by cleaning the backs of the plates they did not injure one another. The lens was adjusted to focus by being set in a tube carrying a screw thread. On turning the tube round the lens was little advanced or retired, and no light could pass between the tube and jacket.

The Chairman said there was no doubt it was very important to prevent stray light from entering the camera by any means. He never trusted to any camera without having a black cloth over everything.

Mr. S. W. Rouch next showed a very portable camera and shutter.

Mr. G. Shew exhibited a camera similar to that shown the previous year, but in the present model instead of a long rack there was an arrangement for clamping the back at different parts of the tail-board, when a short rack-and-pinion would give the more precise focussing. The tail-board was long, but part of it could be turned down out of the way when length was not required. He also showed an adapter for use with a small camera, rendering it capable of taking slides of a larger size.

The Chairman considered this exhibit to be very useful. Many people, after having settled upon the size for their camera, found an occasional requirement for a larger-sized plate, and regretted the inability to produce it.

Messrs. Marion and Co.'s representative then showed a spring shutter and a washing trough for negatives. The last-named appliance was furnished with a syphon of large bore, so that the trough was rapidly emptied as soon as filled.

A MEMBER inquired whether this style would not be liable to cause the upper part of the plates to be weakened by exposure to the air whilst containing a weak solution of hypo. He thought that the plates should be entirely covered for some appreciable time.

Mr. S. D. MCKELLEN said that his experience of a trough of this kind was not favourable. He preferred a box having grooving along the bottom and up one side. It would then suffice for plates of a given or any smaller dimension.

Messrs. Marion and Co.'s print-washing machine was next shown. The prints being contained in an inner frame of perforated zinc, there was no tendency to their running towards and choking the run-off pipe. Streams of water kept the prints revolving whilst the machine was in use.

Mr. W. ENGLAND considered that zinc was an improper material to use, and that the inner vessel might advantageously be made of gutta-percha.

Mr. J. WERGE said that zinc had an injurious effect upon a silver print.

Messrs. Marion and Co. also exhibited a miniature camera for use by those who would not be burdened with a larger size.

Mr. J. CADETT showed a shutter which was an improvement upon those he had previously exhibited, inasmuch that there were means of adjustment by which it could be used with a slow exposure of any length desired, or with a very rapid adjustable exposure up to one hundredth of a second or less.

Mr. MCKELLEN exhibited a camera which combined several points of novelty and utility. The camera was for 15×12 plates, and opened to about thirty inches, but when closed was only about three inches thick. The stand was fixed to a large mahogany flap—a base which permitted of the camera being rotated or fixed in any position. The back and front were easily and rapidly raised into place, and the front was fitted with a rotating inner front in which the flange was placed excentrically. This arrangement permitted of using the lens on one or other side of the field and of acting as a high rising front.

Mr. L. WARNERKE showed a combined camera and changing-box constructed by Professor Ezurtchewsky, of Moscow. The camera was of stereoscopic size, and when closed contained the lenses and was complete. The plates were kept in a receptacle below the camera proper, and were brought by a rackwork one by one under the groove in which they were to be exposed, and, by another rack-and-pinion, were raised into the groove ready for exposure.

Mr. W. E. DEBENHAM was pleased to see any indication of a return to favour of the stereoscopic form of photograph.

The CHAIRMAN concurred in this feeling.

Mr. WARNERKE also showed tablets covered with phosphorescent material for giving definite exposures to transparencies upon gelatino-bromide plates.

A shutter, by Mr. THOMAS FURNELL, was then shown, and this was followed by a dark slide with changing frames, by Mr. A. G. HOPKINS. In this arrangement a thin dark slide is brought over an opening in the camera back, and the plate contained in an inner frame is pushed by a pin down into its place. After exposure the pin is drawn up, bringing the plate and inner frame back again into the slide.

Mr. HART showed a shutter of Belgian construction. This will be found described in the report of the London and Provincial Photographic Association, before which it was exhibited some months back.

A vote of thanks to the exhibitors closed the meeting.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AT the meeting of this Association, held on Thursday, the 23rd instant, the chair was occupied by Mr. J. Traill Taylor.

The lecturette *On Toning*, which had been postponed from the second Tuesday in the month on account of Mr. W. M. Ashman's indisposition, was on this occasion delivered by that gentleman [see page 698], and illustrated by demonstrations of the processes described.

At the conclusion of the lecture, in answer to a question,

Mr. ASHMAN said that he had toned many thousands of prints in the bath of gold and uranium, and that he considered it a very nice bath.

Mr. A. L. HENDERSON said that the lecturer had stated that they were indebted to Mr. Waterhouse for the introduction of the alkaline method of good toning, but he (Mr. Henderson) considered that that introduction was a misfortune to photography, and that ordinary sulphur-toned prints were more permanent than those produced by the alkaline gold toning method. Sulphide of silver was a very stable substance. With reference to the use of nitrate of uranium: he had found it advantageous to employ it in the silver sensitising bath. Prints that were made upon paper thus prepared would appear somewhat yellow in the lights before fixing, but in the hypo. this yellowness entirely disappeared.

Mr. W. E. DEBENHAM said he believed that the view generally held that sulphur-toned prints were very unstable was perfectly sound. In confirmation of this he mentioned that many years previously he had some d'oyleys which were made of fine white jean, and had drawings upon them made with marking ink. This marking ink was a silver compound from which the silver was reduced in a black or dark brown condition by the application of heat. In some cases, where the drawings had appeared too brown in colour, he had subjected them for a short time to the fumes from sulphide of ammonium. This changed the colour to a good black, but in a short time the fine lines in the drawings thus treated faded to a dirty-yellow colour—much like that of a faded photograph. With regard to what had been said and illustrated of platinum toning, he observed that the print toned before them by that method was exceedingly weak and poor, and this was not to be wondered at, as the toning solution was acid with hydrochloric acid. He thought he remembered having seen it recommended to neutralise the hydrochloric acid in the platinum solution and then faintly acidify with nitric acid, but there might be a better method. The borax and gold bath, which had been referred to, he had found very satisfactory, and was what he was in the habit of using.

The CHAIRMAN remarked that he had some transparencies toned with sulphur that had not faded.

Mr. DEBENHAM inquired whether they were protected by varnish.

The CHAIRMAN replied that they were.

Mr. HENDERSON said that if a so-called faded print were immersed in a solution of platinum and iodine the faint parts would be strengthened. At first sight the print looked useless, as the iodine combined with the starch in the paper to make a dark compound all over the picture, but after a time this was got rid of.

Mr. W. K. BURTON stated that, as he had always understood the alkaline gold toning process, there was formed a compound which was the toning agent: but in a work on silver printing, recently published by Captain Abney and Mr. H. P. Robinson, it was stated that the chloride of gold was the toning agent, and would act more quickly without the addition of an alkali, but that the alkali acted as a restrainer. He would like to hear the views of members on the point.

Mr. DEBENHAM believed that the function of the alkali was not that of a mere restrainer, but that a compound was formed by it and the gold which was a better and more active toning agent than the chloride of gold itself. He had recently found that a bath which had gold added to it without additional alkali (borax) did not work so well, and, he thought, not so quickly, as after the addition of more borax.

Mr. BURTON'S experience had been similar to that of Mr. Debenham, and he held the same view as to the function of the alkali. With regard to platinum toning he did not know whether it was generally known that in one of the commercial lists of chemicals there was a platinum salt, which he believed was sodic-chloride of platinum. It was sold to be used either by itself in lieu of gold in an alkaline toning bath, in which case strong black tones were given, or it might be mixed with gold and intermediate colours obtained.

Mr. HENDERSON did not think that toning was a substituting but a gilding process.

Mr. W. H. PRESTWICH used only gold and water for toning with, and no alkali at all. He made a very weak solution and used it next day.

Mr. DEBENHAM observed that London water contained an appreciable quantity of carbonate of lime. If chloride of gold in a very small quantity were added to it there might be sufficient lime to form a proper toning compound. That there was an action of this kind in Mr. Prestwich's case was indicated by the fact that he mixed for use the day before. Mere dilution did not require time, but chemical action did.

Mr. A. COWAN suggested that Mr. Prestwich should make up a bath with distilled water and see how that would act.

In answer to a question as to the preparation of ready-sensitised paper,

Mr. L. WARNERKE said that he had employed successfully a formula published by Captain Abney. After floating on the silver bath the paper was transferred to pure water to remove the free nitrate, and then floated upon a ten-per-cent. solution of nitrite of potassium.

Mr. BURTON had found that this method did not yield such rich prints as those produced in the ordinary way.

Mr. WARNERKE agreed that with ordinary albumen paper it did not give such rich prints. He used double albumenised paper with this method.

Mr. HENDERSON said that upon the occasion of the last meeting, when Mr. Ball spoke of the difference that existed between different sensitometers, he had been asked to send them to the meeting for inspection. He had done so, and a great difference was perceptible to the eye. On plates of the same make one registered 20 and the other 15.

The further discussion of Mr. Ashman's paper was adjourned until the next meeting.

BERLIN ASSOCIATION FOR THE CULTIVATION OF PHOTOGRAPHY.

THIS Association met on the 3rd October,—Professor H. W. Vogel in the chair. Several new members having been admitted,

The CHAIRMAN showed a pamphlet, issued from the Royal Lithographic Institute, at Stockholm, containing some reproductions of copperplates and drawings and some views from nature, in which the half-tones were broken up by a network of lines; also some reproductions of drawings on granulated paper. The Chairman also presented the Society with a copy of an illustrated publication issued to celebrate the opening of the new Technical High School at Charlottenburg, Berlin.

Herr GAILLARD called attention to certain coloured lichtdrucks to be seen in many art shops, and stated that the method by which they were produced was generally something as follows:—A black photolithograph is first prepared, and as many prints made from it upon toned paper as there are plates required for the coloured print. Each of these prints is then retouched so as to remove all the parts except those required for a single colour, so that each print may be considered to represent a single colour. Each of these retouched prints is again photographed, and from the negative so obtained the lichtdruck printing plates for the respective colours are prepared. When circumstances permit all the photolithographs are fixed side by side upon a board, and all photographed together.

Herr QUIDDE remarked that Herr Gaillard's own coloured lichtdrucks were considered very good, and, in his own opinion, there did not exist a better process than Herr Gaillard's.

Herr GAILLARD replied that he had given up working his process, as he could not make it pay. The public did not seem to care for coloured pictures, nor to be able to distinguish between good and bad ones, and, consequently, would not pay for the good ones.

The CHAIRMAN showed a number of black heliotypes and of coloured pictures, produced by Herren Angerer and Göschl, Vienna, by their own process. These were examined by Herr Gaillard, who pronounced them excellent.

Herr SACHS exhibited a collection of instantaneous views, principally street scenes, which he had taken in Spain.

Herr VEIT showed a pasteboard dark slide, which was so far an improvement upon Herr Martini's that it was light-tight.

Herr HALWAS exhibited a photograph of a *danseuse* swinging in the air. She was suspended by a single wire, while the tip of the toe of one foot only rested upon a horizontal wire.

The CHAIRMAN showed the second number of Herr Czermack's work on *Meteorites*, which is illustrated by some splendid microphotographs by Herr Grimm, of Offenbach.

Herr CHRISTMANN presented a number of *Harper's Weekly*, containing a humorous illustration entitled "A day in the life of a photographic amateur."

Herren ANGERER and GÖSCHL spoke very favourably of the results of their experiments with azaline-stained plates.

Herr HABERLAND, referring to the blue intensification, said that if the plate were washed long enough with water the blue colour would disappear, and with it all intensification.

The CHAIRMAN explained by saying that apparently this intensification was produced by the formation of soluble Berlin blue, a substance which has long been known to chemists.

Herr QUIDDE called attention to a cement or mountant called "alligin." He thought it particularly suitable for household use on account of the ease with which it could be used. It did not, like glue or gelatine, require to be warmed, and it had a much greater adhesive power than gum arabic starch, and kept very much longer than the latter.

The CHAIRMAN found that a coating of mould was apt to form on the top of the alligin. It was, however, very easily removed and did no further harm, but it would be very apt to make people mistrust it.

Herr QUIDDE had a sample in his possession which he had opened in the beginning of July, and which he had, therefore, possessed for three months; but as yet it had shown no tendency to become mouldy—perhaps because he kept it in a well-closed bottle.

Herr HABERLAND remarked that both the hyposulphite of soda bath and the alum bath he used for gelatine plates became brown after being a short time in use, and he inquired the reason.

The general opinion was that it was caused by the developer being imperfectly washed off.

Herr HALWAS had remarked that when he laid a plate immediately after development, without being washed, into the alum bath and let it lie there the plate was rendered useless by flame-shaped spots; but if the alum bath were kept in motion this phenomenon did not occur.

Herr KUNZE sought the cause of this phenomenon, which he also had observed, in an unequal further development of the plate, produced by some developer still adhering to the plate and being acted upon by the alum bath. If the bath be left at rest this developer does not distribute itself equally in the alum; consequently the subsequent development only takes place in patches, while these are prevented from forming by keeping the bath in motion.

Herr ROLOFF did not use alum at all in the case of plates which showed no direct tendency to crapiness or frilling or to dissolving off.

Herr SACHS recommended that all plates should be laid for ten minutes or so in an alum bath; that contributed to the permanency of the plate by destroying the last remaining trace of hyposulphite and removing any yellow fog, while at the same time imparting a brown tone to the plate, in consequence of which it would furnish more brilliant copies. In the case of plates which were readily dissolved off, such as those intended to be stripped off, he advised their being placed in an alcoholic solution of alum.

Correspondence.

PHOTOGRAPHS ON CANVAS.

To the EDITORS.

GENTLEMEN,—There can be no doubt that, by the method described in last week's Journal, photographs can be transferred to canvas, and probably the process would give results which, so far as *appearance* goes, would perhaps be better than any other. But the picture on the canvas is required for artistic purposes—to be covered with oil colours. The substratum being of gelatine, "moderately strong," no worse method could be proposed.

If artists would give their experience I think we should hear that all prints on canvas having gelatine as a basis are not to be relied on—that, sooner or later, the picture will crack, and, not improbably, may leave the canvas in parts.—I am, yours, &c., A. BROTHERS.

Manchester, October 28, 1884.

DEVELOPING FORMULÆ.

To the EDITORS.

GENTLEMEN,—A continuation of my experiments with the hydrokinone developer has induced me to substitute one drop of pure strong nitric acid for the citric acid; then only twenty minims of liquid potassium are necessary, with the most satisfactory results. The hydrokinone appears to keep well in solution. I think one grain to the drachm of soft or distilled water will be found a convenient solution. It ought to be filtered then with ten drops of nitric acid made up to 100 minims with water. You have all your solutions convenient, and no weighing every time. I think anyone trying this developer now will be perfectly satisfied with it.

I find many of my negatives that were strengthened some year and more since are going, and I hope and believe that with this developer "strengthening" is a thing of the past. I am trying a modification of the old fixer, viz.:—

Cyanide of potassium	300 grains.
Citric acid	100 ,,
Water	20 ounces.
Methylated spirit	5 ,,

I have not tried it sufficiently yet. I think it promises a more brilliant picture, but will not bear washing after fixing and before drying.

I think it would be worth while to try the result of substituting pyro. for hydrokinone, although I do not anticipate so good a result. As I said in my former letter, hydrokinone appears to me to give any amount of density without sacrificing the high lights.

I also tried a mixture of 240 grains of cyanide of potassium and twenty ounces of saturated solution of alum; but the result, after leaving it for the night, was a straw-coloured liquid with a colloid deposit, which filtered out beautifully. Although, however, smelling strongly of cyanide, the filtrate was utterly powerless as a solvent of the chloride. The other fixer gave a brown tone to the negative.—I am, yours, &c., W. T. F. M. INGALL.

Greenhithe, Kent, October 27, 1884.

THE TRICYCLE AND PHOTOGRAPHY.

To the EDITORS.

GENTLEMEN,—Having seen some correspondence going on in the Journal respecting tricycles for photographers, will you allow me to introduce to your notice a photograph of a tricycle which has been specially designed for touring photographers by a local maker in Exeter, and which I find very convenient?

The tricycle is named "The Photographer." It is narrow and light, will pass through an ordinary door without any alteration, or can be wheeled up a flight of steps. It will go through a very narrow gate and allow me to ride it into a field, where I can get the best view, instead of leaving it in the road.

The front bone is extra long, and quite straight for the convenience of strapping on the tripod. The camera is fixed underneath the rider on a neat bracket, padded with rubber. The camera I carry is a 12×10 with two double dark slides. The weight of the camera and slides balances the rider, thus causing ease and comfort in riding.

The extra length of the straight front bone, and the weight of the camera and slides balancing the rider, causes the machine to run with less vibration than usual. The tricycle is the design of Mr. E. Monkhouse, of Exeter, assisted by practical photographers.—I am, yours, &c.,

October 27, 1884. BROMIDE.

MISUSE OF THE ROYAL ARMS.

To the EDITORS.

GENTLEMEN,—In regard to my proceedings against Messrs. A. and G. Taylor respecting the above, permit me to remark that when the Patent and Designs' Act, 1883, came into operation I felt confident that this firm were never entitled to use the name of Her Majesty in connection with their trade, or had any authority whatever for displaying the royal arms, either in front of their premises or on stationery which they issued to their numerous canvassers. Upon application to the Lord Chamberlain's Office, and otherwise, I found such to be the case, and hence the proceedings which I found necessary for me to prosecute.

In all cases where an Act of Parliament imposes a penalty for its infringement it has been the rule that no officer of the Crown should prosecute, but the vindication of the Act has been left to one of the public, his reward being one-half the fine inflicted, and I believe also the costs of his proceedings being paid by the offender, except in cases where it is called a test case or first proceedings under the Act. Now, in the case of A. and G. Taylor it has been a very aggravated one, as their boast has been that they are the largest photographers in the world, and in a recent pamphlet issued by them they assert that they employ upwards of 800 artists, operators, &c.

Therefore, if that be the fact by their own showing, it stands to reason that this position has been mainly gained by their assumption of being photographers to Her Majesty, the Prince and Princess of Wales, &c. &c., which has been proved to be untrue, though at the same time it has had a great effect with the public, and has enabled them to monopolise a large portion of the photographic business of the country to the detriment of other photographers, their process of obtaining trade being so peculiarly exhaustive as to stop nearly every avenue of business against others, not only in London and its suburbs, but in all provincial towns throughout the country, where you find their satellites actively at work in every railway station, market place, post-office, police station, and all descriptions of workshops. Not only that, but they also pursue a house-to-house canvass in every neighbourhood where it is likely to pay, and with their representations above mentioned manage to intercept business in all directions that would otherwise be legitimately shared by other photographers.

For further information I have to refer to proceedings already reported, in which there have been four adjournments, and in which they had engaged the services of the most popular counsel of the day, who only succeeded in reducing the penalty and obtaining a nominal amount of costs by representing that they were totally innocent of transgressing the law, and had made every reparation in their power by removing the royal arms, &c., from all their premises.

In conclusion: I beg to say that I shall watch this firm very zealously, and if I find them breaking their parole they shall be again called to book by—Yours, &c., WM. TURNER.

140, *Upper Kennington-lane, London, E.C., October* 22, 1884.

To the EDITORS.

GENTLEMEN,—The decision given in the above case is evidently conclusive that the prosecution was a righteous one, There is no denying the fact that work has been obtained by virtue of the statements erroneously made by the defendants. It is also beyond contradiction that a *very serious injury* has been done and trade diverted from its legitimate channel by the defendants' mode of procedure. In fact, I thoroughly believe that the profession has been entirely revolutionised, and that the "club" system introduced by Messrs. Taylor has given a mortifying wound to the trade.

I hold that this case is a case for the profession generally, and it is they who, to my mind, should now come forward and bear the expenses incurred. To say that the prosecution was instituted for the sake of the moiety of the fine (*at most* £10) is out of the question. Who would undertake the anxiety of a lawsuit of this character for such a trifle? I propose, Messrs. Editors, that you start a subscription list; I am prepared with my 5s. I suggest that out of the fund thus raised you pay the law costs and other expenses incurred in this suit, and any surplus to be handed over to the "Photographers' Benevolent Fund"—I am, yours, &c.,

12, *Clapham-road, October* 23, 1884. GEORGE J. TEAR.

MEDAL AWARDS AT THE PHOTOGRAPHIC EXHIBITION.

To the EDITORS.

GENTLEMEN,—In the name of art and photography I am most desirous of knowing the merits of the three medal pictures—*Knuckle Down Tight*, *Small Studies*, and *Interior of St. John's Church, Malta*.

The first is an example of the lowest type of *genre* picture, in which two of the figures have moved, and indifferent technical work is exemplified. The *Small Studies* are indifferent in choice of subject, pose of figures, and technical execution. The *Interior*, with its halation and total disregard of perspective, is surely not equal to Mr. R. H. Lord's *Interior of New Archæological Museum, Cambridge*, with its perfect lines and even lighting of the sculpture—a most difficult task considering the newness and whiteness of the casts. I should feel much obliged if some one would point out how any of these even approach such artistic and perfect work as that of Messrs. Gale, Gibson, Horsey, Forsyth, and others.

Again: may I humbly ask where the science is in the three pictures for which scientific medals have been awarded—one purely a photomechanical process and the other two triumphs over technical difficulties? I fail to see that it is any more "scientific" (oh! misused word,) to photograph a streak of lightning than a breaking wave.

These are the things which send men away sadly from such places, cynically wondering when this rotten something in the state of Denmark will be righted.—I am, yours, &c., P. H. EMERSON, B.A.

October 25, 1884.

To the EDITORS.

GENTLEMEN,—The Rev. H. Victor Macdona, M.A., by the tone of his letter in your last issue, appears to have gone back to his parish in Cheshire after his special visit to the photographic exhibition with a great deal of "the dog in the manger" about him. He appears to envy several of the successful exhibitors their awards, and would lead one to suppose that the gentlemen who acted as judges knew nothing about photography; and the hanging committee——well, they ought to be executed, and, doubtless, the reverend gentleman would be pleased to act as executioner. It seems a great pity that there should be so many gentlemen to act in the capacity of judges, hanging committee, &c., when there appears to be one who is competent to undertake the whole of it. I would suggest that the Rev. Mr. Macdona be appointed next year to hang the exhibits and act solely as judge.

My *Sea Studies* seem to have specially called forth a most unwarrantable attack from the reverend gentleman, who says that "they bear all the distinct traces of very indifferent retouching." He will, perhaps, be astonished when I say there is *no retouching* either on the negatives or prints, the negatives scarcely requiring even ordinary spotting. I should say that the well-known gentlemen who acted as judges were quite capable of judging whether the work they were examining was either *elaborately* or *indifferently* retouched. If not, they certainly ought to have had the reverend amateur at their elbows to advise them.

I may mention that the Royal Cornwall Polytechnic Society awarded me their medal in August last for the same case of *Studies* that have received such attention from Mr. Macdona.—I am, yours, &c.,

Waterloo-square, Bognor, October 29, 1884. W. P. MARSH.

To the EDITORS.

GENTLEMEN,—In reference to the Rev. Mr. Macdona's remarks respecting Mr. W. P. Marsh's *Sea Study* negatives being elaborately retouched, I feel it but just to say that in consequence of having made transparencies from most of the plates exhibited by that gentleman I am in a position to state that they are not retouched.—I am, yours, &c., JOHN HARMER.

Wick, Littlehampton, October 29, 1884.

Notes and Queries.

GEORGE ADCOCK writes:—"Is there any objection to my counting seconds by means of a string suspended to the camera, a small weight being attached to its lower end to cause it to act as a pendulum? If you think well of the idea please inform me what length of string will be the most useful. Ought not a quick vibration to be preferred to one that is slow?" ——In reply: We have often adopted the method of counting seconds suggested by our correspondent. This was, however, in the times of slow plates and long exposures. A bit of string ten inches in length, with a pistol bullet attached to the end as a "bob," will vibrate in half-seconds with practical accuracy.

"OUGHT the eggs which are to be employed in the albumenising of paper to be fresh or stale?—ALPHA."—Well, this is a query to which we cannot give a "square" reply, because we know that some albumenisers—men of probity and experience—say one thing, while others—equally good and experienced men—say the other. Albumen which is *quite* fresh is not employed as a rule by the majority of albumenisers, who prefer keeping it for a period ranging from two to four or five days before using it for coating paper.

W. JOHNSTON inquires:—"1. Does it matter which side of the focussing-glass (matt or smooth) is outside the camera nearest the eye?—2. In using the photometer (direct to source of light) does this mean the instrument to be pointed to the sun or brightest part of the sky, or held pointing towards the view to be taken, as I find there is a considerable difference in effect from the two positions?"——In reply: 1. Cameras are invariably constructed so as to necessitate the ground surface being placed next to the lens.—2. Let the photometer be directed towards the light by which the view is illuminated.

THE REV. E. P. RIVERS writes:—"Some time ago you gave a description of the newly-invented balance thermometer of Messrs. Watson and Sons, of High Holborn. Can you say from actual knowledge whether it does all that was originally claimed on its behalf?"——In reply: The thermometer in question, having been improved since the date at which our article appeared, does rather more than we anticipated on its behalf; for it is so sensitive that the mere lighting of a candle, within a foot of the instrument, will cause it to register the change of temperature produced thereby by means of its indicating end, while as yet such change can only be imperfectly discerned on the register engraved on the tube itself. It is a most convenient instrument in a dark room or any other room.

"OBSERVING that you have published Mr. W. Ackland's process of collodio-albumen for transparency work, will you permit me to inquire in what respect, essential or non-essential, it differs from that which a few years ago was sold as a secret process by Mr. B. J. Edwards? And will you permit me further to inquire, in the event of the two being found to be practically similar, to which of these well-known gentlemen are we to consider ourselves indebted for the inception of this special development of the collodio-albumen process?—I am, yours, &c., THE GHOST OF TAUPENOT." ——To these queries we are somewhat unable to reply; but we were made aware of the Edwards method at a date long prior to that which the Ackland system was brought under our notice. Concerning the identity, or even similarity, of the two systems, it is not necessary that we should here speak, especially as Mr. Edwards has not *published* his, so we leave the matter for those interested.

PRINT-WASHING TROUGHS.—A correspondent writes to inquire if we can furnish him with the name of any London maker where the print-washing troughs recently described by us have been made, and, also, whether one eighteen inches in diameter would be suitable for washing three hundred *cartes*. We have communicated with the gentleman whose apparatus we saw in work, and he writes us that the apparatus was made fourteen years ago by a plumber and zinc-plate worker in London (Clerkenwell direction) to designs supplied, but that he cannot at present furnish any address. If, however, he be able to find the name he promises to send it, and in that case it shall be forwarded to our correspondent. We should advise that a trough twenty-four inches in diameter be used for so large a number as three hundred *carte-de-visite* prints. When prints are packed very closely in a limited quantity of water there is less chance of the rotating current passing over the surface of every individual print, and in print-washing the desideratum is that every print should be equally and well washed.

PERSIAN asks—"Can a glass positive be fitted into a locket, or even a finger ring?"——We reply: There is no reason why any difficulty should be experienced in doing so. Let us suppose that we have got an unvarnished (to take the worst case) positive on glass which has to be fitted into a small locket, and that the edge must be so perfectly cut as to show no chips or fractures. Having placed the "besil," or ring in which the glass is contained, upon the picture, draw with a needle point a line round it, scratching the photograph. Next cut the picture by means of a diamond, and with several cuts as near to the mark as possible. Then, by means of a pair of sharp and, by preference, new cutting-pliers, chip off the glass until the mark has been reached, and gradually encroach upon this until after repeated trials the portrait is found to enter inside of the frame. Seeing that the glass is usually finished with a squarely-ground bevel it is not possible to see the extreme edge of the portrait, and, as a consequence, minute defects in the margin will not be observed. A brush charged with black varnish should then be applied to the edge of the glass, the back having, of course, been also well coated with black. This method affords the perfection of mounting and fitting glass positives.

Exchange Column.

No charge is made for inserting these announcements; but in no case do we insert any article merely OFFERED FOR SALE, *that being done at a small cost in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a* NOM DE PLUME *be thought desirable), otherwise the notice will not appear.*

I will exchange a two-gallon still for a scenic background.—Address, J. GRIMSHAW, Dale-street, Haslingden.

I will give a good exchange or cash for a copy of THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for 1880.—Address, B., 53, Cowgate, Dundee.

I will exchange a Ross's meniscus, three and a-half inches diameter, for Dallmeyer's wide-angle view lens or whole-plate.—Address, J. HILL, Malvern.

I will exchange Seavey's boat and background, cabinet lens, also a splendid *carte* lens, for large photographs or anything useful.—Address, J. W. D., Sand Pits Parade Studio, Birmingham.

I will exchange a Lerebours' half-plate portrait lens, with stops, in good condition, for violin and case, or anything useful.—Address, R. S. BONNALTO, The Factory, Kimberley, Notts.

I will exchange a Lancaster's enlarging lantern, also Marion's cabinet burnisher, for a Cadett's shutter and a good posing-chair.—Address, WILLIAM HALL, 34, Lansdowne-place, Lewes.

I will exchange *Picture-Frame Making*, by James Lukin, cloth binding, clean and perfect, for *Pictorial Effect in Photography*, by H. P. Robinson.—Address, OPAL, 31, New-street, Ashford, Kent.

I will exchange a *carte* lens, by Lerebours, with stops, in case, equal to new, for a posing-chair, backgrounds, or anything useful in photography.—Address, J. BARKER, 106, Chestergate, Macclesfield.

I will exchange a drying cupboard, made according to England's drawings, also a large sheet of plate glass—size 36 × 24 inches—for anything useful in photography.—Address, W. H. SEDGWICK, South View, Sedbergh, Yorkshire.

I will exchange a good *carte* lens, by Hermagis, which will take a small cabinet head, eight inches back focus, for a good artist's outfit, both oils and water-colours; if not both, oils preferred of good quality.—Address, C A., 21, St. Sidwell-street, Exeter.

Wanted, an $8\frac{1}{2} \times 6\frac{1}{2}$ or 10 × 8 portable camera with three double slides (must be light and in good condition), in exchange for pictures in frames (large variety to choose from), albums, frames, fancy goods, tobacconists' goods, &c.—Address, C. F. HEWITT, St. Mary's-street, Wallingford, Berks.

I will exchange a Voigtlander's *carte* lens, an oak studio camera-stand, an iron head-rest (both nearly new), a half-plate water-tight bath in polished pine case, and a 10 × 8 ditto in mahogany case. Wanted a 10 × 8 burnisher in good condition, four Victoria lenses, nine gems, or Ross's 10 × 8 wide-angle lens; difference adjusted.—Address, J. A. BELLINGER, photographer, Sidmouth, Devon.

An artist requiring photographic apparatus, which must be in good condition, is willing to paint a few oil-paintings (landscape), work-up enlargements, finish opals, &c., in oil or water-colour, in exchange for anything useful in photography, particularly a good rolling-machine, 10 × 8 dry-plate bellows-body camera, complete with lens and slides, also a half-plate and quarter-plate ditto, and studio and alpenstock stands; references exchanged.—Address, X. Y. Z., 19, Whitefriars-road, Hastings.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

NOTICE.—*Each Correspondent is required to enclose his name and address, although not necessarily for publication. Communications may, when thought desirable, appear under a* NOM DE PLUME *as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.*

PHOTOGRAPH REGISTERED.—

W. L. Shrubsole, Davey-place, Norfolk.—*Photograph of Their Royal Highnesses the Prince and Princess of Wales and Shooting Party at Thornage, Norfolk.*

AJAX and A. B.—Write to the Secretary.

W. C.—There is no work published on the subject. Articles upon it will be found distributed through this and previous volumes.

BATH.—Write the titles neatly with black varnish on the negatives. You must write them backwards, as a matter of course.

GEO. SMITH.—Many thanks for a copy of the reply. We shall be very pleased to see the result of your trials if you will kindly forward them.

EDWARD NEVILLE.—By a six-per-cent. solution is meant a solution containing six per cent. of the salt—the bichromate of potash in your case.

T. P.—Your previous letter was not preserved. Kindly, therefore, repeat your query, and, if possible, send a plan of your proposed studio, and we will help you if possible.

H. ARNOLD BEMROSE.—In speaking of the novelty we did not infer that the thing had never been done before. There is an old adage—"There is nothing new under the sun."

W. W.—Try Messrs. Langton and Bicknells, 89, Newington Butts, S.E. They will perhaps supply you with a small quantity, as we surmise you do not require much. They, as a rule, only supply large quantities.

X. X. X.—See an article on *Photographing Interiors*, by Mr. H. Y. E. Coteswortlh, in the issue for May 16th of the current year. The same remarks apply equally well to the work you have in hand. We know of no such formula. Cold tones will be better than warm.

J. R. T.—It is not advisable to wash the prints in such very hot water as you suggest. You say that the hot water will not be used until "the prints have been well cleansed from the hypo." If the prints are well cleansed from the hypo., why the necessity of the hot water?

O. O. O.—Pure paraffine wax is far preferable to pitch for coating the insides of wooden dishes which are to contain silver solutions. If you cannot procure it in your village, Messrs. Hopkin and Williams will supply it. It is not nearly so expensive as you appear to imagine.

ROWLAND.—The results are very promising, and certainly should encourage you to continue your experiments. Try the effect of using the ink thinner than you are now doing, and do not be in a hurry with the different operations. Remember: "Rome was not built in a day."

W.—*Eau de javelle* is a very useful hyposulphite eliminator. The cause of the spots of which you complain is that you have printed from the negative before the whole of the hyposulphite of soda was removed from the film; hence the silver paper has acted upon it and produced the spottiness.

WM. NASH.—It is illegal for you to make a photographic copy of a Bank of England note, though it is often done. If you only make a reduced copy for use as a microscopic object, no doubt you will not be interfered with. Such copies are—or at one time were—to be purchased at most opticians'.

COUNTRYMAN.—The Exhibition of the Photographic Society of Great Britain is open daily from ten till dusk, and on Monday, Wednesday, and Saturday evenings from seven till ten. The charge for admission in the daytime is one shilling and in the evenings sixpence, members being admitted free.

ALF. B. HOWARD.—Blue glass was at one time employed for glazing photographic studios, though it was never really in much favour. White glass is now used almost universally. If you use white glass you can, of course, paint or stipple over with any tint desired, and clean it off at any time if not approved.

I. LIGONIER.—The "halo" is what is known as a flare spot from the lens. As yours is a single lens, the cure will be to alter the stop slightly from its present position. If you slide it gently backwards and forwards, while watching the effect upon the image on the ground glass, you will soon discover the best position so as to avoid it in future.

NOVICE A.—It is clear that one fault in your prints is that the silver bath is much too weak—probably not more than half the strength it should be. This is quite sufficient to account for the majority of your difficulties. The prints, we may mention, bear unmistakable evidence of slovenly manipulation, as shown by the finger marks on the backs and, in some instances, on the front. These are caused by the paper being touched with fingers contaminated with the hyposulphite of soda.

PHOTOGRAPHIC CLUB.—The forthcoming meeting on Wednesday next, November 5th, will be the annual general meeting of the Club.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.—At the next meeting of this Society, to be held on Thursday, the 6th November, in the Hall of the Society of Arts, John-street, Adelphi, Mr. J. Traill Taylor will deliver a lecture *On Florida and its Orange Groves*, illustrated by numerous photographs shown as dissolving views by the lantern.

A PROPOSED AMENDMENT IN PHOTOGRAPHIC TERMINOLOGY.—Professor Vogel suggests that, instead of using so many different names for the photo-chemically-produced negatives for the typographic press or relief printing-press (such as phototypes, autotypes, and heliotypes), they should all be called *licht-hoch-druck* (which may be translated *photo-relief prints*), and that the processes intended for the copperplate press, such as heliography, heliogravure, and photogravure, should be called collectively *licht-tief-druck* (equal to light-deep prints or *photo-intaglio prints*). Henceforth he intends to use these terms, which are certainly more intelligible than those he wishes to supersede, as they convey a definite idea of the thing spoken of; but this effort in the right direction will, we fear—so strong is the force of habit and of vested rights in the various names—be as unsuccessful as a previous effort to introduce the word "photogram" for the photographic print, as "telegram" is for the message sent.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. STEWARD, Optician,

For the Week ending October 29, 1884.

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

Oct.	Barometer.	Wind.	WetBulb.	Dry Bulb.	Max. Solar Rad.	Max. Shade Tem.	Min. Tem.	Remarks.
23	30·01	SE	45	45	—	56	42	Foggy.
24	29·94	E	46	47	—	55	43	Foggy.
25	30·12	WNW	39	39	—	50	37	Foggy.
27	29·87	NW	41	45	—	52	41	Cloudy.
28	29·53	N	56	60	—	63	41	Cloudy.
29	30·09	NW	39	41	—	50	36	Foggy.

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1279. Vol. XXXI.—NOVEMBER 7, 1884.

SULPHITE OF SODA IN THE DEVELOPER.

We have purposely refrained from replying to Mr. W. Hanson's remarks a fortnight ago until we should be in a position to speak from actual experiment on certain points mentioned by him. We are now in that position, and propose as briefly as possible to show in what manner we differ.

Mr. Hanson, it will be remembered, holds that sulphite of soda retards the development—a view which we ourselves attempted to controvert on the ground that sulphite of soda being itself capable of development can at anyrate not be a retarder, even though it be not an accelerator. However, Mr. Hanson says:—"But does it necessarily follow because an image can *slowly* be brought out by the aid of sulphite of soda that, therefore, it accelerates development when used in conjunction with one or other of the alkalies?" Then, again, he says:—"When things of an opposite character are joined together a medium product is generally the outcome of the union. Now, let sulphite of soda be allowed to represent extreme slowness in the operation of development, and ammonia (of the right strength) extreme quickness; then a combination of the two according to the above general rule ought to yield a mean ratio of speed, depending on the proportions on which they are mixed."

Now the suggestion contained in this quotation is, we venture to think, based upon an utter and grievous fallacy. In the first place, even accepting Mr. Hanson's own view of the respective functions of sulphite and of ammonia as representing *slowness* and *quickness* relatively, they are *not* "things of an opposite character," but rather represent different degrees of the *same* character. Again: It is to be borne in mind that sodium sulphite is not *substituted for* ammonia, but is *added to* it, and that, therefore, whatever developing energy the latter may possess, it must be augmented by whatever slight developing action the sulphite may exercise. On the other hand, to introduce an *ad absurdum* argument, we will suppose the developing energy of ammonia to be 10, while that of sulphite is 1 and its retarding action 6. Now, with the combined ammonia and sulphite developer the sum of the developing action would be represented by the equation $10 + 1 - 6 = 5$. If the ammonia be eliminated the developing action would be represented by $1 - 6 = -5$—a negative or retarding action. And yet, as we have shown, such an alleged *retarding* solution is really a *developer*, which is utterly absurd.

We are quite prepared to agree with Mr. Hanson that sulphite of soda is a less energetic developer than ammonia or other alkali, and that if it were substituted for an equivalent proportion of the ammonia solution of developing strength then the result would be, as he suggests, a mean between the two. But such is not the case; for, whether sulphite be used or not, the same quantity of alkali is (or should be) present in each ounce of developing solution, *plus* in the one case the sulphite.

Speaking of the theoretical result to be anticipated under his view of the question, Mr. Hanson further says:—"And in practice I find this to be so, for the more sulphite there is present in the developer the slower it works." Now, again, with one important modification, we should be willing to agree with Mr. Hanson, but that modification traverses the whole question. If for the word *sulphite* in the last quotation the word *sulphate* be substituted perfect accord would exist between us, and it is with the view of showing it is really sulphate which produces the result complained of by Mr. Hanson that our experiments were instituted.

We have always called attention to the importance of using pure, freshly-prepared sulphite, pointing out how in consequence of its rapid oxidation it is not to be trusted after having been long in stock. Let anyone interested in this question take the trouble to test a sample of sodium sulphite obtained through the ordinary commercial channels, and it will invariably be found to contain a considerable proportion of sulphate, the retarding action of which is so well known. Different samples will, of course, vary very considerably according to age and other conditions of storage; but it is practically impossible to find a sample that will not give the sulphate reaction.

In order to try the matter thoroughly sulphite of soda was specially prepared and used at once. A solution of pure carbonate of soda was divided into two parts. One half having been saturated with sulphurous acid, the two were mixed and very carefully neutralised, and evaporated until crystals began to form. In ten ounces of the saturated solution fifteen grains of pyro. were dissolved; a second solution was made by dissolving fifteen grains of pyro. in ten ounces of filtered rain water; and a third by using a solution of commercial sulphite to dissolve the fifteen grains of pyro. The same solutions of ammonia and bromide and of carbonate of soda were used throughout, and the developers employed were strictly identical, except in the presence or absence of sulphite and the substitution in some cases of soda for ammonia.

As the result of several experiments, we may say briefly that in no case, either with ammonia or soda, was there the slightest difference in the rapidity of action of the first two pyro. solutions; the third, made from commercial sulphite, developed a little more slowly, but produced an equal result if a slightly longer application were allowed. This was a fairly good sample of sulphite, giving bu little reaction of sulphate.

In conclusion: We are more than ever convinced that where the slowing action of sulphite is complained of it is the result, as we have before alleged, of the presence of sulphate in the sulphite of soda.

AN INCANDESCENT PLATINUM LIGHT.

That there is room for new and powerful modes of illumination in connection with the various departments of photographic practice will be admitted without hesitation by every photographer.

To those interested in this development of physical science we have some pleasure in directing attention to a gas lamp which was introduced to the notice of the London and Provincial Photographic Association at their meeting last week. It consists in the rendering of a thimble of platinum gauze incandescent by the heat emitted from the combustion of a mixture of a large proportion of atmospheric air, with a small proportion of carburetted hydrogen or common house gas.

Ever since the period when Bunsen made his investigations in this direction the heating properties of this admixture of gas and air have been well known, and their special value recognised and applied in various and wide-spread departments of social and manufacturing economics. Indeed, the "Bunsen burner," in one or other form modified to suit special requirements, is now to be met with in every workshop and almost every dwelling-house, its services ranging from the melting of metal down to boiling the domestic kettle.

When a flame of this mixed gas is made to impinge forcibly upon metal it invariably melts, unless it be one of the more refractory class, of which platinum forms a good example. This metal, when subjected to the intense heat of the mixed gases (relegating for the nonce the *rôle* of a gas to atmospheric air), becomes incandescent, and emits a powerful light. Difficulties of an apparently insuperable nature seemed to have hitherto attended the utilisation of this principle of lighting; but from the exhibition that was made at the society mentioned they would appear to have been at length quite overcome. During several years a lighting engineer, Mr. Lewis, has been engaged in the solution of the problem of an easy and satisfactory method of utilising the incandescent platinum principle, and he has now attained such progress as to have elicited the encomiums of *savants* like Professor Tyndall, who has eulogised it highly. At two of the principal railway stations in London it now competes with the electric and other systems of lighting; while at the meeting of the photographic society referred to attention has been directed to its possibilities in connection with photography.

The light, as adapted for either enlarging by the lantern or for the exhibition of transparencies upon a screen, is produced by a small conical thimble formed of platinum gauze about the diameter, at the base, of a lime cylinder, but tapering upward to a point. This forms a species of cap to a circular orifice, through which passes the mixture of gas and air. When this is ignited a poor, dull red colour is imparted to the platinum cap, proving the insufficiency of the flame to warm it up to even a respectable red heat. A glass chimney, when placed over the flame, does not sensibly increase the power of the light. But no sooner is the lower end of a tall chimney, made of thin and light metal, brought to rest upon the glass than in an instant, and as if by magic, a pale, lurid flame which was seen to play around the platinum thimble then disappears, and in about two seconds the gauze becomes incandescent, emitting a light so powerful as to dazzle the eye.

What the chimney does is to increase the draught of air, by which the heat becomes intensified almost instantaneously. The quantity of gas consumed by the small burner that was exhibited at the meeting in question is only three feet per hour, and we are unaware in what other way a light possessing an equal degree of intensity could be obtained by so small an expenditure of gas. Air is the chief factor in the production of this intense illumination, and *it* costs nothing.

In the course of a brief description of the Lewis light, the gentleman by whom it was introduced spoke of an ingenious method by which the necessary increase of air was obtained without the use of either a blower or a tall chimney. Mr. Lewis, it appears, found that if the gas could be placed under an increased degree of pressure, several strong air currents could be induced by the agency of certain short pieces of brass tube, which acted the part of conduits, and by which sufficient air could be supplied to the flame to impart all the heating power necessary. This is one method by which the intensity of the heat can be augmented. But as it involves the employment of either a bag or some other analogous means for increasing the emissive force of the gas, it may not eventually prove so popular in the case of lantern illumination as other and simpler methods.

The best substitute for the long chimney—in itself neither cumbrous to carry nor difficult to manipulate—would seem to consist of a small blower or fan driven by a light piece of clockwork, and by which a gentle current of air could be made to ascend through the bottom of the burner; but whatever system, eventually, be found to possess the balance of advantages in regard to purposes involving extreme portability (such as the application of the light to the lantern), it is satisfactory to know that, by peculiarities in the construction of the burner itself not hitherto introduced, the problem of applying common gas to the production of a powerful and intense light is undoubtedly solved. Owing to its small volume the Lewis incandescent light will prove useful for producing sharp enlargements, this being in accordance with optical laws which we need not here explain, contenting ourselves with reiterating the adage—"A small flame gives a sharp image." We shall watch with interest the further development of this light.

REVERSED NEGATIVES.

Now that the different processes in which reversed negatives are essential—such as in the various photomechanical processes, the carbon process by single transfer, and numerous other processes based upon bichromated gelatine—are being worked still more extensively than ever, it becomes an important question to determine which is the best method for their production.

The Photographic Club have considered the subject of sufficient importance to devote an evening to its discussion, and this took place last week. Various plans were advocated by different members and duly discussed, and the weak as well as the strong points of each were brought prominently forward. It would be quite impossible in the space of a single article to give even a brief outline of all the different methods there are for producing reversed negatives. It is almost superfluous to explain that by the term "reversed negative" one is meant which, if it be printed in the usual manner, will yield an impression that is reversed as regards the left and the right.

The methods of making reversed negatives may be classed under four heads:—First, the plan of producing a negative direct from a negative without the intervention of a transparency; second, by removing the film from the glass so that it may be printed from the reverse side; third, the reproduction of the negative in the camera from a transparency; fourth, taking the negative reversed in the first instance.

Under the first head comes the "nitric acid" process, in which the positive image—resulting from printing from a negative on a collodio-bromide plate and developing by the alkaline method—is dissolved out with nitric acid. Then, after washing and subsequent exposure to light, it is again treated with the alkaline developer, when a negative results. Again: there is the "dusting on" process. This, as most of our readers are aware, consists of coating a glass plate with bichromated gum, dextrine, or analogous substances, and, after exposure under a negative, dusting over with plumbago or other powder in a fine state of division, which then adheres to certain parts of the film in proportion as they have been protected from the action of the light.

Some few years back Mr. W. Brooks worked out a process of producing reversed negatives. His method is somewhat similar to the nitric acid one, except that in place of the nitric acid a solution of iodine is employed to convert the image into iodide of silver, which is unacted upon in the second development. The advantage of Mr. Brooks's process over the nitric acid one is that it is applicable to gelatine plates as well as collodion. About the time that Mr. Brooks introduced his process Mr. Thomas Bolas, F.C.S., devised one for attaining the same end. This consisted of treating an ordinary gelatine plate with the bichromate of potash, which, after drying, is exposed under a negative. When developed in the usual way with the alkaline developer a negative image is brought out instead of a positive.

None of these methods, however, are employed to any extent in practice. The nitric acid plan is objectionable principally on account of the fumes evolved, and also because considerable experience is necessary to obtain success under all conditions. The dusting-on method, especially for large sizes, is somewhat difficult to work, inasmuch as it is dependent upon the hygroscopic conditions of the film, and these are not easy to control in our variable climate. Although we have obtained excellent results, both by the process of Mr. Brooks and that of Mr. Bolas, we believe neither of them have really been fairly tried on a commercial scale.

We will now consider the second system—that of removing the film from the glass. After the negative has been taken in the ordinary manner, a sheet of gelatine—such as that employed for *bon-bons*, or for glazing prints—is softened in water, then gently squeegeed down upon the film, and now allowed to dry. When dry it is easily detached from the glass, which, by the way, should previously have been treated with French chalk. In place of employing sheet gelatine, some operators prefer to place the negative on a levelling-stand and pour on a solution of that material. This is then allowed to set and dry, when the film can be removed, as in the previous case. Instead of using gelatine at all, the plate may be coated alternately with india-rubber solution and collodion until a film of sufficient thickness is obtained, when it is stripped from the glass.

Both these methods are extensively employed in practice, but there is no disguising the fact that they are attended with some inconveniences, namely, that the gelatine films are liable to be influenced by moisture—a serious evil when the subject happens to be copied to scale. Although the compound film of india-rubber and collodion is free from this defect, unfortunately it is sometimes found to become exceedingly brittle after keeping for a few years. Moreover, negatives which have been varnished are not so easily stripped. It is true the varnish may be dissolved off, and then, by treating the film with dilute acetic or other acid before the gelatine or india-rubber is applied, the stripping may be accomplished, but only at considerable risk to the negative, except it be done by a very skilful hand.

We now come to the method of reproducing the negative in the camera from a transparency. This plan, like the previous one, is extensively utilised, especially when varnished or stock negatives have to be dealt with. The weak part of this plan is that, unless considerable skill be exercised in the production of the transparency, there may be a great loss of delicacy in the reproduction. Furthermore: if the optical appliances are not of the most perfect description there must be a sacrifice of definition. But, as a set-off to this, there is the great advantage that the original negative is preserved intact for other purposes, when perhaps a reversed one would prove worthless.

We have now the last of the four systems enumerated above to consider, namely, that in which the negative is taken reversed in the first instance. There are two methods of accomplishing this. The first is that of making the exposure through the glass supporting the film; that is, placing the plate in the dark slide reversed, so that the glass side is next the lens instead of the film. If this plan were to be adopted it is manifest that any imperfections in, or scratches upon, the glass itself must be reproduced upon the image. But this is not all, for it is found in practice, even if the glass be perfect, that the image is never so sharp and crisp as when it is impressed upon that side of the film to which the developer is applied. The second method of taking the reversed negative direct is that of placing a prism, or a mirror at an angle of 45°, in front of the lens—not necessarily in front, be it understood, for it will answer equally as well if placed behind; indeed, there are some advantages to be gained by its occupying this position.

During the discussion at the Club it was suggested that the mirror or prism would absorb a considerable amount of light, and, consequently, entail a greatly prolonged exposure. But it was pointed out by those who had considerable experience in working with the mirror that such was not the case, provided the mirror was kept bright. It was also elicited that a mirror, with care and an occasional polish with rouge, would continue in good condition for a year or two without requiring to be re-silvered.

As the result of the discussion the general impression appeared to be that the best methods of obtaining reversed negatives are those now almost universally employed commercially, namely, that of removing the film from the glass as a pellicular negative, and that of taking the negative direct with the aid of a prism or mirror. For the larger sizes it was thought that the latter method is to be preferred to the former.

THE TREATMENT OF FRAMED PICTURES.

The unfortunate fact that photographs were once very fugitive has been a perpetual stumbling-block and a continual source of trouble, annoyance, and anxiety to the conscientious photographer who, desirous that nothing deserving the epithet of ephemeral shall issue from his studio, puts himself to considerable trouble in overlooking the carrying out of all desirable precautions in his silver printing, and, wherever possible, puts that entirely aside and works in carbon or platinotype. Let him be ever so careful, and his assistants ever so trustworthy in following his instructions, he is liable at any moment, whenever some particular piece of outside carelessness happens to his pictures, to have them brought to him and their fading away pointed out. True it is that a certain portion of the public are now actually aware that photography is as capable as line engraving of turning out permanent work; yet it is not more than three or four years since the *Athenæum* itself, in one of its critiques, deplored the necessary fugitiveness attaching to all photography, and utterly declined to notice a communication which one of our contributors forwarded to it, pointing out that there were many mechanical printing processes in which the pictures were formed in printing ink alone.

One gentleman informed us that he intended to place upon the back of every framed picture he sent out a notification to the effect that it would be undesirable to boil, bake, or roast the enclosed photograph, as he would not then be answerable for the consequences; for he assured us that pictures often received treatment equivalent to this.

There came within our own notice, some little time since, an instance of something very similar. The lady of a house, which was in the throes of the usual "spring fever," passed over some of her less valuable pictures to one of her domestic "helps" to dust and clean. The said "help," being vigorous and thorough, placed one end of the frame in her bucket of soap and water and conscientiously laved the whole frame and glass with her washleather; and then, turning the frame upside down, repeated the operation. Fortunately, for the photographer's reputation, the whole transaction was noted at once, as, otherwise, we feel no doubt the changed appearance presented would have been put down to "those fady photographs." When, again, the gilt frame of a photograph can be subjected, as we have seen, to the tender mercies of a nail-brush and soft-soap to remove fly-spots, what possible indignity can be imagined to which the photograph itself would not be subjected?

These are examples of crass ignorance; but what shall be said of the client—familiar, we scarcely doubt, to every photographer—who brings a faded, yellow, surface-abraded thing with the unfortunate artist's name on the back of it, and demands another print to be done in its place as it "has not stood," when the real truth of the matter is it has been subjected to careless treatment and has "stood" a great deal too much? Put first of all in a cheap frame, the glass of the latter having soon been broken, and the owner either too indolent or too indifferent to get another, it has been knocked about—now given to the baby to play with, then placed on the drawing-room table, and finally banished, perhaps, to the mantelshelf which adorns an ever-smoking chimney—how can it be anything but pale-brown, faded-looking, and ugly?

We may here say what in this regard we think is not generally insisted upon. We consider that a mantelshelf and the wall above it are about as unsuitable places as it is possible to devise for placing a valued or valuable photograph. The dust, smoke, and dirt perpetually circulating around when the fire is alight cannot but influence the photograph, causing it almost inevitably to give way if it be a silver print, and begriming, staining, and spoiling other pictures, whether permanent photographs, engravings, or water-colour drawings.

Still another impeachment must be laid against many members of the general public—the careless disregard of all necessary precautions against damp and moisture, which, though a continual characteristic of certain walls in some houses, is yet quite capable of being evaded. When no precautions are taken, and it is possible at times to see the walls actually glistening with moisture, condensed or percolated, how improper it is for the owner of a picture hung against such a wall to bring it to the photographer and complain that it faded, streaked, or mildewed, when the only wonder is that it had not succumbed far sooner. A wall covered with thin lead specially made for the purpose, or even with pitched paper, would keep out all moisture and render a room far more healthy to live in at the same time.

Further: a room which is not actually damp may yet, if exposed to violent fluctuations of temperature and conditions of atmosphere, be most unsuitable for either photographic or other work, if only by reason of the occasional internal condensation of moisture produced when a long-continued moisture-laden atmosphere has quickly given place to a spell of sharp, cold weather.

We have yet one other point to which attention should be drawn. The old stereoscopic view and the *carte* view have gradually been entirely displaced in favour of those of larger size. In every print-seller's shop in the kingdom may be purchased scrap photographs, views of local interest, &c., &c., nearly all of which are sold in the unmounted state. Bearing in mind our remarks upon the subject of bookbinder's paste, &c., last week, it may easily be seen how large a proportion of these very pictures may be quickly put upon the road for extinction because of the use of some one or other of these vile compounds.

Having exhausted the list of indictments against the members of the public, it is fit that we should call attention to lapses on the part of photographers themselves. We think it would be a most desirable thing that all scrap unmounted photographs should bear, carefully printed upon their plain side, a lightly-printed announcement giving full details of the precautions desirable to take in the mounting and storing of photographs.

Further: though no words of ours will move the man who works always in one groove and produces pictures bound to fade because of the processes he employs, there are many to whom a hint is always acceptable, and to them we would point out the necessity of eschewing, in even the cheapest frame, every possible source of evil. Every glass should be scrupulously and carefully pasted into the frame, leaving not the least corner where air could penetrate; otherwise a streak of dust would inevitably follow in its train and quite ruin the appearance of the picture, this fine dust stain being sometimes almost ineradicable. The same precaution should be taken at the back, for no frame ought to be sent out with the back boards merely held in their place by a nail or two. It should, on the contrary, be most carefully pasted on, and, if in several pieces, each portion carefully pasted over with slips of paper. If this be desirable for appearance only in the case of a permanent picture, far more so is it in the instance of a silver print, which fades most rapidly when not preserved from the action of air—an action almost entirely prevented by the pasting of the back and front of the frame. We can, from our own experience, state that there are many photographers who send out large quantities of framed work, yet who never paste a single glass to the frame—a course that we cannot too strongly deprecate.

The practical conclusion to be drawn from our observations is that, though the public does not yet appreciate the possibilities of permanency in photographs, the fact may be impressed upon them that pictures by photographic processes can be so produced that they shall not fade, and that in all instances it is necessary for photographs to be treated with care and consideration. Finally: that, to ensure this being done, we consider it would be a most desirable thing if all photographers would have stamped upon their works a few brief hints as to the best mode of pasting in books, &c., or upon the most suitable mode of hanging to provide against all contingencies.

THE PHOTOGRAPHIC EXHIBITION.

[Fifth Notice.]

Mr. John Lewis exhibits a few frames of landscapes that are noticeable rather from a technical point of view than from any special claim to the picturesque. Good photography and mediocre subjects do not, as a rule, conduce to the finest results.

Mr. W. Muller exhibits three small collections of pictures representing respectively *Views in Cornwall, South Devon*, and *Scotland*. In No. 110 the Cornish coast scenes are splendid renderings of rock and water, the next frame of Devonshire views being scarcely inferior.

Mr. Henry Stevens sends a couple of frames of his well-known flower subjects—perfect in manipulation, but not differing greatly from his exhibits of the past two years. His figure *Studies* (No. 231) are equally good in technical quality; but the "untouched" work of the cleverest amateur cannot, nowadays, aspire to compete with professional productions in figure and portrait subjects.

Mr. George Hadley's exhibits are of a very varied character. First in the catalogue is *At the Wheel* (No. 24), which shows us, as its name suggests, "the man at the wheel," rough and grimy, clad in greasy canvas, top boots, and sou'-wester—just such a figure as may be seen every day on board our coasting vessels, from one of which, no doubt, the subject was taken. Amongst the same artist's *Small Studies* (No. 362) are remarkably good ones, especially the former subjects. Of the two centre ones we have chosen one for illustration.

No. 362—*Small Studies*. By G. Hadley.

Mr. Richard Keene's *Book Illustrations*, printed in platinotype (No. 466), some of which we have previously seen, will show to the most casual spectator what can be done in the way of artistic embellishment of books by photographic means. Practically permanent—as permanent, at least, as the paper on which they are printed—these pictures possess much, if not all, of the qualities of fine mezzotint engravings. The portrait and enlargement of *Viscount Ingestre* (Nos. 384 and 469), taken in a private room, show what may be done in this direction by a skilful artist.

The annexed illustration is one of Mr. Donkin's Swiss views—*The Way to the Matterhorn* (No. 374)—one of the most picturesque little "bits" amongst the whole collection, reminding us very much of Mr. Andrew Pringle's *Great Dome* picture from the Yosemite Valley, which we gave last year.

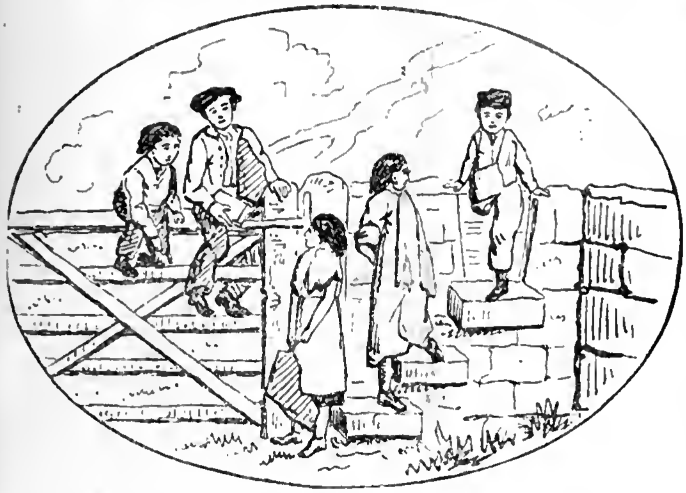
No. 374—*The Way to the Matterhorn*. By W. F. Donkin.

Major Verney's different exhibits remind us, this year, more of the old wet collodion days than any other works in the Exhibition. The strong contrasts in some of the pictures savour more of iodised collodion and pyro. development than of modern dry plates. As a rule, the subjects are well chosen; but we cannot help denouncing the taste (or, rather, the want of that quality) exhibited in one of the pictures in No. 405. We should blame the catalogue probably for some vagueness in the description of others of the pictures.

Captain Abney exhibits in two sizes, his larger pictures being, we fancy, superior to their smaller companions—$7\frac{1}{2} \times 5$. Of the former, two views, *On the Cherwell* (Nos. 261 and 262), are specially noticeable for the delicacy of the rendering of the reflections in the river; but the brightest and best of the series is *Greenwich Hospital* (No. 265). Of the larger ones, two views of *Glaslyn* (Nos. 270 and 271) are worth attention.

Messrs. West and Sons, of Gosport, have a single frame of very fine yachting views, in much the same style as their last year's exhibit. Though the collection contains no individual picture to equal the famous *Chittywee*, the general average is far better than last year; indeed, it may be said that there is not a single "weak" picture in the frame.

Mr. Edwin Smithells devotes his attention principally to *genre* subjects, several of which are well worth a little study. *Shadows* (No. 149) is hung so high that we can scarcely recognise its right to that title. The next two in the catalogue (Nos. 238 and 239) are merely animal portraits, presenting little of interest. Better are *The Mowers* and *A Summer Day* (Nos. 332 and 333); but the most taking picture of the collection is *Just Let Loose from School* (No. 400)—a happy arrangement of figures, but rather marred by



No. 400—*Just Let Loose from School.* By EDWIN SMITHELLS.

extreme fuzziness of the background. This we have selected for illustration, and another picture by the same artist, *A Reverie* (No. 550), we shall probably give next week.

Another of our illustrations is by Mr. J. R. Dunlop, who shows a frame of *Village Scenes* (No. 444), best of which is the group of

No. 444—*Village Scenes: New River Side.* By J. R. DUNLOP.

girls at a well, a rough sketch of which is appended.

Mrs. S. G. Payne's solitary picture, *Knuckle Down Tight* (No. 528), which has been awarded a medal, suffices to remind us that

No. 528—*Knuckle Down Tight.* By MRS. S. G. PAYNE.

we might enjoy the Exhibition better if it contained more of this lady's work. It is a few years since we passed our "marble" days, but we can fully enter into the spirit of Mrs. Payne's picture.

In our next notice we shall close our review of this year's Exhibition. We are glad to learn that, financially and in other respects, the present year has been one of the—if not *the*—best the Society has known.

APPARATUS.

WE now give a description of the new style of camera exhibited by Messrs. Watson and Sons. The front is fitted in a horseshoe, going in a very compact space and giving movement both of rising, falling, and sliding, together with the power of being swung in any direction, horizontal or vertical. By an ingenious arrangement of a double flange, one of which rotates inside the other, a reversing front is secured equivalent to the reversing back of the ordinary camera, which allows the pictures to be taken either horizontal or upright. The dark slides are fitted in a light frame at the back of the camera, instead of sliding in grooves like the ordinary pattern. The grooves being thus dispensed with, the sides of the dark slides are perfectly smooth. This permits all the slides to be made to a gauge, so as to render those belonging to cameras of one sort interchangeable. These slides are thinner than usual, their shutters being composed of lightproof and waterproof cardboard, which, while strong and durable, is lighter than wooden slides can be made. Again: the slides are not cut open, but the two plates are inserted from the side of the dark slide and held in position by a spring which shuts over this from the outside.

It is of such recent date that we described the simplex slides and reversible camera backs of Mr. A. G. Hopkins, it is here only necessary to state that these are on exhibition.

Upon looking for a new form of shutter exhibited Mr. J. Cadett—one differing in certain respects from any hitherto described by us—we quite failed to discover it among the articles exhibited, although entered in the catalogue.

Mr. Thomas Samuels exhibits certain improvements upon his camera, changing-back, and packing-cases as placed in the Exhibition last year. The ingenuity displayed in their construction is undeniable, and we doubt not that in practical work in the field the camera will acquit itself well.

A drop shutter and a spring shutter exhibited by Mr. T. J. Smith are good and efficient instruments, their construction not calling for any special description.

Making here a slight deviation from the order of our remarks on the apparatus displayed upon the tables in the Exhibition, we have to allude to the transparencies prepared for the lantern.

A collection of exceedingly-choice productions of this class, exhibited by Mr. George Smith, challenges admiration. Only a limited number of subjects are shown, but of each of these there are several examples in *facsimile*, the object presumably being to show how absolutely alike these pictures may be produced by the process of printing of which Mr. Smith is such an acknowledged master. The tone of pigment selected is a peculiar shade of brown not easily described, but so transparent as to permit the light to penetrate through even the deepest shadows. It would be very gratifying if Mr. Smith were to impart to the public a knowledge of the mysteries which enshroud his method of printing; for we are aware of some who have tried the production of transparencies by the Woodbury system, but have quite failed in producing results at all comparable with those of Mr. Smith.

The lantern slides of Messrs. York and Son, which find a place on the tables in the Exhibition, comprise excellent selections from some of the numerous series of story or lecture subjects issued by this enterprising firm. They are understood to be produced by wet collodion, the fine neutral tones by which they are characterised being obtained by chloride of platinum.

Discarding all adventitious toning agents, Mr. William Brooks—whose exhibits are produced by the collodio-bromide process, in which he has had great experience—is known to obtain his special tones (usually a warm purple) by modifying the developer. If it were necessary to cite examples of the work of this gentleman we might direct attention to his scenes taken in or near Bettws-y-Coed, which possess a charm peculiar to themselves.

THE following gentlemen will act as jurors at the Northampton Museum Photographic Exhibition: — Messrs. Andrew Pringle,

W. Bedford, and V. Blanchard, photographers; Mr. Joseph Clark, Member of the Institute of Painters in Oil-Colours; and Mr. G. W. H. Brogden, the representative of the local society. We learn that the Exhibition will be opened on Tuesday, December 16th, and *not* December 15th, as previously announced.

Our contemporary, *La Nature*, though generally giving details of the very latest scientific news, renders itself liable at other times to have the stale joke "old news" directed at it. Thus, last week, amid a variety of interesting topics, we find two columns of letter-press devoted to an account of the manner of producing the well-known "magic" photographs—the toy of nearly a score of years ago. The photograph is made, as our readers are aware, by rendering a silver picture invisible by means of bichloride of mercury, and then causing it to start into existence at any future time by placing it in contact with a damped sheet of filter-paper previously saturated with "hypo." The process is amusing enough, but utterly useless. Indeed, when first introduced to public notice it savoured more of the nature of a trick than a scientific amusement, many purchasers being (foolishly enough) under the impression that their shilling's worth of magic photographs would enable them to produce at will a picture of any subject they chose.

Apropos of the subject of the glass used for optical instruments—the great cost of which and the difficulty in obtaining it were alluded to in our last issue—we may give an extract from Mr. Norman Lockyer's recently-delivered Cantor lecture, in which reference is made to the same subject. He says:—"If I am rightly informed, no optical glass of the size now required (for which almost fabulous prices are given) is being made in England. If I am again rightly informed, the only source of supply in the world now available for us will shortly run dry."

It really does seem marvellous that England—which exports large quantities of optical glass to the continent for making instruments which it purchases back again—should not be able to make it in sufficiently large pieces to satisfy the makers of big instruments. Possibly the demand is too limited in extent to render it really worth while going to the expense of the necessary plant and the sacrifice of valuable time. It is not every day that a lens one yard across is required.

The use of a silvered mirror is often recommended for the purpose of taking reversed negatives, and it is certainly a far cheaper instrument than a prism; but a mirror perfectly flat is by no means readily purchased or quickly made. Mr. Lockyer, in the lecture referred to, puts down the cost of one a little over a yard and a-half wide as forty thousand francs—say sixteen hundred pounds!

It used to be the case that, although no optical glass equal to that of English make could be purchased on the continent, yet such instruments as opera-glasses and soforth, for which this glass was needed, were not made at all in this country. It is not the case, however, now, as these instruments have been made for some time in London—not perhaps of the very best class, but still made *bonâ fide* by workmen in our own country.

It is tolerably certain that the use of the tricycle will spread among photographers even more than among the general public. It is advantageous for either amateur or professional use, forming, too, as it so conveniently does, a complete substitute for a tripod. One of the drawbacks to its use is the churlishness with which drivers on the road frequently treat riders on the iron horse; but a lesson recently taught these obstructives will no doubt have a very salutary effect. The Rev. J. T. Dove, who is a county magistrate, was lately riding his tricycle along the road when he came up with two coal-carts, the drivers of which refused to leave the crown of the road when requested by Mr. Dove to do so that he might pass. He had, in consequence, to pass them by riding on the path. They, however, did not know their man, and he summoned them for an offence under the Highways Act. He did not press for penalties, but only for a decision to show the rule of the road, and, in consequence, the drivers were let off with a reprimand and payment of costs.

Professor Hartley, in the Cantor lectures, treating of *Fermentation and Distillation*, puts photography to a new use, namely, the testing the purity of spirit of wine—a substance which ordinarily he considers to be one of the purest commercial products. His method "consists in causing the rays emitted by an electric spark passed between two points of metal to traverse a vessel, with sides of rock crystal, containing the liquid, and afterwards to pass through a slit and a prism and a lens of quartz, and receiving the rays on a photographic plate."

In a list of antiseptics compiled by Herr Miquell we find two photographic substances, one at the head and the other at the tail of the list. Mercurous and argentic iodides were required in quantities of only ·0025 and ·003 per cent. of the liquid experimented upon, while hypo. needed 27·5 per cent. to prevent decomposition taking place.

A very interesting note by Mr. Philip S. Brito, M.B., upon reactions for discovering the presence of iodine in the presence of large quantities of bromine is to be found in the last number of the *Chemical News*. He says it transpires that the process is not really new; yet he thinks the instructions he gives may be of use in the furtherance of chemical knowledge. It would from its simple character seem to be of considerable value, for example, in readily ascertaining the presence of iodide in a dry plate whose composition was unknown. He says:—"In the ordinary process of analysis, from a solution supposed to contain bromine or iodine we liberate the halogen by the aid of small quantities of chlorine, and carry it down with chloroform. The violet-coloured iodine, or the dark sherry-brown colour of bromine, picks out the element; but in a mixture containing both the colour of the less abundant halogen is masked. When iodine preponderates it is got rid of by the addition of sulphate of copper and sulphuric acid. When, however, the bromine is in very great quantity, I find that the addition of a crystal or two of sulphate of iron completely decolorises the brown colour and renders visible the minutest traces of iodine dissolved by the chloroform. The value of this test may be gathered from the fact that in the bromide of potassium supplied as a reagent in the laboratory, and which is supposed to be pure, the application of the sulphate of copper demonstrates the existence of iodine as an impurity. Further: when the colour alone is not decisive, and any doubts exist, its application will settle the point. * * * How far this decolorisation can be taken advantage of to determine volumetrically the amount of bromine in a given exercise can be settled by actual experiment."

We have heard much of late about the injurious effects produced by the inhalation of ammonia since dry-plate development has been the standard work of the dark room. We think that if the method suggested by us some time since, and often referred to, were to be adopted we should hear little about the catarrhal effect of ammonia. Our suggestion was to keep the ammonia in stock in a diluted form, and so preserve it from rapid deterioration of its strength. When such is done and the ammonia in a dilute form is measured, instead of being "dropped" in a concentrated state there will be little opportunity for the escape of ammonia into the atmosphere. We scarcely think that anyone would suggest there could be ill effects from the evaporation of ammonia from the open dish of developer.

YET ANOTHER MODIFICATION OF THE CAMERA.

In spite of the thousand-and-one suggestions for the improvement of the camera, the main features of the instrument in common use at the present time remain about the same as they were years ago. For general outdoor and studio work it answers its purpose fairly well; but for baby portraiture and animal photography it is undoubtedly too primitive, and requires modification in respect of making it capable of allowing the operations of focussing and exposing to follow each other and be performed in as nearly as possible the same second of time. To this end have been applied the double camera and lenses of like focus, the camera with finder, the divided camera with sliding front, the reflecting mirror at right angles, mirrors and shutters combined, and soforth. All, however, appear to have some disadvantage (if it be only that of never having been put on the market) which has prevented their adoption.

That some means for ensuring the exposing of the plate immediately after focussing the living subject is desirable, no one who has had any experience with fidgetty specimens of life will deny. Its necessity is felt when the animal (of whatever genus) is placed or driven before the instrument for the purpose of being photographed, without taking into account its powerlessness of dealing with free and natural attitudes which, probably, would not last through the time required in the preparations to photograph them. It is, therefore, a wonder to me that the camera in its present form has been tolerated as long as it has. It is most certainly a long way behind the times in respect of the loss of time and trouble occasioned between the two operations of focussing and exposing. If photographers would only wake up, our clever and ingenious manufacturers would soon supply their demands; but the former can scarcely expect the latter to take the initiative while they have more business than they can manage in supplying the old forms.

The convenience and rapidity of the present dry plate has put quite another face on the matter. Under the old system, when a man had to haul his hundredweight or so of paraphernalia about, and prepare his plates on the spot as he required them, he did not dream of securing a transient effect except by the merest accident; and, if he saw anything he would care to photograph, the question had to be put—"Will it last for half-an-hour or so?" If this were likely he might commence preparations, and feel in these circumstances that a few seconds more or less between any two operations were not of vital importance; yet, even then, the delay between focussing and exposing his plate was frequently most annoying. It has, at anyrate, proved a nuisance to me, and has given rise to more than one experiment and suggestion in the effort to abate it.

The modification I have now in view, and which I will endeavour to make clear, consists broadly in having the back of the camera fitted with a sliding board, either rectangular in shape or in the form of a segment of a large circle, with two apertures side by side—one to be fitted with the focussing-screen and the other with grooves for the dark slide. In front of the lens is a similar one of suitable size likewise having two apertures, one of which is open and the other fitted with an exposer. These two sliding boards are actuated together from one pivot passing along the base of the camera in such a manner that when the open aperture of the front board admits light through the lens the screen is in position at the back, to pass by a simple turn of the handle to the closing of the lens with the shuttered aperture, and to the bringing of the dark slide with its shutter drawn into position at the back at the same instant.

Such is the naked idea. I will now try to explain the addition in detail, and will take for the purpose a rigid base studio camera, which racks out from the front. To the back of this fit a board something like the back of a repeating camera—that is, sufficiently wide to contain focussing-screen and dark slide (the parts for the latter projecting to the right), and upon which are grooved pieces, into which another board slides having apertures fitted to hold screen and dark slide side by side. In a back thus prepared the slide may be placed, and its shutter drawn at the outset ready for exposure. The only act required with the camera in this state is to push it into position when the lens has been covered.

On the front of the camera, and racking out with it, is placed another board to just clear the hood of the lens, before which an aperture is cut to admit light. The lens is connected light-tight up to this board by having another piece fitted to its hood and sliding in upright grooves upon the back of the front piece. This provides for the raising or lowering of the lens as required to suit the subject in hand. Upon the front of the board at the top and bottom are grooved pieces to admit the sliding of another board having an aperture fitted with an exposer. A pivot or spindle, with lever or winch to turn it by, is secured to the base of the camera in the direction of its length, and is connected up to the sliding board on the front carrying the exposer and that on the back bearing the screen and slide, to both of which it imparts motion by means of slotted arms working upon studs affixed to these boards respectively. That arm on the front has a sleeve to fit the squared end of the front, so as to allow it to slide backwards and forwards during the operation of focussing.

When the whole is adjusted the action is as follows:—The lever being turned to the right, the focussing-screen is brought into position and the lens is uncovered. A simple turn to the left suffices to cover the lens with the exposer already set for action, and to bring the slide into position at the back of the camera, likewise ready, the whole only requiring an instant of time to effect the change.

It does not strike me, in bringing this suggestion forward, that it would be advisable to fit large cameras in this way, but to confine it to half-plates and smaller sizes. This, however, would depend on workmanship to a great extent, and could be decided in practice. Respecting the adoption of some such modification, it would give me much pleasure to see the matter discussed with a view to its improvement or alteration, during which I would be glad to give any further details or explanations as they occurred to me. Perhaps some of our friends will open up. Will Mr. G. Smith, Mr. A. Pringle, Mr. W. H. Harrison, or Mr. G. W. Webster do something towards settling the matter? JOHN HARMER.

MODERN "DARK ROOM" IMPROVEMENTS.

No. I.

THE superseding of collodion by gelatine plates has necessitated an overhauling, not only of the operator's manipulative modes but of his various appliances. The "plant" that sufficed for developing and washing a collodion plate is no longer adequate. The room, often a mere cupboard, has had to be expanded into a more spacious apartment. New arrangements, in fact, all along the line have had to be introduced if comfortable and easy work is to be done in any quantity. Each operator has, doubtless, had to work through a series of tentative conditions, and sometimes through blunders, till such means are found as fairly meet his needs; and then he settles down to their use—the "rule of thumb" often, perhaps, working fairly well in practice. The *ideal* dark room is, doubtless, a variable quantity. What suits a business where small portrait work, pure and simple, is practised will be very different to that suited to a really mixed practice where enlarging, carbon developing, transparency printing, chemical operations of various sorts, and, perhaps, a little emulsion making is occasionally carried on. It is the object of this article to collate a few of the "notions" that have been found useful in a varied business, premising that nothing is set down from theory, but that everything named is, or has been, in actual testing. Only such things are set down as have been proved to save time, labour, or expense, or to produce improvement in the result.

A Comfortable Window is one of the first desiderata in a well-appointed room, and it is not quite so easily attainable as it appears at the first blush. The light should be *perfectly safe, easily changed*, and *thrown on the work*. To take the last point first: the light, in perhaps ninety-nine out of every hundred cases, is thrown principally into the eyes instead of down on the plate or dish, or other work in hand. This must be the case with a window vertically let into the side wall, unless a screen be placed to protect the eyes, and that is but a partial remedy. The window is usually placed as low as possible, and the work near it. The result is an uncomfortable sense of glare, simply through the eye being taxed with the quantity of light it has to look through, instead of that light being on the work and the eye in comparative darkness.

The plan I have found effective is as follows:—Inside the ordinary permanent window of the room is fitted a wooden glazed framework, sloping at an angle of something like 45°. Imagine a second window placed just at the back of the permanent one. Then, keeping the lower part of the two close together, the top of the inside one is sloped inwards so far, and at such a height over the sink, as just to clear the operator's head, and throw the light, not in his eyes, but directly down on the work. The ends of the framework are also glazed, throwing the light along the sides of the room. The upper part is a sort of wooden lid, part or all of which opens to admit extra ventilation. A part of the sloping sash frame is devoted to a framed pane running in grooves, and with a handle placed conveniently for instantly drawing back and admitting a flood of white light. The whole arrangement can be constructed by a mechanical amateur at very slight cost, whilst the pleasant sense of comfortable lighting is recognised by every operator who enters the room.

Next, as to a Safe Light.—The vexed controversy of ruby *versus* yellow and other lights I do not care to enter on. Theory, spectroscopic analysis, and fine-drawn experiments have been applied almost *ad nauseam* to the subject, and are very well in their way. The practical photographer constantly at work more or less in his "den" should value more his practical experience of what he finds safe. My own experience has been rather painful—probably like that of most who adopted ruby in all its depth and power. Some of the glass used was preached up as of special trustworthiness, and it certainly wanted nothing in price. This and other brands were piled on till they made a case of "darkness visible"—in the early dry-plate days, not *very* visible either, though uncomfortable enough. The bottles knocked over and the general awkwardness need not be described; are they not written too well in the memories of most of us?

Worst of all, the eyes were suffering severely; pain on suddenly changing rooms and growing weakness of sight constituted evidence that hardly needed the word of warning raised by Mr. Ackland and others. This was the state of things when Mr. W. E. Debenham's heresy from the orthodox ruby was announced. Many will thank that gentleman for daring to try if ruby light was such a *sine quâ non* as it was supposed to be. I hailed it as a very great relief if only it were true. Mr. Debenham very courteously favoured me with samples of his materials, and experiments were made which proved quite satisfactory. I replaced the ruby with one thickness of the rolled or "cathedral" green and two thicknesses of paper. A second screen of similar light-obstructive power was placed in reserve in ease of need when the sun was shining directly on the window; but this reserve was not put up, it never having been required.

This alteration was effected one evening after the day's sittings were over. Next morning I had to leave home for two or three days, and on returning the operator had a tale to tell—how the new light looked so scaringly like daylight after the previous ruby darkness. He could not fancy it safe. The plates at first were developed with all caution of huddling them up from it. How gradually his courage rose as he found no ill results appear! and now, behold! as with pride he passed in review negative after negative with the clearest possible shadows, and manipulated in a light that by comparison might almost be called daylight. The negatives with the yellow light have proved a *far better average* as regards brilliancy than under the previous ruby *régime*. The window has a south aspect, and during the past fine summer has had the sun shining on it a great part of the day. It is also subject to strong reflections from a wide expanse of sand often wet; but there has been no instance of fog that could be traced to the lighting, although an amount of light is admitted that enables the smallest print to be read with ease in the furthest corners.

It is rather interesting to note if any effect has been produced on the eyes by these altered conditions. It will perhaps seem almost like romancing to the incredulous when it is stated that not only did the pain in the eyes common with the ruby *cease* with its removal, but that now the *sight is very much improved*, and there is a commencement to do without glasses. Before this the tendency was to supplement them with extra power.

I do not want to say that this yellow paper with green glass is, *par excellence*, the photographer's light. Probably there are other media just as good. The "golden fabric" seems to transmit light of a similar character. But I do say this—that the use of deep ruby with its disadvantages is nothing less than an anachronism and absurdity as regards the everyday work of the photographer.

I now come to the actual working appliances—the sink and its adjuncts, means of washing and drying, enlarging apparatus, &c.; but these must be dealt with in a succeeding chapter.

BENJAMIN WYLES.

ON THE NATURE OF THE INVISIBLE IMAGE.

I HAVE just seen an article by John Nicol, Ph.D., in the last issue of THE BRITISH JOURNAL OF PHOTOGRAPHY, containing some remarks on a communication of mine (page 501) on the above subject. It will be remembered that I gave several facts, and I asked if they did not create grave doubts as to whether the action of light on a sensitive plate is really to reduce the bromide of silver to a sub-bromide when the invisible action takes place requiring development.

One of the facts I mentioned was a discovery, by one of the Editors, that collodion emulsion might be left for hours in bright sunlight without being injured. The second was that bichromate of potassium will eliminate the effect of light. Dr. Kenyon demonstrated this years ago, when he showed how an emulsion could be prepared in daylight. The third fact I mentioned was one I discovered myself, namely, that a plate can be exposed to bright gaslight for two minutes, and by simply remelting the emulsion the effect of that exposure can be eliminated. True, after exposing and developing a plate covered with the remelted emulsion behind a negative there was a slight fog; but how does Dr. Nicol explain why there was any picture at all—perfect in its tones from light to dark—after the whole of the film had been previously exposed to white light for two minutes?

Now, Dr. Nicol neither says that these facts are wrong or attempts to explain them by the theory of a reduction to a sub-bromide, and, after making such an attack upon me, he must see that he ought to do one or the other. If he can do neither he must acknowledge that what I stated was correct, namely, that these facts create grave doubts as to whether the sub-bromide theory is correct.

It is most amusing that the only one of my statements which Dr. Nicol attempts to contradict was one I quoted from the opening address to the Leeds Photographic Society by their President, some months ago, in which he stated that an exposed plate that had been put by for a time and again exposed on development showed no trace of the first exposure. Dr. Nicol says this is wrong. Because one of his plates had been exposed one year, and another, which he mentions, four years before development, and both turned out well, does that prove that the statement of the Chairman of the Leeds Photographic Society is wrong? Possibly his plates were kept under different conditions of damp or heat. One of the members of the Parent Society told me that he had plates which acted in the same way. Dr. Nicol recommended my close attention to Montaigne's advice. Would not slight attention on his own part be advisable?

I regret to have to call attention to the unfairness of what are apparently wilful misquotations of my statements. For instance: he says my "new theory teaches that silver bromide is not affected by light at all." I never said anything of the kind. What I said was "that when salts of silver are held in suspension in collodion or gelatine the action of light on the particles at first causes a rapid vibration or expansion of them"—that is, there is a mechanical action. With silver bromide or chloride, if the action of light be allowed to continue, a chemical action or reduction to a sub-bromide takes place, as on a daguerreotype plate or in the ordinary printing processes.

A few days ago Mr. A. L. Henderson told me Mr. W. E. Debenham and himself had discovered that there appears to be a phosphorescent action on a sensitive plate which can be produced by light and other means. What is phosphorescence but the *rapid vibrations* set up in the molecules of a substance by the ether waves? If there is proved to be such an action I calculate it will be rather awkward for the "reduction-to-a-sub-bromide" theory, and it will be another proof in favour of my theory.

If we prepare pure bromide of silver *in the dark*, and pour over it the ordinary developer (pyro. and ammonia), the particles will be reduced to a metallic state. *In this case there is no previous reduction to a sub-bromide by light;* but if we form an emulsion by adding gelatine to the silver bromide, pour it on a plate, and let it set and dry, on pouring on the developer the gelatine will be found to protect the particles from being reduced to a metallic state. Were it not so, photography by development *would be impossible.* If we wash off the developer and expose the plate to actinic light, and afterwards develope, we find that this protecting power of the gelatine has been destroyed (through the breaking of the gelatine cells by the vibration of the particles), and the silver bromide is then reduced to a metallic state. The first experiment proves that it is not necessary to reduce the silver bromide to a sub-salt before it can be reduced to a metallic state, and we know that friction by destroying the protecting power of the gelatine has the same action as light, and there can be no reduction to a sub-bromide in that case. The second experiment shows that the gelatine acts as a protector to the particles, as well as to hold those particles in a fine state of subdivision.

Dr. Nicol says "several writers, with some pretension to chemical knowledge, and something like method in their system of experimenting, have, pretty nearly at least, shown that the sub-bromide theory is correct;" and yet we find Mr. G. D. Macdougald, in his paper on *Chemistry and Photography*, read at a meeting of the Dundee and East of Scotland Photographic Association on the 2nd ult., advising the members of that Society to go into these very questions.

On the one hand we have gentlemen elected as officers to our photographic societies calling attention to the necessity of further investigations into these subjects, which shows that *they* do not consider them settled. On the other hand we meet men who simply pooh-pooh everything but what they have been taught as being incorrect, without inquiry or experiment, and who consider that that only is correct which they have themselves been using or thinking for the past twenty-five years.

I do not wish to enter into any controversy. I have simply called attention to certain facts, and stated what I consider those facts prove. Whether my ideas are only worthy of Dr. Nicol's opinions of them time will show. Meanwhile I look to that gentleman to prove that his remarks are justified by explaining the above facts by the sub-bromide theory.

HERBERT S. STARNES.

SOME PHOTOGRAPHIC USES OF FLUORESCINE.

RECENTLY I pointed out that for practical purposes a solution of carmine in albumen and ammonia gives the operator the power of making his own lantern screens, possessing the same optical properties as the ordinary ruby glass coloured with sub-oxide of copper.

Absorption of light takes place in the interior and not at the surfaces of bodies, so a sufficient quantity of the substance must be used to bring out its chief optical properties. Pure distilled water, for instance, is of a bright green colour; but when this is proved sometimes, as at the Royal Institution, a tube about fifteen feet long by eight or ten inches in diameter is used. Its ends are closed with glass plates, and a parallel beam of white light from the electric lamp is sent through its whole length. The circular disc at the farther end then appears of a bright green, from the colour of the water. The same principles apply to glass coloured with sub-oxide of copper, or albumen films coloured with carmine. When feebly coloured they are more or less pink, letting plenty of blue through, and are at that intensity useless for developing-room illumination; but let the colour be increased in intensity, they become exceedingly safe. Nevertheless, from their chief optical properties, they have always a tendency to permit the passage of a small amount of blue when their powers are overstrained by the use of a strong initial light.

On hypothetical grounds I pointed out in these pages several months ago that the best way to overcome this tendency was not by the use of two thicknesses of ruby glass, but by the use of a second sheet of glass faintly coloured by any other substance which has special powers of absorbing the blue, and yet permits red to pass without obstruction. The special merits of a "stained red" glass as opposed to ruby began to occupy attention about that time, and it was published more recently that that glass is coloured with sub-oxide of copper on the one side and oxide of silver on the other. The latter has the requisite power of specially absorbing the lower blue rays, and the practically useful results of the combination prove that the original hypothesis was a sound one.

Of late I have tried a long series of experiments with fluorescine, and find it to be of such use in relation to developing-room illumination that I am likely to keep it always at hand for the future to aid in effecting that purpose. A sufficiently-strong solution of it in albumen, to which one-fourth the volume of the latter of the strongest liquid ammonia has been added, has the power of giving films which cut the spectrum in half. When the solution contains just enough fluorescine to give a bright yellow film all the rays above the yellow-green are cut off when the initial light is not stronger than that of diffused daylight. Statements as to what rays a particular glass or other coloured film cuts off have little meaning unless the intensity of the initial light used be also specified to some extent.

Fluorescine has another useful property. Being fluorescent to the blue and violet rays it lowers their refrangibility to green, and then transmits the yellow-green so produced for use in the developing room. Thus it actually utilises some of the actinic rays themselves, changing them so as to be of value in developing operations. At the same time, it cuts off none of the rays below the yellow-green when the film is of the depth stated; consequently no better medium can be imagined for transmitting a very large amount of light, free from the blue-green rays upwards. After five months' experience and experiments with it, it has given me satisfaction in every respect.

By means of a strong single or double film of carminised albumen and a single film of fluorescine, a screen is made resembling in its optical properties the now celebrated "stained red" glass. The only difference is that the compound albumenised screen is the better of the two; it gives the clearer and brighter red, with no orange. Stained red, when tested by a strong light, such as the direct light of the sun, passes a trace of orange.

Albumenised solutions of carmine and fluorescine mix without apparent decomposition, so probably their combined optical advantages may be obtained in a single film; but being now away from home I have not tested the optical properties of the mixture.

A strongish solution of fluorescine, having a good orange rather than a bright yellow colour, cuts off almost all the green rays. A weak solution of fluorescine has a greenish and fluorescent appearance; it then transmits some of the blue rays unchanged, and lowers the refrangibility of the remainder. Is it possible to lower the refrangibility of some of the extreme violet rays by means of a fluorescent film, transforming them into rays of the wave-lengths which act most powerfully on photographic plates, and thereby to increase rapidity? To avoid loss by additional reflections, the almost colourless film might be formed on a surface of the lens, in optical contact therewith. A substance is wanted which is fluorescent to the extreme violet, and transparent to other rays.

Weak and alkaline solutions of fluorescine have magnificent fluorescent properties far in advance of sulphate of quinine and uranium glass. As the organic dyes vary so much with different manufacturers, and are for the most part not sold as definite chemical substances, it may be well to mention that my sample was purchased from Messrs. Hopkin and Williams, at four shillings an ounce. A very small weight of the crystallised dyes will usually go a very long way in preparing photographic lantern screens, and make the user independent of the manufacturers of coloured glass.

Although the means have herein been pointed out of obtaining the optical powers either of ruby or stained red glass, it must not be supposed that I approve the use of lights produced by their aid in the developing room. Mr. Debenham has rung the death-knell of pure red light in the developing room for ever, and has at last made a convert of the well-known expert, Mr. J. Traill Taylor. The chief light of the future will be principally yellow when examined with the spectroscope—although to the eye it may not be always such, as in Mr. Debenham's light modified with glass of a feeble green tint. His green glass is of little use in promoting safety; it cuts off some of the red of the spectrum, and thereby so modifies the rest of the light that the observer hardly knows what colour to call the available illumination, so constantly is the human eye the victim of optical illusions and delusions.

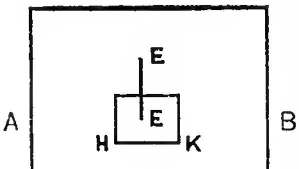
From its practical properties fluorescine is usually catalogued with the aniline dyes; but in chemical composition such may not be altogether its proper place. It may also be used to form films when it is dissolved either in collodion or varnish rendered strongly alkaline, by adding some ammoniacal gas dissolved in strong alcohol; but the solution in albumen is the best for present purposes. In collodion, after a certain strength in fluorescine is passed, the film becomes opalescent. When too much ammonia in alcohol is added to varnish some of the resin is precipitated and not redissolved. Unless there be a strong proportion of ammonia in the liquid, the colour imparted to the film by the fluorescine is less intense, so more dye has to be added to produce an equal effect. Another way of increasing the intensity of a film thrown down from a liquid weak in ammonia is to subject the dried film for some hours to the action of ammoniacal gas. The best plan, however, is to dissolve the fluorescine at the outset in albumen and ammonia, as already stated; in this liquid it dissolves freely and immediately to apparently almost any extent. As to the keeping qualities of the solution: mine is two months' old, and as good as at first. Two or three weeks after mixing it exhibited symptoms of gelatinising, so it was diluted with a little ammonia and water, which restored it to its original condition.

What is known as "true canary medium" owes its safety to its thickness—to its translucency and not to its colour, for it transmits blue of low intensity. Herein the use of separating the safety of colour from the safety of translucency is seen, because if the same make of white paper as used in canary medium be purchased, and then stained with fluorescine to the same depth of yellow as the canary medium in the market, a paper apparently the same can be produced, yet which will allow the passage of safer and stronger transmitted light.

I have only recently commenced experiments on the values of different increments of translucency. The first step taken was to deal with the colour element to get it under control, and to become independent of the meagre and variable supply of coloured glasses in the market. Fluorescine at one blow cuts off the most mischievous of the rays which fog photographic plates, yet is fortunately perfectly transparent to all the rest, in which it gives no trace of an absorption band. The yellow-green can next be cut off when desired by a stronger solution of fluorescine aided by a little carmine, a safe and bright apparent orange being the result; in it, however, the red rays are present. When it is desired to specially absorb the yellow and orange rays alkaline solution of litmus will do; but as yet I have not tried to make transparent litmus films. With any pure colour of the lower end of the spectrum obtainable at will the colour element will be under complete control for experimental purposes, and the hues brighter than those of stained glass.

The optical properties of a sheet of glass coated with fluorescine and albumen are interesting when the sheet is used as a screen through which to observe a landscape. As it completely cuts off all the rays which are blue, or nearly blue, but permits the rest to pass freely, the general colours of the landscape and all but blue flowers are much the same as before, but the whole scene is greatly heightened in warmth and brilliancy. The leaves have the bright, green hues of early spring; the dull leaden clouds covering the whole sky appear as though the sunshine were about to break through them. Yellow glass has the same effect in a degree, but those specimens of yellow glass in my possession exhibit it inferiorly, because their colours are not so pure and bright as that of the albumenised fluorescine. Light yellow rays are said to have a cheering effect on lunatics; those sane photographers who look at a broad landscape on a dull day through one of the films just mentioned will find that it has a cheering effect on everyone. The sight also reveals what a large amount of blue is reflected by the leaves of trees, their apparent darkness at this season being changed to the brightness of youth by cutting off the cold blue element. The electric light is commonly said to have a ghastly effect; this is due to its containing more blue in proportion than does daylight. We do not call daylight ghastly, because we are accustomed to it and its normal proportion of blue; but, after gazing at a landscape for a few minutes through a film of albumen and fluorescine, the same landscape appears ghastly when viewed by ordinary daylight, especially when there is no direct sunshine. If a window were formed wholly of such films, the illusion would be strong enough to make unwary observers believe on a rainy day that the weather is fast clearing up, whereas in reality it is as bad as ever.

A photographer who cannot spectroscopically test the light of his developing room, or of any new screen he purchases for its window or lantern, is in a very helpless position in the matter of getting the best light for working. A spectroscope is not, however, necessary for the purpose, Dr. van Monckhoven once pointed out a simple way of testing coloured glasses and screens. He took a large sheet of cardboard, A B, thick enough to be opaque to light. In this he cut the narrow slit E E, then laid upon the cardboard a piece of the glass H K to be tested. It will be noticed that the glass but half covers the open slit E E, so that when a white light, such as that of a paraffine lamp, is placed on the other side of the cardboard it shines through the upper part of the slit freely. The illuminated slit is then viewed through a prism, at a distance of a yard or more. A common prism will do from a chimney-piece ornament. A prism of optical glass is not necessary; one worth a penny or twopence is all that is required. Through the prism the operator will see the upper part of the slit giving the spectrum of white light, and the lower part of the slit giving the spectrum of the light after its passage through the glass under examination. He will thus, by comparison, see at once whether all the blue and violet are cut off by the glass. It is more comfortable to make observations of this kind with the room in total darkness, with the exception of the light coming through the slit. This is easily managed by using the above arrangement as one of the windows of a dark lantern. A way to test a coloured window is to temporarily fix a sheet of tinfoil on it with glycerine. The tinfoil should have a slit cut in it. The operator then places a paraffine flame close behind the slit, and after dark examines with a prism from outside the window, the light passing through the slit.



As the film of albumen on glass is excessively thin the solution of fluoresceine must be strong enough to look nearly as dark as ink. It is useless to attempt to get a thicker film of albumen by horizontal drying, for directly the film has any appreciable thickness it cracks as the water evaporates. These films should be varnished with a benzol varnish; alcohol dissolves the colour. W. H. HARRISON.

RECENT RESEARCHES IN STELLAR PHOTOGRAPHY WITH THE EQUATORIAL STELLAR CAMERA AT THE LIVERPOOL ASTRONOMICAL SOCIETY'S OBSERVATORY.

[A communication to the Liverpool Amateur Photographic Association.]

THE application of photography to astronomy during the last few years has been very extensive. Until last year, however, it has been used chiefly for photographing isolated objects, such as the moon, the great nebula in Orion, or the comets. Professor E. C. Pickering, the Director of the Harvard College Observatory, United States, during his European tour showed some negatives of large fields of stars. The instrument used by him was an equatorial stellar camera with an aperture of three inches, and with this he succeeded in photographing stars down to the eighth magnitude. During his visit here to address the Astronomical Society of Liverpool he showed me these negatives. The line of research seemed to me so interesting that I at once set to work to attempt the photographing of certain constellations. A camera with a lens of two and a-half inches aperture was borrowed, and an altimuth stand was converted into an equatorial. The exposures of an hour were done entirely by hand. The first negatives were shown at the second meeting of the Astronomical Society's session, and the Council at once determined to ask for subscriptions for providing a suitable instrument. We quickly discovered that the purchase of any such instrument was entirely beyond our means; but at this state of affairs came a generous offer from Mr. Howard Grubb, F.R.S., to lend us what we required. The instrument arrived in March, and was very soon in position and at work. I must now give a brief description of it.

The lens is a compound lens of four and a-half inches aperture, and focal length of 15·8 inches. It is fitted into an ordinary wooden camera. Upon the camera is fixed a finder of short focus. The only form of mounting admissible was that known as the "equatorial." The principle of the equatorial, as you doubtless are aware, is an axis parallel with the earth's axis of rotation. To this is affixed another axis at right angles to the first. The first axis is called the "right ascension axis;" the second the "declination axis." The convenience of this form of mounting lies in the fact that the star can be followed with one motion only. The equatorial is of massive iron. The wooden camera is attached to this by screws, while a suitable counterpoise is affixed on the other end of the declination axis, so that the camera will remain in any position. The declination and right ascension axes are fitted with circles suitably divided. The iron mounting is attached by screws to a strong wooden stand. As the exposures have often to be of considerable length a clock motion is added, so that the camera is kept fixed on a star during the required exposure. Additional slow motions are provided in the declination and the right ascension; the right ascension one is so contrived that the camera can be moved without stopping the clock.

The work which I was especially desirous of undertaking was the determination of the actinic magnitudes of the stars. The brightness of a star to the eye is the combined effect of all the rays of the spectrum that are emitted by the star; but the impression on the photographic plate is due solely to an isolated part of the spectrum. The action of light on the plate is greatest at the violet end, and decreases as the spectrum approaches to the red. You will at once perceive we shall have on the plate a totally different scale of star brightness. The more a star abounds in rays of great refrangibility the brighter it will appear on the plate. A star of an orange or red hue will, therefore, be diminished on the plate, while a star of blue colour will be proportionately increased. Taking, then, the eye magnitude as mean magnitude, the photographs will show a certain number of stars superior and a certain number inferior to the mean magnitude. Now, a star is white to the eye, because the rays of all refrangibilities are in their proper proportion to produce the absence of colour. In about two-thirds of the stars this proportion is maintained. Taking these as our standards for the reduction of the plates, we shall find that in the case of two-thirds of the stars the eye magnitudes and the photographic magnitudes will agree; but in one-third they will differ from the mean magnitude by a quantity depending upon the refrangibility of the rays they emit. In other words, the photographic magnitude gives us one of the factors necessary for the determination of the colour of the stars.

The question, then, to be solved is how to obtain photographs of large fields of stars, and how to reduce the photographic magnitudes from them. Now, with the rapid plates at present in use daylight photographs may be taken in an exceedingly-minute fraction of a second with a lens of very small aperture; but for photographing the stars long exposures are needed, because the starlight is so faint. An object photographed in the daytime is photographed by the light it reflects, but the stars have to be photographed directly. The most sensitive plates now made ought to have their sensitiveness increased many times for stellar photography.

The quantity of light we have to deal with is, except in the case of a few bright stars, so small that long exposures are necessary. Now, length of exposure means increase of probable error. The errors fall under—(1), the instrumental errors; (2), temporary cloudiness of one part of the field photographed; (3), unequal absorption—the last a very difficult and complex matter. In the first place, it is never a constant quantity—not even from hour to hour; hence it is impossible to reduce one plate by comparison with another, supposing them both of equal sensitiveness. Each plate must be reduced separately. The first two sources of error have been eliminated by allowing the stars to drive. In this way the stars, instead of coming out as dots, come out as lines. Supposing a cloud to intervene in any part of the field: its presence is shown on the photograph by a break in the line. Supposing the stars were photographed so as to come out as dots: it is obvious that the cloud or mists present might pass undetected, and a serious error be introduced in the resulting magnitudes. The exposures for the ordinary zone work are generally between minutes and half-an-hour. On these plates stars down to eight and a-half magnitude are photographed, and on nights when the absorption is at a minimum stars of even smaller magnitude.

The number of stars that can be reduced on any plate is limited by a curious fact, which came out in the reductions for the catalogue of the photographic magnitudes of five hundred stars lately published. This is over-exposure in an insidious form. If α be the quantity of starlight necessary to penetrate the silver film completely in half-an-hour, it is obvious that all stars whose light is greater than α will penetrate it before half-an-hour, and the action perpendicular to the plate will immediately cease. At first sight it would seem easy enough to tell where this has happened, for all stars whose light is greater than α would come out the same. If the rays of light passed through a medium whose refractive power was constant during the exposure this would be so; but in the case of the air the quantity is never constant nor similar in any two directions for a moment, and hence the light is spread out all round the star's image. The action on the plate thus resolves itself into a vertical and horizontal action—the vertical being due to the star's light falling directly on the plate, and the horizontal due to disturbance of the star's image by atmospherical inequality.

You will see at once, then, that if we attempt to determine the magnitudes of stars greater than α we really use a different method to that in the case of stars less than α. In the former, we use the horizontal impression, which is purely due to spurious discs caused by the lens and by atmospherical inequality of refraction; and, in the latter, we make use of the vertical impressions on the plate due solely to the star's action. The value of α is affected by three things:—(1) Length of exposure; (2), aperture of lens; and (3), the sensitiveness of the plate. From the photographs already taken I have been able to get a provisional formula for the equatorial stellar camera from Wratten and Wainwright's "drop-shutter" plates. Having the aperture constant, and the sensitiveness of the plates supposed to be constant, the following formula is approximately true for exposures under one hour:—

$$\alpha = \sqrt{T}$$

When T is the length of exposure in minutes, and α the value of total penetration in magnitudes.

I may be allowed to point out that increased sensitiveness of the plates is more important than either size of aperture or lengthened exposure. If T equal the time of exposure, A the aperture of the lens employed, and S the sensitiveness of the plates, the joint results will be expressed by some relations of

$$T, S, (A)^2$$

Supposing this to be—

$$\text{Minimum magnitude} = \frac{(\sqrt{T} + \sqrt{S}) \times (A)^2}{30}$$

—a provisional formula which fairly represents observations up to the present date—it is obvious that the increase of aperture is of more consequence than either increase of exposure or sensitiveness. But increase of aperture means increase of focal length and decrease of the field of vision; hence we are very quickly limited in this direction. Increase of T means increase of all sorts of errors, both instrumental and atmospherical. The only thing we can infinitely increase without error is S, the sensitiveness of the plates.

In conclusion: I must apologise for the incompleteness of this paper. There are several points to which I should have liked to draw the attention of the Society, namely, atmospherical actinic absorption, and to the importance of the new line of research in other respects. In the stars we have the past and future of our sun written in no uncertain hand. Intense energy is shown by the star being white, decline of energy by the yellow star, and the approach of extinction by the red star. The actinic light disappears first. Our sun has reached the second stage; each thousand years the actinic light will grow more feeble, till life will at last disappear. But the camera tells us that the universe is comparatively new, not above a third of its myriads having reached the second stage yet; but it tells also of universal slow decline. What powers of recuperation space contains we cannot say. Remove the actinic light and we blot out life; increase it and we have a luxuriant vegetation and contemporary prolific animal world. If it be true that our sun has reached the second stage, then it was in the first stage that animal and vegetable life appeared on the earth. With the decline of chemical light the sun's forcing power diminished, and life—vegetable and animal—adapted itself to the change by natural development. We should find, then, that in the first stage life was more prolific, but in the second more developed. An interesting path of speculation is open, but I must refrain. This age should be the age of exact observation; to the future belongs the teaching of these observations. But whatever the future discovers it will owe it in a great measure to your noble science—the science of photography.

T. E. Espin, B.A., F.R.A.S.,
Special Observer to the Liverpool Astrom. Society.

HOLIDAY TRIP TO WEST CORNWALL.

I have frequently been asked—"Where is a good place to get some studies of shipping, boats, &c., suitable for the camera?" There is not a better place known to me than the town of Falmouth. It is reached by the Great Western Railway from London, and by tourist ticket the journey is by no means expensive for the distance. The fare from London (all tourist tickets being available for two months) is—first class, eighty shillings; second class, fifty-five shillings; and third class, forty-two shillings and sixpence. Passengers are allowed to break the journey at many of the stations either going or returning. Not only from London can tourist tickets be obtained, but from most of the great centres, such as Manchester, Liverpool, &c.

The town of Falmouth in itself is not very prepossessing, the main street, which is the old part of the town, being long and narrow, but the Corporation are widening this street as much as possible. On the outskirts modern residences are fast springing up, and plenty of apartments can be obtained. Of studies of boats, shipping, &c., any number can be obtained. In the harbour, and all along the shore, will be found boats building, boats new, boats old, and boats all to pieces in every conceivable variety.

Falmouth has a natural harbour, said to be one of the finest in the world, and a hundred ships can anchor within it. All round the coast is very picturesque, with rocks and woodland scenery of very great beauty. A most magnificent panorama can be obtained from the high ground, which is well suited for the camera. The entrance of the harbour is guarded by Pendennis Castle and fort on one side, and St. Mawes Castle and fort on the other, whose guns sweep the whole entrance. They are said to have been built in the time of Henry VIII. Both these castles make very good pictures.

Pendennis Castle is not very far from the railway station. It is situated on the headland, and a very charming walk can be had round the castle drive. There is one thing not to be overlooked, and that is the number of seats for the weary placed about by the Corporation—a good example for other towns to take pattern by—and these little comforts are fully appreciated by visitors. The view from Pendennis is very grand indeed, and a capital panoramic picture can be obtained showing the harbour on the one side and the bathing beaches on the other. St. Mawes Castle is reached by steamer, which starts from the market strand pier. The fare for return tickets is sixpence halfpenny, the distance each way being about three miles. On the steamer a good sight of the harbour is obtained. The castle can also be reached by sailing or rowing boat.

One of the prettiest trips by boat is up the river Fal. This is one of the most delightful river trips that I have ever had. The steamer is "The New Resolute," Captain Benney, who is only too pleased to give all the information possible to visitors. I think the distance is about ten miles each way—that is, from Falmouth to Truro. The return fare, first-class, is one shilling. The fore part of the vessel is, I believe, somewhat cheaper. The time on the passage each way is about one hour and a-half. The river at times seems perfectly land-locked, owing to the windings. On its banks is situated the charming seat of Lord Falmouth—Tregothnan. There is only one stoppage on the way at Malpas—pronounced by the natives "Mopus." Here, also, are to be had plenty of boat studies. The steamer runs according to the tides, which serves twice daily, and gives several hours' stay in Truro, the newly-created city. Truro in itself is one of the most dead-and-alive places a person can possibly imagine, and what formed the inducement to make it a city I am at a loss to conceive.

I am going on too fast, however. I should have mentioned a little about St. Mawes. This town has a small harbour, and at times here are to be had some capital studies—fishing boats, &c., and also of fisher folk. The inhabitants are very hospitable and obliging. The castle can also be visited. On my last visit to St. Mawes an old fisherman nearly ninety years of age was pointed out to me, who, it is said, has never been more than ten miles into the country, and never has been in a railway train. I should think he must have had a very contented mind. I also saw some very quaint cottages, with porches. Pendennis can well be seen from here, and so can the town of Falmouth. Any amount of little "bits" can be got along the coast in every direction, the fishing gear, crab pots, &c., in these little villages making charming foregrounds.

From Falmouth again the little town of Flushing must not be overlooked. It is best reached by walking on to Green Bank and crossing by the ferry boat; or any of the watermen will row parties from Falmouth. The town of Flushing is very quaint in parts and very interesting, and plenty of boat studies can also be obtained from here.

Opposite to Falmouth is Trefusis Point, which is very picturesque. One of the best shore views of Falmouth can be obtained from hence. Again: all along the coast charming studies can be obtained in every direction, and there is a large number of little creeks and coves with boats hauled up in all positions suitable for the artist. On the Falmouth bathing beaches plenty of rock studies are to be had. The name of the bathing beach is Gyllyngvase, and following this beach round from Pendennis to the right brings us to what is called the Swanpool Beach. The Swanpool is a kind of lake, very picturesque, with tall rushes and flags on its banks; it is separated from the sea by a roadway or sand-bar. The further headland is crowned by a tall chimney stack, which belongs to some old disused smelting works. This headland is called "Pennance Point." From this point, near the Stack, capital views can be obtained; and it is a very delightful walk from Falmouth. Near this point is a little cove called Maenporth, and other very picturesque coves follow the coast line round in which the artist may revel.

Following the beach we come to the entrance to the Helford river and harbour. Here, again, some very pretty little river studies can be had by proceeding up the river. Those who care for breaking seas as studies can have any number during the end of the autumn and winter months on the bathing beach, as it is very rough at times, the seas breaking heavily on the beach.

To those who care to visit Falmouth in the summer time a few hints may be acceptable. In the hot weather it is by far the best to seek apartments on the upper terraces. If the lower ones are chosen it will be found warm and relaxing; but by getting on the top it is much more cool and bracing, and the breeze is felt. It is rather a stiff climb up, but it is well worth the fatigue. The present observatory is on these top terraces, and can be seen for miles; it is, besides, a good landmark for all the country round.

If any days prove unfavourable the time need not be lost, as several views may be found of interest in the town. There is one place to which I must call special attention, and that is the "old curiosity shop" kept by Mr. John Burton. It is true to its name in every sense of the word. No one need be afraid to enter; although everything is for sale no one is ever asked to buy. China vases can be bought from a few pence per pair up to one hundred pounds. The proprietor is a most genial man, and is very happy to give all information either about his goods or the neighbourhood. Almost everything will be found in the collection, from a needle to a sheet anchor. The last time I was there I saw many things that would be far more suitable as studio accessories than half the rubbish which is intended to mean everything and means nothing. No one ever enters Falmouth without paying this place a visit; all the aristocracy who enter the town go to see it. I have often wished that it was possible to get a photograph of it.

In the month of September is generally held the Polytechnic Exhibition at the Polytechnic Hall. The last was its fifty-second annual exhibition. A prominent feature in the exhibition was the photographic department. The institution was founded by Miss Anne Maria Fox, who is still living and takes as great an interest in it as ever. There are some very excellent shops in Falmouth, and some very quaint old ones. In Killgrew-street—a short cut into the next, or, as it is called, Wellington-terrace—is a flight of stone steps called by the inhabitants Jacob's ladder, which consists of 109 steps, but I need not say that some prefer going round to mounting the so-called ladder. Coming down is all very well provided one can do it the same way as the boys do, viz., sliding all the way down the iron handrail. I have frequently seen a dozen coming down in this fashion. I myself (not being one of the lean kind) prefer going round. It is a straight flight from top to bottom without any turning, and is, as the Cornish say, "going up orver steers." But, instead of "going up orver steers," we keep straight along Killgrew-street, which will bring us to Kimberley Park—a small enclosure beautifully laid out and kept. It is a nice place for a rest in the heat of the day.

There is one thing I must not omit to mention, and that is the cheap means of getting about. I mean by vehicles (not rail) and also by boat, as will be seen in the former part of this article. During the summer months a brake and four runs nearly every day to the Lizard and back, a distance of nearly fifty miles, for four shillings; but all through the year it can be reached by the daily 'bus *viâ* Helston. There is another thing to which I must refer. The visitors to Cornwall, as a rule, are very select, for there is an entire absence of the rough element, which constitutes such a nuisance at what are termed the fashionable seaside places. There is also another inducement for visiting this district, namely, the cheapness of living compared with many other similar resorts; for although, in the first place, the railway fare seems more than from London to the so-called cockney watering-places, when all expenses are put together for a month it will not be found more expensive, if so much, and one gets a thorough change into the bargain.

Wm. Brooks.

THE CARBON PROCESS FOR AMATEURS.

[A communication to the North Staffordshire Photographic Association.]

The carbon or autotype process is one of the most beautiful of all printing processes, and, having as one of its principal attributes the advantage of permanency, is especially recommended to the amateur photographer, who, as a rule, only requires one or two prints from each of his negatives, and who, whilst admiring the beautiful range of tone obtainable in silver printing, prefers to use a more permanent and satisfactory method of making a picture.

Several of the difficulties inherent in the carbon process have been the means of deterring many people from working it. I propose to deal with those difficulties *seriatim;* and, without touching upon the history of the discovery of the fact that a film of bichromated gelatine is rendered insoluble by exposure to light, give you a practical demonstration of the method of developing a carbon print, with a few such hints upon the requisite exposure necessary for various kinds of negatives as my own personal experience will allow.

Here is a piece of unsensitised carbon tissue. The colour happens to be "portrait purple." To sensitise it it is immersed in a bath composed of bichromate of potash one ounce, water twenty ounces, with the addition of about twenty grains of carbonate of ammonia. This last neutralises the free acid almost always found in commercial bichromate, and to a certain extent retards the spontaneous insolubility of the tissue. The latter difficulty I have never met with, as I never keep sensitised tissue for many days. The tissue having been immersed in the sensitising bath three minutes, until completely flaccid, is withdrawn and laid face downwards upon a piece of plate glass. A squeegee, made by screwing a strip of thick india-rubber between two laths, is passed over it, thus removing all excess of moisture.

Drying the tissue is with most amateurs somewhat of a trouble. I have seen several plans recommended, but have found none so easy and satisfactory as the following, which I learned from one of the photographic almanacs:—Sensitise at night; let the room used be freed from deleterious gas or other fumes by passing a draught of air through it for a few minutes. The kitchen is preferable, as it is usually warm in the evening, and not too hot after all the household have retired to rest. Suspend the tissue by American clips to a line stretched across the apartment, and come down early in the morning before daybreak, when you will find all the tissue dry and curled up. A door or doors of the drying-room should be, if possible, left open, as the object is not to dry so much by heat as by a current of dry air. When dry the tissue is, of course, ready for printing, before which operation, however, the negative must be prepared by making a "safe edge" to it. This I do by drawing round the reverse side of the glass for about a quarter of an inch in depth a margin of Brunswick black. This depth for 11 × 9, and proportionately less margin for smaller negatives.

Now place the tissue face towards the negative in a printing-frame, and as it is, of course, impossible to judge by appearance of the progress in printing an actinometer must be used. This being placed by the frame is your timekeeper, and an exposure to a certain number of "tints" is necessary for each negative, the meaning of the word "tint" being that the paper (exposed in the actinometer simultaneously with the negative you are printing from) has acquired a similar tint to that painted upon the lid of the actinometer, dividing all negatives into three classes:—No. 1, thin; No. 2, medium; and No. 3, dense. No. 1 will probably require one or one and a-half tint only; No. 2, perhaps two or or three tints (the general number from my usual run of negatives); No. 3, probably four tints or, at the most, five. Bear in mind that after removal from the frame the operation of printing still goes on to a certain extent; so that, although with experience advantage may be taken of this fact, it is best for the amateur to develope his prints as soon after exposure as possible. For this operation no chemicals are required, only plenty of warm water; and as we will say that we wish to imitate a silver print as much as possible, we will take a piece of plate glass, free from scratches, and which has been rubbed and polished with bees'-wax and turpentine, so that a slight film of that compound still adheres to it. Place this in cold water with the piece of exposed tissue. This latter will begin to curl up and then go quite flat. At *this moment* bring both glass and tissue face downwards upon it out of the water; apply the squeegee so that all air-bubbles are expelled, and place aside to drain for a few minutes. Of course, several pieces of tissue and glass may be similarly treated at the same time.

Now place the glass and adherent tissue in warm water at about 100° Fahr. Agitate a little until you see the dark pigment begin to ooze from beneath the edges of the paper, lift up one corner, and the whole may be lifted from the glass, leaving behind an apparently slimy mass; dash the warm water over this until you see the image distinctly, and the water comes off colourless.

At this stage it will be seen whether the exposure has been approximately correct. Should it have been too long a little warmer water may probably reduce the image; if too short, use cooler water containing a little alum; but, as in other processes, a correct exposure always gives the best results. After an immersion in alum and water place the glass plate with the developed image aside to dry. When dry take a piece of transfer paper which has been previously soaked in cold water until flaccid, then in warm water until just slimy; flood the glass plate with cold water, apply the transfer paper, squeegee, and again set aside to dry. This time the image will, if left to itself, adhere to the transfer paper and leave the glass, giving a highly-polished picture.

For more detailed information I refer you to Captain Abney's *Instruction in Photography.* In practice the carbon process is not a bit more difficult than silver printing; and although my description thereof has been somewhat lengthy I hope my demonstration has been none the less interesting, and that some of you, after surmounting the principal difficulty of exposing, will adopt what, although having been called a "blind process," is none the less a beautifully-scientific, and from the variety of its applications an exquisite, adaptation of a simple phenomenon to photographic purposes. W. B. Allison.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 14,156.—"Photographic Apparatus." George Percival Smith, Beechholm, Tunbridge Wells.—*Dated October* 25, 1884.

No. 14,335.—"Holders and Dark Slides to be Used Therewith for Sensitive Plates." (Complete.) W. G. Honey, Devizes, Wiltshire.—*Dated October* 30, 1884.

No. 14,406.—"Photographic Dark-Room Lamp." T. C. Hepworth, Cantlowe's-road, London, N.W.—*Dated October* 31, 1884.

No. 14,516.—"Films, Plates, or Tissues for Use in Photography, and Process of Manufacturing and Using the Same;" communicated by G. Eastman and W. H. Walker. A. J. Boult, 323, High Holborn, London.—*Dated November* 3, 1884.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
November 11 ..	Great Britain	5a, Pall Mall East.
,, 11 ..	Bolton Club	The Studio, Chancery-lane.
,, 11 ..	Newcastle-on-Tyne	College of Physical Science.
,, 11 ..	Glasgow Amateur	177, Buchanan-street.
,, 12 ..	Cheltenham Amateur (An. Meet.)	
,, 12 ..	Bury	Temperance Hall.
,, 12 ..	Photographic Club	Anderton's Hotel, Fleet-street.
,, 13 ..	London and Provincial	Masons' Hall, Basinghall-street.
,, 13 ..	Manchester	Manchester Technical School.
,, 14 ..	Ireland (Annual Meeting)	Royal College of Science, Dublin.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society, held on Thursday, the 30th ult., the chair was occupied by Mr. W. K. Burton.

Mr. J. T. Taylor said that, as the lantern season was approaching, the members would doubtless be interested in any improved methods in connection with the working of the instrument. The use of petroleum in any form he considered a nuisance, and he thought it might be superseded to some extent by a light which would be shown to the members—an improved method of obtaining illumination from platinum heated to incandescence. He was not to be understood as proposing this plan as a substitute for the higher class of illuminants, such as the lime and electric light, but as taking the place of the various paraffine burners. He would have the pleasure of introducing to the meeting Mr. Lewis, the inventor of the light, who had brought two of the burners with him, and would demonstrate them before the members. The essential principle was that a Bunsen burner was employed to raise platinum to such a heat that it gave out light by incandescence. In the two burners before them the draught necessary for strong combustion was obtained by means of the chimney. When, however, a blowing machine was used the heat was greater, and the light became white and more intense. Among other advantages this form of light was particularly adapted for Keevil's dissolving lantern, in which a single light only was used—one optical system having its illumination from the side of the flame and projected forward to the screen by means of a reflecting prism. It was obvious that for an arrangement of this kind it was necessary that the source of light should be, as was the case with the light now under consideration, equal when looked at from the side and from the front. The definition also, on account of the smallness of the light, would be found much better than with any of the forms of paraffine lamps, and, therefore, it was much better suited than the latter for the photographer's use in making enlargements.

Mr. Lewis was then introduced to the members, and answered several questions respecting the intensity and candle-power of the light. For photographic purposes the colour of the flame might be rendered of a pure white, but for lighthouse and fog-penetrating power a yellowish colour was preferable.

The lights were kept burning for some time, and a vote of thanks was awarded to Mr. Taylor and Mr. Lewis.

The adjourned discussion upon Mr. Ashman's lecture *On Toning* was resumed.

The Chairman, with reference to the statement in the work *On Silver Printing*, by Captain Abney and Mr. H. P. Robinson, observed that since the last meeting he had tried toning with gold merely neutralised. It could be done, but the action was quicker as well as better when more alkaline salt was used.

Mr. A. Cowan inquired whether Mr. Prestwich had tried toning as suggested last week with gold diluted with distilled water, and no alkaline salt.

Mr. W. H. Prestwich had done so, and succeeded in obtaining satisfactory tones. The paper he used was that purchased as ready-sensitised. In further discussion it transpired that Mr. Prestwich was in the habit of passing his prints into a solution of carbonate of soda before putting them into the gold solution, and this was considered to account for Mr. Prestwich's results.

Mr. W. E. Debenham said that as to the distinction which had been spoken of between substitution and gilding processes, the fact was that some gilding processes were substitution processes. If it was meant by calling toning a "gilding" and not a "substitution" process because gold was added to the deposit, without silver being converted into the compound from which the gold had been removed, he submitted that in such case the print would, as toning progressed, become much deeper from the additional metal, and not merely changed in colour by the substitution of one metal for another.

Mr. F. W. Hart remarked that with reference to toning with chloride of gold, with or without the addition of alkaline salts, much would depend upon the method of preparation of the gold itself, and upon how much alkaline had been added to neutralise it before being put up into the tubes in which it was sold. As to the washing of prints before toning, he thought it a mistake to advise, as some had done, that all trace of nitrate of silver should be removed from the paper before toning. In fact, when that was done the prints could scarcely be toned at all. In order to ensure that some nitrate of silver, and this a regular and definite quantity, should be left in the prints he employed a definite quantity of water for the washings. He put the prints into water in the proportion of one print for each sheet of paper. After three waters in this proportion the prints were ready for toning.

Mr. J. B. B. Wellington inquired what would be the effect if a large quantity of silver were left in the paper.

Mr. F. W. Hart replied that the toning would be unmanageable. As to permanency, he thought that the more gold there was deposited the better. Slow toning tended to bring about this result, and was, therefore, to be recommended.

Mr. A. Mackie said that, with respect to ready-sensitised paper, he thought the more it was washed before toning the better.

Mr. W. M. Ashman, in the course of his reply to the remarks of the various speakers, observed that Mr. Henderson had stated that sulphur toning was by far the best method. He would like to know whether Mr. Henderson was prepared to issue his prints toned by this method. As to whether toning was a substitution method, he considered it to be a process like that of coating a knife with copper by immersion in a solution of that metal.

Mr. McKellen was then introduced to the meeting and exhibited his camera, which met with much commendation.

The Chairman observed that there were more novelties in this camera than in half-a-dozen other new cameras. A description of the camera was given in our report, in last week's issue, of the technical meeting of the Photographic Society of Great Britain.

Mr. Henderson said that all modern dark slides allowed the plates to fog if they were kept for some time in the light. He suggested a return to the old plan of having them to open with a flap door inside the camera.

Mr. W. Cobb had used a slide of this description for his instantaneous pictures.

Mr. McKellen said that for large cameras he had not found the flap door for the dark slide to answer. He had recently been on a trip with the members of the Manchester Photographic Society, who all kept their dark slides carefully shielded with a cloth, and some of them assured him that he would find his plates fogged, as he did not use this precaution. He found, however, that they developed perfectly free from this defect. Of course, really good workmanship was necessary.

Some plates were shown by a member as having been fogged by emanations from the leather or American cloth of a dark slide.

Mr. J. Barker inquired whether Mr. Cobb had succeeded in curing the defect of this nature which he had mentioned as existing in some of his dark slides.

Mr. Cobb replied that age appeared to have remedied the evil in question. The slides did not fog now, although at first a few minutes even were sufficient to produce the effect.

Mr. Henderson read a letter from a gentleman in the provinces upon a method of producing a safe light. The writer said that if two holes were pierced in two pieces of card, and the holes were opposite each other, the cards being parallel, white light would pass; but if the cards were set at an angle to each other light could not pass. In order, therefore, to correct the inequalities in the several thicknesses of any coloured medium employed, he proposed to place these thicknesses at an angle to each other instead of keeping them close together and parallel.

The Chairman observed that the writer's idea was based upon the notion that defects in the transmitting medium took the form of tubes perpendicular to its surface, and if this were not so the remedy proposed would not meet the case.

Mr. W. H. Harrison was elected a member of the Association. It was announced that, at the meeting to be held on the 13th inst., the slides produced from identical negatives by various processes of transparency making would be shown.

POSTAL PHOTOGRAPHIC SOCIETY.

A committee meeting of this Society was held at the address of the Hon. Secretary, 3, Plowden-buildings, Temple, on Wednesday, the 29th ult. Dr. Horace Day was elected Chairman, and the minutes of the previous meeting were read and confirmed.

The Committee, after having inspected specimens of photographic work sent in by candidates for membership, elected the following gentlemen, some of whom had been provisionally admitted:—Hugh Heal (Hayward's Heath), C. J. Watson (Birmingham), S. H. R. Salmon (Croydon), C. F. Pritchard (London), Rev. W. Miles Barnes (Dorchester), Chas. Yeomans (Sheffield), and Chas. Baker (London).

The Chairman then proposed that in future albums, where a member exhibits more than one print, the votes which are given him in respect of each exhibit shall be added together; and the member so gaining the highest number of votes shall take the prize. This motion was carried.

The prints in album 14 were considered, and it was found that Mr. J. W. Leigh's No. 830 had the greatest number of votes, Mr. Mathewson being second with one of his pictures. The prize was accordingly awarded to Mr. Leigh.

Dr. Day was unanimously elected President for the current year, and, after several letters from various members had been read and other business transacted, the meeting dissolved.

AMATEUR PHOTOGRAPHIC ASSOCIATION.

The annual meeting of the Council of this Society was held on Tuesday, the 28th ult., at 12, York-place, Portman-square,—Dr. Arthur Farre, M.A., in the chair.

The minutes of the last meeting having been read and confirmed, the following members were elected:—Professor Butler, M.A.; Sir H. Hussey Vivian, Bart.; H. H. Williamson, F.R.A.S.; J. J. Brown; Miss Mary Egerton; Miss Maude Sullivan; John Hanmer; F. Trimmer, M.R.C.S.; J. E. Dumont; F. Grant; Mrs. Hobson; W. E. Pickels, F.R.M.S., &c.; D. B. Fraser; and F. J. Double.

The Secretary then laid before the meeting the pictures for the current year.

Mr. J. Glaisher, having carefully examined every single picture, read his report, of which the following is an abstract:—

Class I. contains 170 pictures; Class II., 210 pictures; Class III., 172 pictures. The remainder are comprised in Classes IV., V., and VI.

The pictures in Class I. are contributed as follows:—R. Leventhorpe, 17; C. Stephens, 6; The Right Hon. the Lord de Ros, 2; A. D. Halford, 3; F. Beasley, 15; R. Murray, 2; T. Brownrigg, 2; W. S. Hobson, 14; W. Adcock, 3; F. S. Schwabe, 6; General Sladen, 5; A. Hill, 5; Rev. H. J. Palmer, 6; R. O. Milne, 7; P. Gunyon, 2; W. Vanner, 9; W. Muller, 12; J. C. Hannyngton, 3; G. Brook, 2; S. Norman, 9; J. H. Robinson, 1; R. B. White, 13; H. O'Farrell, 2; A. Tagliaferro, 4; G. R. Fludder, 2; P. H. Emerson, 2; W. D. James, 5; S. Salmon, 1; H. R. Moiser, 4; H. E. White, 3; F. C. Borckhardt, 1; G. Western, 4; and J. H. T. Ellerbeck, 1.

Class II. contains the following:—C. Stephens, 7; the Right Hon. the Lord de Ros, 3; A. D. Halford, 1; F. Beasley, 11; R. Murray, 5; T. Brownrigg, 4; W. S. Hobson, 4; W. Adcock, 1; F. S. Schwabe, 1; Major Board, 7; General Sladen, 2; A. Hill, 1; Rev. H. J. Palmer, 7; R. O. Milne, 4; P. Gunyon, 4; W. Vanner, 3; W. Muller, 12; R. Leventhorpe, 3; F. Whitmore, 5; J. C. Hannyngton, 11; J. L. Ranking, 1; G. Brook, 3; F. H. Shaw, 3; Lieut.-Col. Bigg, 1; S. Norman, 3; J. H. Robinson, 5; A. R. Dresser, 5; J. W. Baxendale, 3; G. Smith, 2; Mrs. Abbott, 1; R. B. White, 1; C. H. James, 1; T. Perrot, 2; H. O'Farrell, 4; A. Tagliaferro, 5; Mr. Inspector Hirst, 1; the Hon. H. Prittie, 2; G. R. Fludder, 13; P. H. Emerson, 5; W. D. James, 6; S. Salmon, 3; Lieut.-Col. Nicholl, 7; H. R. Moiser, 3; H. E. White, 6; T. C. Borckhardt, 1; R. Bellringer, 3; G. Western, 14; and J. H. T. Ellerbeck, 10.

Class III. contains 172 pictures, contributed by the Right Hon. the Earl of Rosse, C. H. James, A. R. Dresser, J. W. Baxendale, Major Board, and others.

The following prizes were awarded:—The first prize to R. Leventhorpe, Esq., for Nos. 107, 111, and 114, a large silver goblet. The second prize to R. B. White, Esq., for Nos. 2, 7, and 15, a silver goblet. W. Muller, Esq., for Nos. 1,005, 1,019, and 1,020, a water-colour drawing in frame. R. O. Milne, Esq., for Nos. 8 and 9, a silver goblet. H. E. White, Esq., for Nos. 1 and 2, a silver goblet. F. S. Schwabe, Esq., for Nos. 3 and 5, an oil painting in frame. W. S. Hobson, Esq., for Nos. 305 and 310, an album elegantly bound. C. Stephens, Esq., for Nos. 59, 60, and 65, an album elegantly bound. S. Norman, Esq., for Nos. 6, 9, and 11, a silver goblet. W. Adcock, Esq., for Nos. 2 and 4, an album elegantly bound. W. D. James, Esq., for Nos. 14 and 15, a water-colour drawing in frame. W. Vanner, Esq., for Nos. 74, 77, and 80, a water-colour drawing in frame. Certificates of honourable mention were awarded to the Right Hon. the Lord de Ros, A. D. Halford, Esq., T. Brownrigg, Esq., General Sladen, A. Hill, Esq., the Rev. H. J. Palmer, F. Beasley, Esq., G. Brooks, Esq., A. Tagliaferro, Esq., G. R. Fludder, Esq., P. H. Emerson, Esq., and H. R. Moiser, Esq. A. J. Melhuish, *Hon Sec.*

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

The monthly meeting of this Association was held at the Free Library, on Thursday, the 30th ult.,—Dr. Kenyon, President, in the chair.

The minutes of the September meeting having been read and confirmed, Mr. F. P. Paul, F.R.C.S., was elected a member.

The Chairman announced the donation of twelve prints to the album by Mr. W. H. Atkins, and, also, to the Library of guide-books to Carnarvon and Ruthin, by Mr. Maurice Jones.

The Rev. T. E. Espin read a paper on *Stellar Photography* [see page 714], and passed round some negatives and prints in illustration of his remarks.

The Chairman, after complementing Mr. Espin on the ability and scientific interest of his paper, asked if he considered that the sun had entered upon its yellow stage of existence.

The Rev. T. E. Espin said that spectroscopic observation tended to confirm this theory. He further adverted to recent experiments on the power of actinic rays in promoting vegetation and developing life.

The Rev. H. J. Palmer mentioned the case of a schoolmaster friend of his, who, under the conviction that the blue rays were conducive of brain power, had the walls of his school and class rooms coloured blue.

After some further discussion the Chairman proposed a cordial vote of thanks to Mr. Espin for his most interesting and suggestive paper.

The Rev. T. E. Espin, in replying, said that he should be most happy to show his apparatus to any photographer who would visit the Observatory of the Liverpool Astronomical Society at West Kirby.

Mr. W. H. Kirkby, after some observations condemnatory of combining the monthly meetings of the Society in July and August either with excursions or with social gatherings at the country houses of members, proposed the following addition to the rules:—"All the monthly meetings of this Association shall be held at the usual place of meeting, and within the city of Liverpool; and that at Council meetings five shall form a quorum, and at the Association meetings ten shall form a quorum."

Mr. Atkins seconded the resolution.

Considerable discussion ensued, in which the Revs. T. B. Banner and H. J. Palmer, and Messrs. Atkins, Beer, Corkhill, Ellerbeck, and Kirkby took part. The resolution, on being put to the vote, was lost.

Mr. C. A. Wharmby then proposed the addition to the rules as follows:—"Each member shall send in to the Secretary, at or before the meeting following his election, his *carte* portrait for insertion in the Society's album."

This resolution was seconded and carried.

Mr. A. W. Beer gave notice of his intention to move the following addition to the rules of the Association:—"All members elected on and after the January meeting, 1885, shall pay an entrance fee to the Treasurer of ten shillings and sixpence."

Mr. W. H. Atkins then gave a demonstration of his mode of making enlarged negatives with gelatino-bromide paper, and used an ordinary triplex paraffine lantern, with a Steinheil half-plate lens. The sensitive sheet was placed in an ordinary printing-frame, and the enlargement was one of five diameters, from a very good transparency from one of Mr. Atkins' own negatives. After exposure for some three minutes Mr. Atkins placed some non-actinic glass in front of his lantern, and proceeded to develope his picture with the pyrogallic acid and washing-soda developer. After applying a citric acid and iron clearing solution the enlargement was fixed in hypo. and washed, and passed round for the inspection of the meeting. The result was a brilliant success, and great interest was manifested by a crowded meeting in all Mr. Atkins' manipulations.

The Chairman expressed the pleasure and instruction all had derived from the sight of Mr. Atkins' dexterity, and his vote of thanks to the demonstrator was carried by acclamation.

Mr. Kirkby gave some account of his recent experiences with the platinotype process.

Mr. W. H. Atkins complained of the degraded whites of some of the prints he had recently made by this process.

Mr. Twigge showed some specimens of his work with the sepia-toned paper, and detailed his difficulties in working it satisfactorily.

Mr. Ellerbeck called the attention of the members to the inconvenience they occasioned the Librarian by requesting him to receive and give out books, &c., at all times during the meetings, and suggested that after 6.40 the library should be closed. He (Mr. Ellerbeck) spoke on the advisability of establishing an exchange department of the work of the Association.

The Chairman thought the Treasurer might with advantage utilise the funds of the Association to facilitate the exchange of prints.

Mr. Beer proposed that Mr. Ellerbeck's suggestions on this important matter should be included in the *agenda* of the next meeting of the Society, and this proposal was agreed to.

The exhibits of the evening were:—Prints coloured by the new Cundall process; a number of 15 × 12 enlargements, and a volume of views in England, Ireland, and Wales, by Mr. Beer; views in Wales, by Mr. Ellerbeck; stellar negatives and prints, by the Rev. T. E. Espin; a series of enlargements, by Mr. Cornish; and some home portraits on opal, by Mr. Twigge.

The meeting, which was a very crowded one, was then adjourned.

NORTH STAFFORDSHIRE AMATEUR PHOTOGRAPHIC SOCIETY.

A meeting of this Society was held on Wednesday, the 31st ult., at the Mechanics' Institute, Hanley,—Mr. Charles Alfieri, President, occupying the chair.

It was resolved that a presentation print (10 × 8) should be given to each member of the Society at the annual meeting held in November, the Secretary being instructed to advertise for the same.

A paper (with demonstration), *On the Carbon Process for Amateurs* [see page 716], was read by the Hon. Secretary.

After some interesting discussion thereon, and Mr. G. P. Bradford having been elected a member of the Society, the meeting was adjourned.

HALIFAX PHOTOGRAPHIC SOCIETY.

The monthly meeting of this Society was held on Tuesday last, the 4th inst.,—the Rev. W. E. Hancock, M.A., in the chair.

A letter was read from the retiring President, Mr. Thomas Birtwhistle, regretting greatly his inability to be present in consequence of indisposition.

The Chairman referred in feeling terms to the great respect and sympathy all entertained for their worthy President in his troubles, and of the great spirit and energy he had ever displayed in face of failing health. His heart was in the work, one of his greatest pleasures being to be among his old friends of the camera.

An unanimous vote of thanks was heartily accorded to Mr. Birtwhistle and to the rest of the retiring officers for their past services, and the following gentlemen were elected officers for the session 1884-85:—*President:* Rev. W. E. Hancock, M.A.—*Vice-Presidents:* Mr. Councillor John Smith and Mr. Joseph Whiteley.—*Treasurer:* Mr. E. A. Caw.—*Secretary:* Mr. W. Clement Williams.

Mr. Manley, of Halifax, and Mr. F. E. Berry, of Sowerby Bridge, were elected members.

The Chairman, in congratulating the Society upon the rapid increase of their numbers, trusted no individual efforts would be relaxed to further augment the rank and file of the Society, and so make it sufficiently prosperous to warrant the Committee in inviting from time to time some of the men great in photography to lecture before the Society. The past session had been a successful one, so far as the reading of papers and demonstrations were concerned; and, with the exception of a few serio-comic or, perhaps, tragic adventures, in the broken cameras and river duckings connected with the outdoor meetings, all had gone well. But zealous amateurs had now come to look upon mishaps of this character with something like stoical indifference, and were to be found prosecuting their craft in the most unlikely and dangerous places. Most of those who had availed themselves of these outings under the green, leafy canopy of woodland, of mountain, brake, and stream, would be able to look back with pleasure to days happily and pleasantly spent; and he trusted such gatherings would be largely repeated in the future. He was glad to find that members were beginning to contribute to the various exhibitions held elsewhere; for such praiseworthy emulation to compete with their photographic brethren of other societies was in itself a healthy sign, and likely to elevate the status of their own Society. He (the Chairman) proposed giving them a lantern evening shortly, when he hoped all the slides would be the work of the members. Slide-making was an intensely interesting branch of photography. After field work, possibly no more pleasing occupation could be followed when the dark days of winter came round; and, when exhibited, the scenes depicted passed before them again and again, vividly recalling pleasant recollections of past enjoyments.

A discussion on lenses then took place, when the consensus of opinion seemed to be in favour of the portable symmetrical for depth of focus when very near and fine detail had to be taken with the more distant landscape.

Pending the preparation of the syllabus, Mr. Fred. Myott promised a practical demonstration of emulsion making for the next meeting. The meeting was then adjourned.

Correspondence.

THE MEDAL AWARDS AT THE PHOTOGRAPHIC EXHIBITION.

To the Editors.

Gentlemen,—In view of the fight over the medal awards I shall be glad if you will allow me to say a few words as standing on neutral ground, being not only a non-exhibitor this year, but not even having had time to see the Exhibition.

The Rev. Mr. Macdona's strictures may or may not be too severe, but I certainly think that Mr. Marsh has dealt somewhat harshly with him. Mr. Macdona is not a mere personal acquaintance of mine but a very intimate friend, and, therefore, I can speak from knowledge of him. He has only worked at photography for a very few years, but he is one of the most enthusiastic amateurs that England possesses; and, so far from being "a dog in the manger," his friends who know him—at least as well as Mr. Marsh can conceive or picture him—would never tack such an epithet on so noble-minded and worthy a man.

And yet I can scarcely agree with my good friend in finding fault with the opinions of the judges. As a cricketer I should certainly think twice at least before I impugned an umpire's decision; and I can safely say with respect to Mr. Macdona that, being a man possessed of the uprightness and fairness which characterises an English gentleman, he would be the last to accuse other gentlemen of the possible absence of such qualities. The construction I put upon his criticism was this—that, if somewhat more prolonged and careful judging had been made, some few of the medals might have been differently awarded. But this only shows how slight must be the difference of quality between some of the productions decorated and some that are not; and, in most cases, where so thin a border-line exists, there must necessarily be a certain divergence of opinion between the judges and the public. Indeed, with regard to the judges, their very names are inscribed on the pillars of the temple of photography, and it is far from likely that they would ever think of risking their position amongst us by giving a medal to any but those whom they deemed to have deserved it. I have had the pleasure of knowing one of this year's judges for upwards of twenty-five years, when he stood without an equal or a rival within the classic precincts of Cambridge, and there are very few University men of his time who would ever venture to put their opinions into the opposite scale with his. Others can doubtless bear as high an encomium with regard to his *confrères*.

In view of such facts, I fear we amateurs must accept our beaten position, and only determine to bind on our armour more securely for future exhibitions. Nevertheless, the point mooted by Mr. Macdona, as to separate awards being made for amateurs and professionals, is one worthy of more than merely passing consideration. The amateurs of England are a very large and influential body, and I feel sure that if the judges of the future could see their way to apportion a certain moiety of the medals to amateurs—just as in every school each class has its prize for the head boy or boys—not only would the professional ranks be more stimulated to send in their very best work to compete for the fewer medals, but an incentive amongst the amateurs would be roused which would redound to the credit of the whole community, and urge us to greater exertions to reach that pinnacle of fame amid the glades of nature to which the professionals have arrived within the walls of their studios.

It goes without saying that we have not the slightest chance of competing with the professional men in portraiture; and, considering the truly pitiable productions of amateurs' portraits in general, it would be well if my brethren could be induced to reduce to a minimum the practice of "taking our friends' likenesses," and devote themselves entirely to that which, in my humble opinion, is the far more enjoyable work of vieing with the poet and the scenic painter in depicting the grand and open temple of Nature.—I am, yours, &c., J. CARTER BROWNE, D.D.

Thurning Rectory, Hants, November 3, 1884.

THE HYDROKINONE DEVELOPER.

To the EDITORS.

GENTLEMEN,—I cannot understand Mr. Ingall's formula for the hydrokinone developer, as stated in the Journals of the 17th and 31st ult., and write to ask if he will be so good as to take the trouble to make it a little more clear for the benefit of those who, in common with myself, would like to use a developer so highly recommended by Captain Abney, Mr. E. Howard Farmer, and others.

In the formula given in the Journal of the 17th ult., page 671, only one and a-half grain of hydrokinone is to be dissolved in five ounces of water. Is this what is really meant, as about one grain to the ounce is what is usually recommended?

In the letter which appears on page 702, "one drop of pure strong nitric acid" is advised in preference to the citric acid in the formula on page 671; but farther on Mr. Ingall says—"I think one grain (of hydrokinone) to the drachm of water will be found a convenient solution. It ought to be filtered then with ten drops of nitric acid made up to 100 minims with water." It, of course, cannot be meant that the 100 minims of diluted acid are to be added to one drachm of water containing one grain of hydrokinone; but, if not, to what must the diluted acid be added?

Perhaps Mr. Ingall will kindly, through your columns, give the formula which he has found to be the best, and very much oblige,—Yours, &c., F. W. B.

November 4, 1884.

Notes and Queries.

FRANKLIN says:—"Can you give me a reliable formula for the preparation of a phosphate toning bath for albumenised prints?"——Let our correspondent try the following:—

Chloride of gold	1 grain.
Phosphate of soda	20 grains.
Water	8 ounces.

J. A. S. very unnecessarily tenders a profuse apology for "troubling" us in the following matter, quite overlooking the fact that it affords us the greatest pleasure to render services of this nature to our readers, whether regular subscribers or not. The matter referred to is this:—He took a photograph of a certain vicarage. While doing so two gentlemen came up, and just as he was about to uncap the lens they stood still and stared at the camera. When he afterwards exhibited the photograph for sale one of the persons referred to objected to it, and threatened him (the photographer) with an action at law if he persisted in the sale. He wishes our opinion concerning this.——In reply: Our correspondent ought not to discontinue the publication under such threats. If an action be brought the plaintiff will only get himself laughed at. His presence there was an accident, and his standing still during the exposure is an admission that he wished to be taken in the photograph. Even if it were the means of bringing him into public ridicule, which is evidently not the case, he could have no claim against the photographer.

T. S. MATTHEWS would like to know whether it would be illegal were he to photograph a statue of (say) a Grecian undraped figure, and then have it painted and exposed for sale.——In reply: It is not possible to answer such a question unless we were made acquainted with all the circumstances of the case; but we may observe that many years have not yet elapsed since some one—a photographer, we think—was fined and reprimanded by a Glasgow magistrate for having sold coloured photographs of a statue of the class mentioned.

GEO. HAYNES asks whether there is any patent existing in the United States of America for the use of gelatino-bromide paper on which to produce positive prints.——In reply: We are informed that such a patent does exist; but, seeing that application for the same had not been made at the date when such invention had been made public in England, it is uncertain whether or to what extent the previous exhibition of the results of the invention, and the publication of the means whereby such results were obtained, might affect the patent taken out in the States.

QUERIST says:—"Can you inform me what would be the proper focal length for an object lens for an optical lantern, to produce a disc ten feet in diameter at a distance of fifteen feet from the screen? and, also, whether the ordinary double combination form of portrait lens would be a suitable kind to use for the purpose?"——In reply: To cover a ten-feet disc at the distance mentioned try a lens having an equivalent focus of five inches; but the dimensions of the transparency have something to do with this. We here assume it to be of the usual nature. The ordinary portrait combination, if properly corrected for flatness of field, will answer the purpose well.

S. D. A. inquires if any means exist whereby he will be enabled to take a group of three figures on an eighteen-inch plate by means of a whole-plate lens. He imagines it is to be effected by the agency of a concave lens, which may be placed between the two lenses that form the present combination, and asks for particulars as to focus, diameter, form, and price of such lens, together with information as to the precise place in which it should be inserted.——In reply: There is a better and far simpler system than that described which may be adopted for effecting the desired end. Let our correspondent remove the back cell, together with the lenses contained therein, from the tube and insert in room thereof the front cell with its lens remaining in an undisturbed position. Next insert a diaphragm in front of the lens, the flat side of which should now be directed to the outside, and the conditions for securing a large group on an eighteen-inch plate will have been complied with. Try a stop with an aperture of about an inch, and let it be placed a distance in front of the lens equal to its diameter. Precise directions cannot here be given, but these will afford a sufficient clue to the requirements of the case.

Exchange Column.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPHS REGISTERED.—

Messrs. Hall, Wakefield.—*Photograph of Norbury Church.*

Elijah Yeoman, Teesdale Studio, Galgate, Barnard Castle.—*Two Photographs of John Bowes, Esq.*

Thomas Mills, 53, Garth-road, Bangor.—*Photograph of the Council of the North Wales University*, also *Photograph of Opening Ceremony.*

JOHN BORDLEY.—The idea is by no means new, it having been introduced and used many years back.

O. O. O.—Make up a varnish by dissolving gum dammar in benzole twenty grains to the ounce, and coat the pictures with this. It will not require heat in its application.

A. B. C.—The picture is certainly much improved by your work. We have returned the prints as desired.

A. Felix.—Ferrotype portraits are coloured in the same way as glass positives, namely, with powder colours.

J. Robertsein (Glasgow).—Yes; the last volume of our Journal contains the most complete treatise on the subject.

T. B. P.—Any gasfitter will supply the burners; or you may get them direct from the manufacturer, Charing Cross, W.C.

Charles Waters.—Tinned vessels should not be used. Better employ stoneware or porcelain. The funnel should be a glass one.

A. Z.—1. About ten or eleven feet.—2. Fifteen to sixteen feet.—3. Five feet opaque at each end will be better than more.—4. To about two feet six inches from the floor.

Robt. A. Good.—Write to the gentleman himself if you are desirous of more particulars. We know nothing of his private affairs, or whether he would sit to you for his portrait.

Staffs.—There is no doubt whatever that the glass was not thoroughly cleaned before the emulsion was applied, and that the markings arise from this little piece of carelessness.

F. B. E.—We cannot do better than refer you again to the remarks we made when we reviewed the apparatus a short time back. We have nothing to add to what was then said.

Print-Washing Trough.—If the correspondent who last week desired to know where he could have one made will turn to our advertising columns he will see there is one advertised in the current number.

D. H. T.—Without seeing the pictures in question it is impossible for us to say how they were produced. We presume, however, that they were mounted in the ordinary manner before the prints were removed from the glass.

Robt. Ferguson.—As you have all the works you mention, the only addition we can suggest is the last edition of Hardwich's *Photographic Chemistry*, published by Messrs. J. and A. Churchill, New Burlington-street, W.

M. N. O.—Thanks for the strips of cardboard and the negative. We will examine the former chemically and let you know the result. Treat the stains first with dilute hydrochloric acid, and afterwards with pumice-stone. Ordinary black varnish is the best for writing the names on the negatives. They should be written on the film side, but backwards.

X. Y. Z.—The alterations we should suggest in your proposed studio are to make the side light higher—say nine or ten feet, and the ridge fifteen feet. Instead of having six feet opaque at the ends, five would be better. If possible, it will be advisable to have the studio longer than you propose. Twenty-one feet is rather too short when full-length figures have to be taken.

A. F. Bumford.—The cause of the fog is very evident if the developing solution was prepared according to the formula you enclose, as it contains no restraining acid. Add to each ounce of the solution twenty minims of glacial acetic acid, and try again. If your negatives still fog probably the fog is due to the bath, and a drop or two of nitric acid to each pint will, no doubt, set that right.

Opal.—As you say that, sometimes, your opal pictures are all that you can desire as regards brilliancy and colour, while at other times they are inferior although you use precisely the same materials, it is clear that the difference is due to your manipulation or want of skill. Unless we saw you actually at work we cannot suggest where you fail. Possibly more experience is all you require. Use the chloride of palladium, and dissolve it in water.

Touchstone.—You had better purchase one or other of the retouching mediums now in the market. The makers of them do not publish the formulæ by which they are compounded. Some mistake has been made; gum arabic is *not* soluble in benzole. All will depend upon the water supply. The larger the vessel and the more plentiful the supply of water the more perfect will be the washing. Better make the trough a little too large than too small.

W. H. W.—The machine mentioned in your letter will certainly yield sufficient light to enable you to take a portrait; but for practical purposes we should certainly advise you to have the next larger-sized machine. If you have the smaller one you must place the light much nearer the sitter than with the larger, and this is always a disadvantage. While you are incurring the outlay, the difference in cost and installation of the larger and smaller machines will not be so very considerable.

Received.—Ed. Liesegang, Ph.D.; "M. A." In our next.

Photographic Society of Great Britain.—The first ordinary meeting of this Society for the ensuing session will take place on Tuesday next, the 11th instant, at 8 p.m., in the Exhibition Gallery, 5a, Pall Mall East, when the medals awarded will be presented, and short papers read by Mr. Arnold Spiller on *Hydroxylamine Used as a Developing Agent*, and by Captain Abney, R.E., F.R.S., on *The Siemens' Unit Lamp Applied to Photography.*

Obtaining Money by False Pretences.—A man named William Cobbett was charged at the Maidstone Borough Police-court with obtaining money by false pretences from his employer, Mr. E. Hibling. Prosecutor, who is a photographer, engaged prisoner to canvas for orders for photographs on commission. He gave in the names of several persons to his employer with fictitious orders, and received his commission. It was proved that many of the orders were false, and prisoner was committed for trial at the Borough Quarter Sessions.

Photographic Club.—The subject for discussion at the forthcoming meeting of this Club, at Anderton's Hotel, Fleet-street, on Wednesday next, the 12th inst., will be on *Emulsions in Collodion.*

Photographic Chambre Syndicale.—The photographers of Lyons have combined to form a Chambre Syndicale, the President of which is M. Bernand.

Canvassing for Photographs.—William Cunningham, 33, a respectable-looking man, who described himself as a canvasser in the employ of the Temple Photographic Gallery, 170, Fleet-street, was charged with obtaining the sum of 5s. 6d. from Catherine Evans, a widow, by means of false and fraudulent pretences.—Mr. Sims, from the office of the Solicitor to the Treasury, prosecuted.—The alleged false representation was that the prisoner came from the Photographic Gallery, Temple-bar, and asked prosecutrix if she wished to have her late husband's photograph enlarged like one he showed her. She gave him a likeness of her son's to get done, and 5s. 6d. He promised to bring it back in a week. She last week saw him in custody.—Detective-sergeant Martin said a number of frauds had been perpetrated in connection with photographs lately. It was shown that the prisoner had nothing to do with the above-named gallery.—The prisoner in defence said he handed the portrait and money to a young man, who said he was in the employ, and he thought it would be done.—Mr. Slade committed him for trial.

Herr Hennig's Gum Arabic Emulsion Process.—In the *Correspondez* Herr A. Hennig gives the following simple emulsion process:—"If a drop of a thick solution of gum arabic be placed in a test-tube containing some washed aqueous bromide of silver and left to precipitate, one will perceive that an emulsification of the bromide of silver takes place just as with a warm gelatine solution. This well-known phenomenon led me to seek a new way of avoiding the troublesome part of the work of making gelatine emulsion, namely, the washing of the nodules. The process is as follows:—Precipitate from the aqueous solution bromide of silver, which falls rapidly to the bottom on account of its weight; and, therefore, in a very short time—from a-quarter to half-an-hour, according to the quantity—it may be washed completely free from the nitrate salt by two or three changes of water. This precipitate is emulsionised by grinding in a mortar with gum arabic. This gum emulsion may be dried upon glass plates, then mixed with finely-divided gelatine, and thus a dry and keeping preparation prepared, which has the advantage over the troublesome-to-prepare and dear, dry gelatine emulsion of commerce, that it can at once be dissolved. When the precipitate taken from under water is emulsionised with gum arabic all that remains to be done is to add it to the necessary quantity of gelatine and water in a bottle, and leave it to digest for an hour at 50° to 60° C., after which the emulsion is ready. The sensitiveness may be increased by frequently agitating during the digestion, as the gum emulsion will thereby be the more intimately united with the gelatine. * * * Finally: if after digestion at 50° or 60°, two per cent. of ammonia, at 0·910 sp. gr., be added to the above emulsion (which is then further digested for a short time at 30° to 40° C.), a still higher sensitiveness would be obtained." Herr Hennig developes with 30 c.c. of Dr. Eder's ferrous oxalate emulsion, to which a couple of drops of a saturated solution of chloride of mercury has been added, or with Kramer's mixed ammoniacal pyrogallic acid developer, or with Dr. Stolze's potash developer. A large quantity of the emulsion may be prepared in a couple of hours, with but a twentieth of the quantity of washing water usually required, and has the further advantage of a store of it occupying but little space.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician,
For the Week ending November 5, 1884.

These Observations are Taken at 8.30 a.m.

Oct.	Wind.	Barometer.	WetBulb.	DryBulb.	Max. Solar Rad.	Max Shade Tem.	Min. Tem.	Remarks.
30	W	30·26	45	47	—	57	39	Foggy.
31	W	30·29	52	54	—	59	45	Overcast.
Nov. 1	S	30·14	51	52	—	56	48	Overcast.
3	NE	30·12	42	44	—	60	42	Hazy.
4	SE	29·95	48	49	—	58	41	Foggy.
5	W	29·92	57	54	—	61	47	Fine.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1280. Vol. XXXI.—NOVEMBER 14, 1884.

PERCENTAGE SOLUTIONS.

"What is a ten-per-cent. solution?" is an inquiry we frequently hear, and it has been renewed this week by a correspondent, who further asks "a full explanation." As, notwithstanding the apparent simplicity of the question and its answer, a good deal of misconception and even ignorance exists on the matter, we shall meet our correspondent's request as fully as possible.

We need not wander through the numerous replies we have received to the question when directly put to several persons who "ought to know," and really do if they only stopped to consider, but they generally amount to something like the following:—"A salt dissolved in ten times its quantity of water;" "water one part, substance dissolved ten parts; or water (or other liquid) containing one-tenth part of some other substance in solution." Now, on the face of it, the two first definitions are absolutely incorrect, while the third is so ambiguous in its terms as to be scarcely intelligible to the seeker after information.

In the first place, in the case of "a salt dissolved in ten times its quantity of water," there would result a solution consisting of eleven parts by weight (accepting the "quantity" of the salt dissolved as a "part"), but of which the *volume* would be unknown. This could in no sense be considered a ten-per-cent. solution; for, even if both salt and solvent had been *weighed*, the solid contents would be one-eleventh of the whole. If measured the proportions would be an unknown quantity. A nearer approach to accuracy—so far at least as percentage by weight is concerned—is attained in one of our answers—"one part of a solid to nine parts of solvent;" but this would be worthless if the resulting solution had to be *measured* out in small quantities representing a definite quantity of the substance dissolved. In brief, the only method is to take one part of the substance to be dissolved and *make it up* to ten parts of solution.

But then a difficulty arises, in this country at least, in the system of weights and measures in vogue, which, even when the true meaning of a percentage solution is thoroughly understood, renders its preparation, except in a few instances which will be noticed, a matter of troublesome calculation, involving fractions and divisions of quantities necessary to such an extent as to practically bar these solutions from use. On the continent, however, where the metric or decimal system prevails, the term "five-" or "ten-per-cent. solution" is in general use, and is as familiar as our own "thirty grains to the ounce," &c.

There are, however, one or two instances in which the term is familiar to English photographic ears—notably in the case of the "five-per-cent." bichromate solution employed in sensitising carbon tissue. This is as readily prepared without calculation as could possibly be the case if the metric system were in use; but we doubt whether in nine cases out of ten a true five-per-cent. solution is made—not that for this special purpose it matters much. The five-per-cent. sensitising solution is usually made by dissolving one ounce of bichromate in a pint of water, but that is "how not to do it." If the bichromate, however, be first dissolved in a smaller quantity of water, and afterwards *made up in bulk to a pint*, a true percentage solution results. But how many operators attend to this?

With the exception of the ounce avoirdupois and the pint when a solid is to be dissolved, there is scarcely another instance in which fractions and calculations can be avoided with our English weights and measures; but here, at least, we are on solid ground. The ounce avoirdupois, which is equal to 437·5 troy grains, is the weight of 480 minims (of ·911 grain each); this forms the "fluid ounce," twenty of which make a pint, weighing 8,750 grains, or one pound and a-quarter avoirdupois, which latter consists of sixteen ounces, or 7,000 grains. Thus it will be seen that it is possible without trouble or calculation to form true percentage solutions for such figures as 1¼, 2½, 5, 10, 20, &c., per cent. where not less than a pint of solution is required; but beyond that we cannot go far without resorting to fractions.

For instance: if we wish to make so small a quantity as two and a-half ounces (a fraction by the way) of five-per-cent. solution, we must calculate the percentage quantity in troy grains and fractions (in this case 54·6875 grains), unless, indeed, we are in possession of a-quarter of an ounce avoirdupois—a rare weight in the laboratory, though common enough in the office or library on the letter scales. But as we depart from multiples or aliquots of five the difficulties become greater still, except, perhaps, in a few cases where accidental coincidences arise.

For small quantities it is, of course, possible to use troy grains and minims in conjunction. Thus, forty-eight grains of a salt made up to one fluid ounce would be a ten-per-cent., or one drachm dissolved in two ounces forty minims a six per cent., solution. But this is after all but a clumsy mode of procedure, and not at all comparable with the neat and perfect metric system.

Here we have the unit of weight in the gramme and the unit of fluid measure in the cubic centimetre, the gramme being the weight of a cubic centimetre of distilled water at 15·5° Centigrade. The two terms are, in fact, practically identical in measuring; for a gramme of distilled water is a cubic centimetre of water—so long, at least, as the temperature remains at 15·5. Variations in temperature as well as the presence of the salts contained in ordinary water produce so slight a difference in the specific gravity that for most purposes they are ignored, and the gramme and c. c. are used indiscriminately for solutions. It results from this that if we wish to make a solution of *any* percentage by the decimal system we have only to take the number of grammes, whatever it may be, and dissolve it up to 100 c. c. in volume, *et voilà!*

We have referred to the metric system for the purpose of calling attention to a system used by some chemists in this country, by means of which the advantages of the former are secured without discarding the English weights. This consists in the plan of graduating the vessels of capacity in "grain measures," "decems," and "septems"—the "grain measure" being, in fact, identical with the minim, and the "decem" ten minims. A measure of one hundred decems (or one thousand grain measures) then takes the part of the French hundred cubic centimetre measure. The septem, or seven "grain measures," is the one thousandth of a pound avoirdupois, and this, though less useful than the "decem" graduation, enables aliquot parts of the avoirdupois system to be dealt with. Measures of all descriptions, graduated in this manner, can be obtained of all dealers in chemical glass, and we should recommend every photographer to be the possessor of at least one.

Returning to the question with which we started—"What is a ten-per-cent. solution?"—it will be plain from what we have said that it is a solution *measuring* one hundred parts, each of which contains one-tenth of a part of the substance dissolved. To attain this result ten parts of the substance must be dissolved—not in any definite quantity of solvent, but in a much smaller quantity—and when dissolved the volume is gradually made up to one hundred parts. As we have shown, the "parts" used in correlation must consist either of avoirdupois ounces and pints, or their multiples or aliquots, or of troy grains and minims. For small quantities especially we cannot too strongly recommend the convenience of the decimal system spoken of, as it gives all the advantages of the French metric system, with the additional one of retaining our own English weights.

THE BICHROMATE DISEASE.

It will be remembered that previously, on more than one occasion, we have directed attention to the pernicious action of the bichromate of potash upon the skin. We revert to the subject again more particularly as the various processes in which the bichromate is employed are now being worked more generally than at any previous period, and, in all probability, will be still more extensively utilised as photomechanical photography becomes fully developed.

The last time we referred to this subject was on the occasion of Dr. B. W. Richardson, M.A., F.R.S., &c., bringing it before the Medical Society. Since then that gentleman has not allowed the matter to rest; for in the current number of *The Asclepiad* he has an article *On Disease from Bichromate of Potassa.* The article is rendered the more valuable because it is illustrated with a couple of coloured photographs of hands, showing the disease in one of its worst—or we hope in *the* worst—phases it is likely to occur in connection with photography. These pictures fully exemplify how valuable is photography in illustrating pathological works; for it appears that the bichromate disease, from a written description, very closely resembles one or two other cutaneous diseases, from which, without knowing the surroundings of the case, it is difficult to be distinguished.

The former portion of the article is principally devoted to the consideration of the action of the bichromate upon the system when employed in its more concentrated form, and also when it is taken internally. This is given principally from the observations of MM. Chevalier and Bécourt. From these gentlemen it appears that in the manufactories where the salt is produced many of the workmen suffer severely from the fine particles of bichromate, which are constantly floating in the atmosphere, being inhaled through the nostrils. In time this frequently causes an entire destruction of the septum of the nose, and, curiously enough, when once this is totally destroyed no further inconvenience is experienced; for the disease appears to stop here, as the other portions of the nasal organs remain unaffected. Another curious fact is that those of the workmen who are habitual snuff-takers experience immunity from this nasal disease, and snuff is now actually employed as a preventive.

In connection with the manufacture of the salt, it is mentioned that if the epidermis be intact "the bichromate exerts no baneful influences. The hand may, in fact, be plunged into a concentrated and hot solution of the salt without fear. The hand may also remain covered with the salt for an entire day without any observed effect. But if the skin be torn or abraded, however slightly—by the prick of a pin, for example—a sharp pain is felt upon the exposure; and if the salt be left in contact with the wound the caustic character of the salt is brought out intensely, the cutaneous tissue is decomposed, and violent inflammation is established. These symptoms are accompanied with intense pain, especially in winter when the cold is severe. The action of the salt does not cease until the cauterisation has penetrated to the bone." This shows how careful we should be in using solutions of the bichromate, as, for instance, in sensitising carbon tissue that the hands should never be immersed in it if there be the slightest abrasion of the skin; or, if there should happen to be such, the salt should be at once removed by washing the part copiously with water and afterwards sucking the wound. These painful sores are not altogether unknown to several photographers.

The second portion of the article is that with which our readers will be the most interested, inasmuch as it deals with the particular form of disease experienced by photographers, which, by the way, is characterised as a "new form of disease." In it is the author's own valuable observations on the disease, as well as several extracts from The British Journal of Photography, on the pernicious action of the bichromate. The author, in describing the appearance of the disease, says that in the first case that came under his notice some of the affected parts very much resembled acute eczema, and others psoriasis palmaris.

In another instance Dr. Richardson says:—"The appearance in this case was not of eczema, but was so singularly true to *pityriasis rubra* that I should have entered it in my notebook as a good example of that disease in its sub-acute stage." This example, it may be mentioned, forms the subject of the photographic illustration, and shows that when the disease is far advanced it must necessarily be an exceedingly painful one, as the backs of the hands and knuckles appear to be covered with deep cracks or fissures, while the skin looks like hard leather which cannot be bent without producing other cracks.

Dr. Richardson mentions several other cases that have come under his notice, but the symptoms and appearance of the disease—at least in the eyes of a layman—do not differ from those already described. In the earlier stages of the disease the symptoms appear to be precisely those we have described in our previous articles on the subject. According to Dr. Richardson it requires many months' constant working with the bichromate to develope the disease, and it is consoling to photographers to learn that the disease is quite local—rarely extending beyond the parts that are in continual contact with the solution, or water used for developing the picture; also that it is only some workers who suffer, while others enjoy perfect immunity from the action of the bichromate. As an example, one case is quoted by Dr. Richardson of an operator having worked constantly at carbon printing for fourteen years without experiencing any ill effects whatever, except, on two occasions, when sensitising the tissue the solution had come in contact with an abrasion on the skin, and deep and painful ulcers were produced. These took many weeks to heal and have left deep scars behind. Once, however, during this period he suffered severely in the nasal organs for a few hours through inhaling fine particles of the bichromate.

On the question of treatment—the part of the subject with which many of our readers will be most interested: in the case of abrasion of the skin it is recommended to wash the affected part with feebly-alkaline water, then to poultice, and afterwards apply freely sub-acetate of lead in solution. With reference to the treatment of the disease itself, Dr. Richardson again quotes from our pages, and adds:—"In the cases I have seen I very much question whether any treatment was of much avail. It seemed to me that recovery commenced when the cause of the evil was withdrawn and nature followed her own course. I see quite well how recovery would follow on removal of the local cause without other aid, and I do not see any *rationale* for the remedies that were tried, with one exception. It is clear that the local application of the sub-acetate of lead is attended with good results in relieving the local irritation, and perhaps in arresting the discharge. I have used it with certain benefit in the cases under my care."

As a preventive of all forms of bichromate disease, it is recommended to avoid the salt or its solutions coming in contact with any of the surfaces of the body. "The wearing of a mask while at work, or while exposed to the bichromate dust, would prevent the nasal affection; and the wearing of an impermeable glove or gauntlet while working with the solution would prevent the cutaneous affection." We may add that india-rubber gloves are now being used by several workers of the carbon process who have previously suffered from the cutaneous disease, and they now experience no ill effects whatever from following their avocation.

In a pathological commentary—the major portion of which will be better understood by the medical profession than by the bulk of our readers, but from which we cannot refrain from giving an extract, as it contains a speculation as to the part that light may possibly play in certain diseases—Dr. Richardson, after concisely describing the action of light on bichromatised gelatine and the details of the carbon process, adds:—"By a process similar to this or identical with it the bichromate, I believe, acts upon the gelatinous structures of the body. It changes their molecular conditions, and renders them insoluble. That leads to an arrest in the living dialysis and in the transudation of fluid. The arrest leads, in turn, to perversion of function, to congestion, and to all the subsequent phenomena. Here, then, is a suggestion for a new departure in research. Are there no other substances capable of producing similar changes? Is it not very probable that on the surface of the body some oxidised products locally evolved may lead to similar molecular changes on gelatinous structures, and to similar local manifestations? I think it is most probable, and that in the study of the action of light on local diseases we touch, etiologically and pathologically, some great discovery."

NATURE AND ART.

When we recollect that it is only some thirteen or fourteen years since the retouching of negatives in this country became at all well known (or, indeed, recognised) as a legitimate mode of treating a portrait negative, it may well cause surprise to see how universal the practice has become—a surprise which, unfortunately, we may say, is too often coupled with dismay when some examples fall under our notice. With regard to the fell mode in which beautiful photographic work may be treated by the mechanical stippler we must, in justice, remember that with retouching, like all other arts, there are many grades of skill—not only grades of skill in the worker, but grades of appreciative power in the sitter. The photographs that would satisfy Bond-street would scarcely find appreciative critics in the New Cut, and between these there are all shades of skill and of criticisms.

The original idea that actuated the retoucher—how this very word itself, now a recognised term, used to be objected to!—was the softening of harsh wrinkles and the smoothing down of rugosities produced by the unequal power of colours in their reproduction by photography. Gradually, however, the work of the retoucher assumed a more important position, and now so important a factor has he become that not only would the public reject any picture not handled by him, but photography has become secondary to retouching—artists of great skill being employed to do this work. There is, still, a limit to the retoucher's power, and certain work has to be done external to his. The hold that retouching has obtained is to be deplored on many grounds; but the visibly growing taste for truth and art, and truth in art, leads us to hope that the future may see improvement rather than retrogression in the character of the photographs that are to be.

Still, human nature has to be considered. Most people have some little vanity, and prefer a little flattery rather than a caricaturing of their lineaments such as a plain photograph not unfrequently perpetrates, and to prevent which the successful photographer will resort to all kinds of expedients. A just photograph does not necessarily give a mathematical delineation of the sitter's face and form as a rule and compass would set them out. We all form a mental conception of our friends which is usually very different from the actual facts of the case, as a tape measure would show, and we should like to have that conception realised when the photographer sets to work. If he sometimes exceed that conception and produces a grossly-exaggerated portrait it must be charitably put down to his good nature, and a hope may then be expressed that he will improve in the future. In giving any hints as to methods adopted we must be understood as describing them for the benefit of truth as well as harmony, and not as a presentation of aids to pictorial frauds.

A correspondent asks us about a method of producing dimples. The experienced retoucher knows that, unless the negative be locally reduced and then retouched to form, no amount of ordinary retouching will produce a shadow or hollow except by the aid of the needle-point, which in skilful hands is capable of very marvellous effects. What is really referred to is, we expect, a treatment of the sitter's own face; and, to show the extent to which vanity will prompt some people to tamper with nature, we here give an extract from the *Chicago Herald*, though as to its trustworthiness we have to say we possess no means of forming an opinion:—"The artist in dimples places a small glass tube over the spot where the dimple is designed to appear. The air is sucked out of the tube, thereby raising a small protuberance of skin, which is ligatured, or tied with a piece of fine silk, and then duly snipped off with a keen knife. The wound is next bound up, a silver cone, inverted, being placed over it so as to mark its centre. The part is 'dressed' daily, and after the lapse of five days, as a rule, the injury has healed, and in its place appears the 'coveted dimple.'"

Then, again, freckles are positively said to be in demand, a peculiar sand termed "freckle sand" being commonly employed to produce them, though the more superior description are hand-painted at half a dollar a freckle and are warranted to last three days! With examples like this before him, can it scarcely be wondered at if the photographer, too, while professing to hold the mirror up to nature, allows his hand to waver a little, and so cause a few peculiarities to remain hidden, while beauties are rendered visible that were hitherto undreamt of.

If there be one thing more than another that a lady is sensitive about it is her figure. The days of tight lacing have most decidedly not gone by, and the photographer has to do his share in producing a similar effect. In many establishments it is the custom uniformly to take a few inches from every lady's waist by carefully stippling out a portion of the figure and adding it to the background. This, which we can assure our readers is practised to a very considerable extent, may be much more readily done when the background is not quite plain, after the style affected by some artists. It is almost impossible to do it thoroughly successfully with a plain background, and in any case a little "spotting" is usually required upon each print to hide the retoucher's work.

If any of our readers will examine an album full of portraits, he will find that the bulk of them are represented with eyebrows which, from the centre of the arch outwards, seem to dissolve away into nothing, no matter how thick they may be as they approach the nose. The reason of this is the overmastering property of light-coloured objects to swamp any delicate shades or colours in near proximity to them. The outer portion of the eyebrow is always thinner and more sparsely furnished with hair, the consequence being that in a photograph they become "killed." To remedy this many photographers instruct their operators to carefully pencil each portrait where the eyebrows do not show well. By far the better plan, however, is to pencil the sitter himself. A little black crayon rubber over a piece of brown paper, and a small artists' stump to take it up and pencil the eyebrows with, particularly the side nearest the light, costs next to nothing, and may be applied so as to give a far more truthful representation of the sitter's appearance than if nothing had been done to cause them to come out with due distinctness and depth beyond working upon every individual print. This expedient is as legitimate as it is useful.

As to freckles: there is little to be done with them but to paint them out of the negative one by one. It has been recommended that just before being photographed the sitter should wash the face with warm water, which, by producing a ruddy glow upon the skin, would prevent the freckles showing. We can only say that we never heard of any professional photographer adopting any such plan, and indeed it is not likely he would attempt it.

A well-known lady photographer on the continent used to surmount all difficulties by carefully painting not the negative but the sitter himself, who before being placed in front of the camera was so bepowdered and painted that his (or her) features were quite a work of art to contemplate—eyebrows, face, mouth, nose, all being painted; the result was that the photographs possessed an extreme delicacy which in some cases, especially with ladies, was most effective. We doubt, however, if English sitters, in their own country at anyrate, would permit such preliminary liberties to be taken with their august persons. Powder may be, and is, used to aid in giving delicate complexions; but it has to be most dexterously applied to the face to avoid a patchy effect, which at once would tell what had been attempted, and which is next to impossible to eradicate on the negative by the use of the pencil.

We may conclude by giving a few hints upon the treatment of hair. We well remember a number of years ago being induced to take a picture of a friend whose hair was the extremist of reds, and, besides, lay flat and devoid of gloss. If his locks had been of raven hue they could not have come out blacker in the photograph than they did; but, having heard that powder was the thing to employ, we spread a towel over his shoulders and well powdered his hair before taking the next negative. The result then was that his hair was white. By degrees we found that the needful effect in the photograph was to be obtained by a mere sprinkling of powder to so small an extent that at half-a-dozen yards' distance it could not be noticed. It will be found that when so-called "red" hair, as also the yellow and tawny shades, is very slightly grey no powder will be needed to cause the photograph to suggest the right depth of shade. These little hints which we have gleaned in conversations with our professional friends may be of use to the less experienced of our readers; but we would earnestly recommend them to use them as sparingly as possible, to put as much pure photography in their works as they can, and, instead of making artifice and the *retouch* the main object, let them rather make art subservient to nature.

THE PHOTOGRAPHIC EXHIBITION.

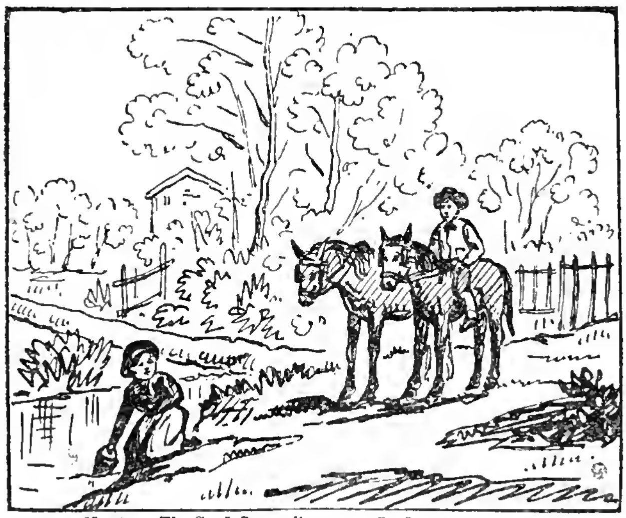
[Final Notice.]

A medal has been awarded to Mr. Herbert B. Berkeley for a series of excellent little landscapes printed in platinotype. The variety of tones now attainable by this process is well shown in the few specimens exhibited by Mr. Berkeley. *The Keep, Corfe Castle* (No. 208), presents a pleasant, cold grey tone, while the next (No. 209) reminds us more of an old sepia. *A Drowsy Day* (No. 221), is a clever composition of landscape and river, with a number of cattle lazily cooling themselves in the stream.

Mr. T. M. Armstrong exhibits a few clever instantaneous pictures of steamers in motion, but his best picture is a quiet piece of nature, *The Silver Sea* (No. 277), in which the "moonlight" effect is very pleasing.

Mr. Robert Slingsby only shows two pictures this year—*Tales of Other Lands* (No. 281), a couple of children deeply engaged in an interesting story book, and *A Portrait* (No. 372)—both of which are excellent in technical qualities.

Mr. Lyddell Sawyer has quite a number of studies, in which figure and landscape are combined. Of these we have chosen *The Good Samaritan* (No. 315), though there are, perhaps, others



No. 315—*The Good Samaritan.* By Lyddell Sawyer.

equally good in the collection. The "good Samaritan" takes the form of a girl, who is drawing water from a brook to give a drink to a couple of thirsty horses returning from their day's toil. The suggestion of sunset or twilight conveyed in the picture is very clever. *Come Along, Granddad* (No. 316), and *The Sisters* (No. 500) are also well conceived.

The Rev. H. J. Palmer's *Portrait of Mr. Gladstone* (No. 290) is a thoroughly good production by an amateur under the difficult circumstances of having to operate in an ordinary room. Mr. Palmer's *Porch of the Cathedral of Chartres* (No. 404) is also a clever piece of photography, as well as a fine architectural study.

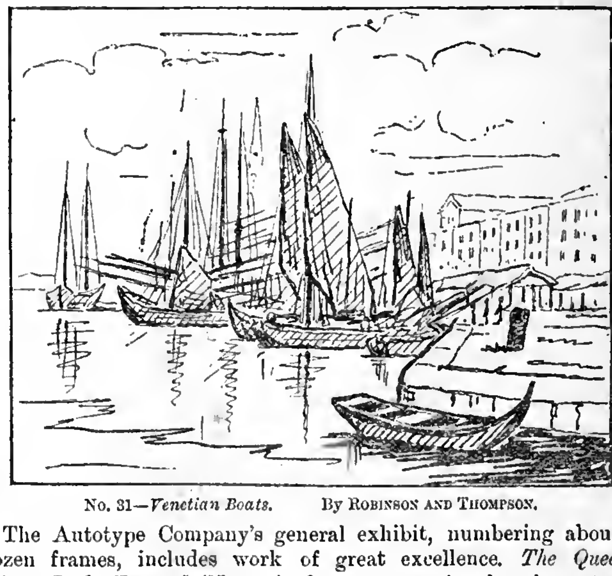
The Rev. H. B. Hare is well represented by a number of pictures of different types—landscape chiefly. *Too Deep; Neddy Won't Go* (No. 334) tells its own story of the "donkey who is not fool enough" to go out of his depth in crossing a doubtful ford. *The Deserted Mill* (No. 336) is a quiet and suggestive piece of landscape.

The Woodbury Company do not exhibit profusely, but the quality of the work shown is quite up to the average mark, if not beyond it. *Lady and Dog* (No. 364), from a negative by Messrs. Downey, is a really charming picture, and it is difficult to decide which to admire most—the admirable posing of the subject or the excellent rendering, in the enlargement, of the various textures, especially the silky coat of the little terrier. A three-quarter length portrait of *H.R.H. The Princess of Wales* (No. 165), and busts of *Miss Maud Branscombe* (No. 166), and *Miss Mary Anderson* (No. 196), all from negatives by Messrs. Downey, are fine works.

No. 364—*Lady and Dog.* By The Woodbury Company.

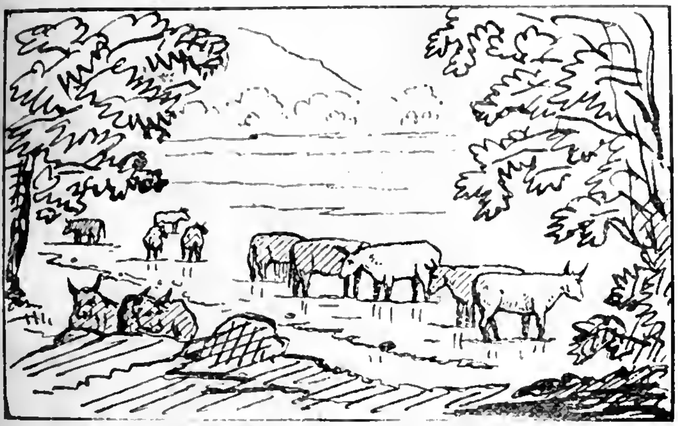
Mr. William England shows a single frame containing four large Swiss views, measuring something like 18 × 15. Mr. England's work has been familiar to not only visitors to the annual exhibitions, but to nearly the whole world, for years past; but, however good it has been previously, we are constrained to confess that his first venture into a large size seems to us to show better work than ever.

Messrs. Hunt and Thornton exhibit four frames of enlargements on opal, which possess good qualities. No. 434 is especially good in tone, though the subject is not a very prepossessing one.



No. 31—*Venetian Boats.* By Robinson and Thompson.

The Autotype Company's general exhibit, numbering about a dozen frames, includes work of great excellence. *The Queen's View, Loch Tummel* (No. 10), from a negative by the veteran G. W. Wilson, forms a handsome picture of a well-known piece of Scottish landscape. *A Peep at Derwentwater*, by J. G. Sinclair (No. 135), to which in conjunction with No. 217 a medal has been awarded, is of mammoth size, and, despite our dislike to these immense pictures, we must confess it to be one of the finest enlargements we have seen, Mr. Donkin's *Matterhorn* (also enlarged by the Company) being the only one of similar dimensions that can approach it. *The Interior* of the *Church of the Knights of Malta* (No. 217), from a negative by Signor A. G. Tagliaferro, is the much-abused picture several correspondents have told us about; but, as we remarked in connection with the smaller picture, whatever its mathematical defects may be it is a good photograph *and* a picture, and the enlargement rather enhances its beauties than its defects. *Cattle at Noontide* (No. 472), a sketch from Ulswater, by Mr. J. G. Sinclair, and exhibited in its enlarged form by the Company, is chosen for illustration; but it is impossible to convey in a mere line block the idea of delicate distance and bold foreground which the picture itself shows.



No. 472—*Cattle at Noontide*. By The Autotype Company.

Mr. H. Forsyth is specially good in his landscape work, and it is a pity his subjects are not more varied that we might see his powers in other classes of landscape. Of his three views, *On the Wharfe* (No. 428) strikes us as decidedly the best, the atmospheric effect, delicacy of the distance, and boldness of the foreground combining to make it a most exquisite picture. His two views in *Bolton Woods* are also fine pieces of work. One further word in Mr. Forsyth's favour is that he makes his own plates. Perhaps a good many who "score" medals know what that means, especially when 15 × 12 is the size.

No. 550—*A Reverie*. By Edwin Smithells.

We shall group together (though not so in the catalogue) the frames of Messrs. W. Wainwright, Jun., and J. C. Stenning—two members of the Amateur Field Club—whose subjects in the main appear to have been selected from very much the same source—the Lake District, the *locale* of this year's *rendezvous* of the Club. Mr. Wainwright's *Colwist Force* and *Stybarrow Crag*, in No. 366, are remarkably good, both as pictures and as photographs; and in the same frame is a fine piece of woodland scenery in a view in Bromley Hill Park. Mr. Stenning's *Stybarrow Crag* (No. 423)—two views, if we mistake not—will compare with Mr. Wainwright's; but the best picture in the frame is the centre one—a study of ferns and foliage—one of the most exquisite "bits" it is possible to find. Mr. Stenning's *Swiss Scraps* (No. 502) are also good.

Mr. Charles Andreæ (also a member of the Field Club) exhibits a *Stybarrow Crag*, but devotes his attention chiefly to other subjects. His *Interiors of Worcester Cathedral* (No. 430) are especially good, and also his instantaneous *Views of London Streets* (No. 410).

Mr. Wm. Brooks's picture, *The Wreck* (No. 538), is aptly described in the accompanying lines from *The Tempest*—"A brave vessel, dashed to pieces!" It represents an actual wreck—or what remains of it—on the Cornish coast. If we recollect rightly it is the ill-fated steamer "Brest." Whatever the vessel may have been, the picture shows the probable results of venturing too near the picturesque but dangerous coast of our most southerly county.

There are, no doubt, many more pictures in the Exhibition which fully deserve notice; but life is not long enough—or, rather, the days at this time of year are not—to permit us in our spare moments to get to know *all* the exhibits. For our sins of omission we must, therefore, in closing our notices, beg our critical readers to excuse us.

APPARATUS.

Although not entered in the catalogue, having been received too late, there are two well-made examples of the patent multiplex back, patented by Messrs. J. Hare and H. J. Dale. These, with the other exhibits, receive much attention from the visitors.

The leading feature in a camera exhibited by Mr. Herbert S. Starnes is that which is implied in the catalogued title, "combined camera, changing-box, and plate-box." The plates are stored in a box to which admission is gained from the interior of the camera, and, by inserting the hands through light-proof coverings, they may be raised up to the place of exposure and again removed and placed in the grooves of the box below.

A shutter, the movement of which may be either instantaneous or protracted at will, attests to the inventive faculty of Mr. Thomas Furnell. It consists of two flaps, one above and the other below the lens, moving in succession, so that when the lens is uncovered by the motion of one it is quickly capped by that of the other. By mechanical means this action is either instantaneous or very slow, or it may even be arrested midway. The shutter is operated by a string or piece of twine, which is enclosed in a rubber tube. Pressure upon the end of a ball at its termination effects a loosening of the tension upon this string and a corresponding action upon the mechanism.

The exhibits of Messrs. Sands and Hunter are somewhat numerous, and are such as to keep up the excellent position this firm has secured in the world of photographic mechanics. They exhibit a book of an ingenious construction for containing plates; a camping lamp, which, we think, must prove very convenient indeed; a whole-plate reversible camera; a camera of same dimensions fitted with their "patent swing," and another with reversing action. The workmanship of these is all that can be desired as regards fitting and finish.

Messrs. J. L. Lane and Sons have a useful class of exhibits, well made and well finished. This applies to three cameras which we examined, as well as to a large slide and a stand.

Mr. H. Moorse appears to be one of those who have not been up to time, by which we mean sufficient time to have had his exhibits entered in the official catalogue. We, however, noticed among the various contributions a light yet very steady stand, bearing the name of this maker.

Concerning the apparatus as a whole, we may say that this department appears to have been a most attractive feature in the Exhibition; and, such being the case, it ought to be encouraged and special arrangements made in order to its being duly managed so as to be productive of most good.

It may here be observed that hitherto no medal has been awarded for apparatus; but (we quote from the address of Mr. J. Glaisher the President, when awarding the medals on Tuesday evening last) certain features of novelty in a camera exhibited by Mr. S. D. McKellen, of Manchester, were, in the estimation of the Committee of Awards, so excellent as to warrant them in giving a medal to that gentleman.

We learn that the Exhibition of the Photographic Society of Ireland (Dublin), which will be opened on Tuesday next, the 18th instant, in the presence of the Lord Lieutenant, promises to be of exceptional excellence. There are upwards of six hundred frames, forming almost a representative collection. The medals will be awarded—not, as usual, by appointed judges, but by the general vote of the members.

At the Exhibition of the Newcastle and Northern Counties Photographic Association, which was opened on Tuesday last, the exhibits, which are confined to members, number upwards of one hundred and twenty. Mr. J. P. Gibson, of Hexham, took the medal for the best set of three pictures; and Mr. Goold, of Newcastle, the prize for members who had not previously taken a medal or diploma. The competition for the presentation picture of the Society will not be decided until Tuesday next, the award being made by the votes of members. We hope to give a more detailed report of the exhibition next week.

Mr. W. W. Winter, whose name will be familiar to those of our readers who take notice of the medallists of the year, and whose works at the Exhibition in Pall Mall have received favourable comment, does not appeal to the artistic feelings of his *clientèle* through his photographs alone. He caters for a still larger public, and the inhabitants of Derby and its neighbourhood have lately had an opportunity of seeing at his extensive premises—which embrace large exhibition rooms in addition to his portrait studios—a large collection of works of art contributed by competitors drawn from many and distant quarters. Yesterday week, as we learn from the *Derbyshire Advertiser*, he was honoured by the presence of the Mayor and Mayoress of Derby, many town councillors, and a large and influential gathering of ladies and gentlemen to witness the distribution of the prizes and diplomas to the successful competitors. The proceedings passed off with complete success.

The name of Dr. Kayser, in connection with photographs of lightning flashes, is well known; but at a meeting of the Berlin Meteorological Society last month he exhibited a photograph very unlike the ramified pictures now so familiar. This particular picture showed four unramified, irregularly-undulatory lines, running in exact parallels from top to bottom, which must, by reason of their parallelism, have arisen simultaneously or immediately after one another in order that their discharges should have pursued the same track. The first flash was further distinguished by a series of light layers attached to one side of it. Dr. Kayser assumes that a double discharge had taken place, and the course had been displaced by reason of a strong wind. Knowing the rate of the wind he was able to calculate approximately the time between the discharges to within some hundredths of a second.

Our readers have heard of the identiscope and the Claimant, the inventor of which instrument asserts he has discovered a true means of establishing identity by superposing two portraits upon one another, when, if certain fiducial points coincide, he holds it proved that the pictures are of one and the same individual. The theory is very pretty, but Mr. Francis Galton—who ought to know more than anyone else of the effect of superimposed pictures—utterly demolishes the theory and completely exposes the fallacy in *Nature* of the 13th ult. At the commencement he points out that in the campaign which, according to the *Pall Mall Gazette*, is about to be run in the country on behalf of the Claimant by "six of the best orators whom money can collect, * * * supplied by a hundred identiscopes, the pictures to be combined will be not photographs, but drawings in bold lines made from them." However, even with photographs Mr. Galton shows the untrustworthiness of the method of the identiscope, and in every way points out its uselessness. He concludes—"First, that the fact of two photographs blending harmoniously is no assurance of the identity of the persons portrayed. Secondly, when drawings made from portraits are shown to blend, it does not follow that the portraits from which they were drawn would blend equally well. And, lastly, the photographic print of the iris of the eye (the point of departure in this comparison of identities) does not afford a trustworthy unit of measurement." We are, therefore, enabled to hope that photography may not be called in to aid in this gigantic imposture.

Speaking of experimental photographs, we read in *Science* that among the papers announced to be read at the Newport meeting of the National Academy of Sciences, on October 10th to 16th, is one on an experimental composite photograph of the members of the Academy.

Readers of Professor Tyndall's *Forms of Water* will be familiar with the fact of the gradual flow of the huge glaciers, the "sea of ice," &c., with his modes of measurement for proving the existence of the flow. To achieve the same object Professor Simony has recently taken a large number of photographs of the summit of the Hohe Dachstein, of the Gosan Glacier, and the Karls icefield, in order to execute future measurements. The plan is certainly excellent, and will enable the more laborious part of the work to be performed in the study, instead of upon the face of the ice with the mercury of the thermometer almost out of sight.

An interesting paper on thermometers was read before the same meeting as that to which Dr. Kayser's photographs were exhibited. In it the writer, Professor Förster, reported several series of experiments in the measurement of heat carried out by the Standard Commission under his direction. As a result of these investigations it appeared that the possible errors, even for the best thermometers, were very considerable—so much so that it was found a displacement of the fixed points by several degrees might be brought about by repeated heatings up to 100° C.

"Wanted, a photograph!" Any photographer who can obtain a photograph of the latest addition to our knowledge of natural history would be sure of an immense sale for his picture. He will have no further to go than a small island on the river Amazon, and the object to be photographed is a small bird called a "gipsy" by the inhabitants, but whose claim to fame rests not upon its name but upon its possession during the early period of its existence of four feet. The fact that monotremes were oviparous with mesoblastic ovum was considered to be the most important intelligence ever sent by Eastern cable; but this fact, if fact it be, of a four-footed bird is still more wonderful. Who will produce the first photograph?

If a little time ago we gave our readers extracts from the works of some eminent astronomers which were the reverse of encouraging to those who have the welfare of photography at heart, we may this week point to the words of one of our foremost English astronomers who, so far from depreciating the usefulness of photography for scientific purposes, reaches a pitch of enthusiasm in describing what has been done, and what under certain easily-realisable contingencies could be done, by the combined aid of optics and photography. The Cantor lectures, delivered by J. Norman Lockyer, F.R.S., on *Some New Optical Instruments*, are most interesting to read, and the latter one, which is devoted in the main to photographic astronomy, will be given in a future number.

Twenty years ago the man who would have predicted that photography was likely to prove such a stepping-stone to fortune that the high office of Lord Mayor would be held by one who had attained a commanding position by the commercial pursuit of the art would have been a fair butt for sarcasm. Yet, as our readers are aware, such a hypothetical vaticination has been fulfilled this year in the election of Alderman Nottage as Lord Mayor of London. Mr. Justice Grove, acting in the absence of the Lord Chief Justice at the official reception of his lordship, made a happy allusion to the Stereoscopic Company, tracing the invention of the stereoscope to Leonardo da Vinci's discovery of the true functions of the eyes in binocular vision, he having pointed out (in his treatise *Trattato della Pittura*), that each eye saw a different picture, the coalescence of which enabled the sensation of relief to be felt. The speaker also bore high testimony to the present position, and the possible future, of photography. We are sure that all our readers will join Mr. Justice Grove in his congratulations to the Lord Mayor upon his acceding to the dignity of the high office, and they cannot but possess a feeling of gratification at the dignity of their profession in reading the learned justice's further congratulations to the Lord Mayor, upon "having in your honourable pursuit been connected with matters of such great interest, differing so greatly from the common matters of business with which most Lord Mayors have been concerned."

RECENT RESEARCHES IN THE CHEMISTRY OF THE HALOGENS.

All students of photographic chemistry will be careful to note anything which is done towards extending our knowledge of the reaction of the halogens. A great deal has been written of late upon the affinities of the halogens and the inverse displacements—so difficult to comprehend—which the haloid silver salts can be proved to undergo under certain conditions. Thus, it has long been known that, in the general way, the affinities of the halogens are in the order—chlorine, bromine, iodine, fluorine; but that, under certain circumstances, the affinities appear in the inverse order. Berthelot, who has given much attention to this question, has recently published some most elaborate researches, which seem to prove conclusively that these displacements are in perfect accordance with the law of "thermic maximum;" that is to say, that the system which disengages the most heat is formed by preference. It is not, however, very comforting, from a photographic point of view, to know that thermo-chemical laws are able to explain the apparent capriciousness of certain elements, inasmuch as the reactions which take place in photographic operations are generally too complex and on too small a scale for calorimetric investigation.

Some light has recently been thrown upon the peculiar properties of silver iodide when heated. Rodwell found that the iodide suddenly contracts considerably between 142° and 145·6°, and afterwards expands regularly. Mallard and Le Chatelier have recently shown that silver iodide is dimorphous. These investigators found that on reaching 138° the colour of silver iodide suddenly changes from deep yellow to a yellowish-white, and, when examined by polarised light, it is proved to pass from the hexagonal to the cubic system at a temperature of 146°, absorbing 6·8 calories in the change. This change of crystalline form and absorption of heat would sufficiently account for the sudden contraction observed by Rodwell.

A great deal of attention has lately been paid to the methods of separating the mixed halogens in analysis, and, as this is a question which intimately concerns the quantitative analysis of photographic chemicals, it will perhaps be useful to give a brief summary of some of the more recent methods which have been suggested. The following method has been proposed for detecting traces of iodine in mixtures containing large quantities of chlorine and bromine. It is in reality a modification of Duflos' process for determining the iodine in iodides by boiling with ferric chloride, and condensing the vapours in a concentrated solution of potassic iodide. This method is not applicable when bromides are present, as bromine passes over with iodine; but if ferric sulphate be employed instead of the chloride only the iodine is volatilised. This reaction may be conveniently used for testing commercial potassic iodide for chlorine, as all the chlorine remains behind in the retort, quite free from iodine.

Bloxam has proposed a simple plan for separating silver cyanide from silver chloride by treating the mixture with hot dilute nitric acid, in which the cyanide is soluble.

A simple method for the estimation of mixed chlorides, bromides, and iodides is based upon Field's observations on the conversion of silver chloride into bromide by the action of potassic bromide, and of the bromide into iodide by potassic iodide. The mixed haloid silver salts are dissolved in an aqueous solution of potassic cyanide of just sufficient strength to dissolve them completely. Potassic bromide is now added equal to the weight of the original silver salts, and the excess of cyanide is decomposed by sulphuric acid. The precipitate now contains only bromide and iodide of silver. It is weighed, and again dissolved as before. Potassic iodide, equal to one and a-quarter times the original weight, is added, and the excess of cyanide decomposed as before. The precipitate now contains only silver iodide, which is weighed, and the proportion of chlorine, bromine, and iodine is calculated from the difference in the three weighings.

J. Vincent Elsden.

FIXING SILVER PRINTS WITHOUT HYPOSULPHITE.

It is a well-known fact that small quantities of chloride of silver are soluble in ammonia, as well as in the chlorides of sodium, ammonium, &c., and though solvents are not sufficiently powerful to be used as fixing agents for silver prints.

Being engaged in the production of transparencies on glass by the aid of the collodio-chloride process a few days ago, I was struck by the thin layer of chloride and citrate of silver contained in the films, and at once tried the action of the above-named solvents on them.

Liquid ammonia cleared the films immediately; a concentrated solution of common salt took about five minutes to dissolve the whitish film, the chloride disappearing before the citrate.

I next tried to fix untoned collodio-chloride prints upon paper in the same way. Ammonia has the same effect as the usual five-per-cent. solution of hyposulphite, but one cannot think of using it in large quantities in open trays, because of its fumes.

Solution (concentrated) of chloride of sodium is a little slow in action. I, therefore, tried a saturated solution of chloride of ammonium, in which I left the prints for an hour. It may be that a shorter time is sufficient or that longer soaking is necessary, but my observations lead me to think that one hour is a safe time. The prints came out of the bath with the same brownish-yellow colour which also the hyposulphite imparts to them. I washed the prints for one minute under the tap, dried them, and exposed them—one half being covered with black paper—to the light. Till now they have had only a few hours of sunshine and ten days of diffused light; not a trace of difference is observable in the protected and the exposed parts. Of course, this time is not at all sufficient to prove that the fixing is perfect. I shall leave the prints in the window and report on their behaviour.

I next toned a batch of prints in an old toning bath of tungstate of soda, very weak in gold, for the usual time of ten minutes, and kept them for an hour in the chloride of ammonium. After drying they had an unpleasant slate-blue colour, showing that too much gold had been deposited on them. I, therefore, prepared another batch of prints, which I left only one minute in the gold bath; in the chloride bath they took a vigorous purplish-brown colour, but showed to be somewhat over-exposed, although I had taken care to print less than for hypo. fixing.

Now, if this way of fixing prints will prove to be safe—which only time can teach us—we shall have the advantage of doing away with hyposulphite, of using less gold for toning, and shortening the time of printing.

Comparing the prints with others fixed with hyposulphite, I find that the finest half-tones are better preserved, and that from under-exposed negatives better results are to be obtained.

If the chloride of ammonium do not sufficiently fix the prints I am sure we shall succeed by adding to it some ammonia. The fixing might be done in the upright vessels in which the prints are hung.

Since writing the above I have tried to fix bromo-gelatine plates of different makers in the saturated salt solution, and I think with perfect success. It takes from two to three and a-half hours to clear the film; addition of liquid ammonia hastens the process.

Albumen paper prints lose their chloride in the bath, but the albumenate of silver remains and deepens in colour by light.

The collodion prints show no sign of alteration in light up to the present time.

Ed. Liesegang, Ph.D.

SULPHITE OF SODA IN THE DEVELOPER.

After a careful consideration of the several experiments described in the editorial article last week, I am inclined to think that the difference of opinion concerning the true function of sulphite of soda in the developer (there referred to) is not satisfactorily explained by the hypothesis that sul*phate* of soda was present in my previously-recorded experiments, which had led me to suppose that sulphite of soda greatly retarded development. My reason for doubting the sufficiency of the explanation will appear directly.

In the meantime I may just say, in reference to the Editors' remarks on "things of an opposite character," I am willing to allow the stricter accuracy of their phrase—"different degrees of the same character;" but the general sense of my argument seemed to require the word "opposite." Further: respecting the assumption that because an agent is a developer it, therefore, cannot be a retarder of development, I respectfully refer the Editors to an article at page 501 of The British Journal of Photography, on *Gallic Acid in the Developer—A New Restrainer*, for confirmation of the seeming paradox.

Now for my reasons for venturing to question the Editors' explanation of the difference of opinion before referred to. If they will take the trouble to look at the details of my experiments, as previously described, they will see that I make my sulphite of soda by adding sulphurous acid to a solution of carbonate of soda immediately before development; and, therefore, it is not likely that sulphate of soda could be present (unless the acid were impure), because there was no time for oxidation to take place. Still, a developer thus prepared was found to work much more slowly than pyro. and carbonate of soda alone, so I came to the conclusion that sulphite of soda exercised a retarding action on development.

However, the admirable experiments recorded in the editorial article under consideration appear to leave very little room for doubting that I was mistaken in my supposition. I now think that the fault which was ascribed to sulphite of soda was, perhaps, due to another agent, unsuspected at the time, namely, carbonic acid; for, according to Fownes, "even boiling water absorbs a perceptible quantity of this acid, so, of course, more or less of it would necessarily remain in the developing solution." It is probable the action of this acid, *and not the sulphate of soda*, as alleged by the Editors, may explain the difference of our conclusions, and this conjecture is supported by the facts that the bicarbonates do not promote development, and the subcarbonates are more energetic than the carbonates. Moreover, all this seems to agree with a new fact which I have observed when mixing pyro. with one or the other of the sulphites to preserve it. Thus, when the pyro. is dissolved first in a given quantity of sulphurous acid, and a saturated solution of carbonate of soda, potash, or ammonia is added until neutralisation takes place, the mixture is clearer than when the pyro. is dissolved in a solution of sulphite of soda directly. I was perplexed with this fact, but the theory that carbonic acid is a powerful restrainer of development fully explains it.

In conclusion: I will only ask that my remarks from first to last may be regarded from a practical point of view. It has not been my intention to attempt to cope with the Editors on theoretical ground, for I well know their strength and my own weakness thereon. W. Hanson.

[We are glad our valued correspondent is willing to (shall we say?) meet us half way. With regard to the question of sulphurous acid we may, however, say that that is quite as likely to oxidise before as after conversion into sulphite if kept in solution. As regards the gallic acid parallel—or suggested parallel—there can be no analogy, since gallic acid, though a developer in conjunction with silver, is not necessarily so in conjunction with alkali. The *crux* of this particular question lies here:—Sulphite of soda *plus* pyrogallol will develope a picture; gallic acid *plus* pyrogallol will not. Therefore it is not on all fours with sulphite. Turning to carbonic acid: we called attention to its restraining action when Mr. J. McKean published his *New Departure in Alkaline Development*, and we are at present engaged in a series of experiments with a view of fixing its actual restraining power, of which there is not e least doubt.—Eds.]

PHOTOGRAPHIC INDUSTRIES.

A LANTERN SLIDE PAINTER'S STUDIO.

The leading characteristic in the painting of a lantern slide, as contrasted with any other class of painting extant, consists in this—that the former must be so finely executed as to bear being examined through a somewhat powerful magnifying glass. In the small space of three inches, more or less, such an amount of detail and finish has to be compressed as to stand critical examination when enlarged to twenty or thirty feet.

Photography, when employed as a means of reproducing a sharp original, does so in a manner which is quite as perfect as the most fastidious can desire, even when such reproduction is on a scale of magnitude far transcending the original as measured by angular extent. But, in every instance in which the peculiar skill of the colourist or painter is employed in the construction of the picture that is to be examined under these enlarged conditions, the skill must be of an order altogether different from that displayed by ordinary painters on canvas, because the result of the artistic ability of the latter is to be submitted for the examination of the public under conditions of diminution, this being dependent upon the distance intervening between the spectator and the painting; whereas, in the former case, every detail is intended to be practically examined through a magnifying glass having a considerable degree of power. The skill required by the lantern transparency painter is, therefore, much in excess of that of the painter on canvas, seeing that he must produce an effect similar to that of the artist who works on the large scale of delineation, while he must do so with microscopic skill in almost microscopic dimensions. The painting of a lantern slide is, therefore, a work involving a far higher degree of skill than when the result is a picture of large dimensions.

London can justly boast of being the residence of several artists who make a *specialité* of lantern transparencies, and who have made for this city a name and reputation. A special request preferred to one of these artists, Mr. Chatham Pexton, of Bryantwood-road, Holloway, whom we had known as the producer of several excellent works for the lantern, secured us an immediate invitation to visit his establishment and describe to our readers everything we should see likely to prove of interest to them.

Having been ushered into a studio in which a number of young ladies were seen seated at easels, and engaged in one or other of the multifarious branches of transparency painting, we first of all inquired of Mr. Pexton if there were any secrets in his profession that we would witness, yet which he might not consider desirable to be described to the public. The reply of Mr. Pexton was—"Write and describe whatever you see; we have no secrets here; we trust to skill alone, and not to any fanciful methods of mixing or applying colours."

While watching the painting of a lantern transparency on a photographic basis, we could not but admire the skill displayed in making a sky possessing uniformity, and which is considered a difficult feat. This was effected in the following way:—The transparency having been placed on the easel, and the palette set with a range of colours from oil tubes, the blue pigment, previously modified with an admixture of varnish, was applied at the top with broad sweeps from left to right in such a manner as to become lighter and lighter as the horizon was approached. But just previous to this stage being reached other colours, of the rose madder class, were blended so as to bring the sky down to the horizon in a warm and pleasant tone. The sky was now ready for having the colours blended together and made to run into one another with such imperceptible grading as to present the appearance of one harmonious and continuous whole rather than a succession of tints. The deft application of the point of the finger effected this, and although it appeared to be accomplished with much ease, yet we could plainly see that it required great care and skill to ensure a uniform result. In reply to our question concerning the advantages of other methods of equalising skies or broad tints—such as dabbing brushes, the fingers of leather gloves, and expedients of a similar kind—Mr. Pexton informed us that he found the finger to be the best means for obtaining this effect. Smoothness of texture of the skin and the most scrupulous cleanliness were essentials towards producing the highest class of results. To show the perfection that could be attained, he requested one of his lady assistants to lay a uniform tint upon a piece of plain glass. This was done, and such was the smoothness and uniformity secured that, had we not witnessed the operation, we would have thought it had been produced by pouring a clear-coloured varnish over the surface of the glass.

The sky having been laid in, the production of clouds is the next step. This involves a high artistic perception. Everyone knows how exceedingly beautiful are some of the clouds in a high-class lantern slide. Nay, so beautiful and fascinating may they be rendered as sometimes to prevent the eye from readily resting upon the scene below; and the character of this scene is greatly modified by the clouds. In no department of slide painting is there greater scope for artistic revelling than in the formation of clouds and skies. Taking up a photographic transparency of a Scottish coast scene, in which were several fishing boats careering upon a glassy sea, Mr. Pexton said that to paint such a scene in the most effective manner, so as to "bring down the house," it ought to be made a moonlight study. At our request the transparency was treated in this manner, and never was a more magical change presented. The moon, which was "picked out" after the sky and sea had been draped in the solemn blue and green characteristic of moonlight, shone brightly and tipped the edges of the sails and rigging of the boats, and by the skilful use of what we may designate "delicate little artistic scalpels" its beams danced upon the scarcely-rippling water.

We inquired concerning the production of what is known in the lantern trade as "tales," and were told that these subjects are first drawn upon cardboard on a somewhat large scale, and finished in light and shade with the most scrupulous care. The test for good finishing in this drawing consisted in enlarging a three-inch photograph obtained from it up to forty feet. The production of these originals was attended with great cost, as a high degree of artistic skill was involved; and, although many figures were frequently introduced, it was necessary that the *likenesses* of each characteristic figure should be maintained throughout the whole series. Mr. Pexton showed us the original drawings of some sets which are now being brought out commercially, and so fine were they that we have conceived a respect for pictures of the fairy tale and kindred classes we had not previously experienced.

"What about preserving a becoming distinction between painting photographs intended for strong lime-light illumination on the one hand and the oil lamp on the other?" we inquired. We were informed that this received special attention when photographers or dealers specified the nature of the light to be employed; but in the absence of such information there was a medium degree of force employed which suited both systems of lighting. A room immediately over the studio was furnished with lanterns of the various classes, and even during broad daylight, when it could be rendered quite dark, a customer desiring to see any special effect could be shown, on the screen, the picture on a disc of any determinate demensions and by any class of light. This was found to be very convenient for those who desired special effects of painting to be produced in their photographs, and who at the expense of waiting for a brief period could witness the precise effect produced before the transparency was mounted.

We may say, in passing, that in the show-cases of Mr. Pexton we saw many beautiful specimens of single, biunial, and triple lanterns of elegant designs. He appears to give the preference to albumen as the medium upon which to produce the photograph; but as we saw many exquisite paintings which had been produced upon the works of York, Wilson, Valentine, and others who are understood to use collodion, as well as upon those of Mr. George Smith, of the Sciopticon Company, whose works are on gelatine, we arrive at the conclusion that if the photographic transparency be really fine it matters but little by what process it is produced. The test for excellence in the transparency, as regards the chances of its producing a fine effect when painted, consists in laying it, face down, upon a sheet of white paper, and observing if there be any degradation of the purity of the paper when seen through the high lights. If there be, then the photograph is unsuited for being transformed into a picture of the highest class.

RECENT PATENTS.

PATENT SEALED, NOVEMBER 7, 1884.

No. 10,950.—"Improvements in Cameras;" a communication from C. Rae Smith, New York. A. H. REED, 90, Cannon-street, London.—*Dated August* 5, 1884.

DARK SLIDE FOR PHOTOGRAPHIC CAMERAS.

By ARTHUR FULLERTON HOWMAN, George-street, Oxford.

MY invention relates to a simple and inexpensive construction of slide for photographic cameras, whereby I provide effectually against admission of light to the sensitised plate within.

It consists of an outer rectangular frame with a back fixed thereto, the two sides and bottom of the frame being made with grooves to receive the edges of a thin metal slide which forms the front cover, and the bottom having also an under groove to receive one edge of the sensitised plate. The top of the frame has on its inside a recess containing a rebated strip pressed downwards by a spring, and has above that a groove holding a strip which is pressed forwards by a spring. There is also a spring on the back which presses against the sensitised plate, keeping it steady against shaking. When the plate is in the frame it is held at its lower edge in the groove at the bottom of the frame, and at its top edge by the rebate of the strip pressed downwards by a spring, and it is covered by the thin metal plate which is slid in from the top and is held in the grooves of the two sides and bottom. On withdrawing this slide the sensitised plate is exposed in front, and light is prevented from entering by the top of the frame by the strip, which is pressed forward by a spring closing the slit by which the metal plate is withdrawn.

[Certain drawings accompanied the complete specification which it is unnecessary here to give.]

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
November 18	Bolton Club	The Studio, Chancery-lane.
" 19	Photographic Club	Anderton's Hotel, Fleet-street.
" 20	London and Provincial	Masons' Hall, Basinghall-street.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

THE first ordinary monthly meeting of this Society for the present session was held on Tuesday last, the 11th inst., at the Gallery, 5A, Pall Mall East,—Mr. James Glaisher, F.R.S., President, in the chair.

The minutes of the previous meeting having been read and confirmed, the following gentlemen were elected members of the Society:—Messrs. W. M. Crouch, F. Machell Smith, E. Smithells, G. E. Thompson, T. Furnell, W. Brooks, Henry Smith, W. P. Marsh, Ernest E. White, G. H. M. Whish, J. J. Smith, J. Mason Harrison, Charles Harrison, C. F. W. Sage, W. E. Halse, A. Spiller, F. Harrison Low, M.R.C.S., M. Loring, S. Stagall Higham, T. C. Turner, Jun., B. G. Wilkinson, Jun., T. Scanlan, F. Maude, T. E. Freshwater, J. G. Gibbs, H. G. Moberly, M. H. Clerk, Rev. J. S. Knight, R.N., H. S. Mendelssohn, T. Whitehead, A. Mackie, K. B. Murray, F.R.G.S., F.S.S., G. H. Hunt, D. Barnett, M. Auty, G. Hadley, W. W. Winter, J. Lafayette, S. D. McKellen, J. Bracebridge Hilditch, Hon. Slingsby Bethell, B. Myles, J. Harris Stone, M.A., F.L.S., F.C.S., and J. Duncan Peirce.

In reply to the Chairman's inquiry respecting the Exhibition medals, The HON. TREASURER (Mr. W. S. Bird) stated that through some little hitch the medals had not arrived in time for the meeting. He had a promise that they should be delivered by nine o'clock, and he hoped they would arrive before the meeting closed.

The CHAIRMAN said it would gratify the members to learn that the number of attendances at the Exhibition was even better than last year. In 1883 the number of members was 718; this year it was 781, being 63 more than that of the previous year. In 1883 the number of tickets reached 4,046. This year the number was 3,732. In 1883 the number who paid was 4,057. This year there had been 4,177. The amount received at the doors last year was £227 9s.; this year they had taken £244 3s. As each year the attendance was larger than that of the previous year, and the money takings likewise increased, so he hoped it would continue; it was also satisfactory for the Society to know that their work was so much appreciated. Speaking of the jurors, he said their work was laborious. Every picture was separately examined by each juror, who assigned a certain number to it; these figures were summed up, and from the totals obtained the highest received the medals. The jurors had accomplished their difficult task in the most faithful manner, and he asked that the usual vote of thanks be accorded to them.

The vote being accorded,

The CHAIRMAN requested the members to accord a vote of thanks to the Hanging Committee, which was done. He then called upon Mr. Arnold Spiller to read a paper on *Hydroxylamine Used as a Developing Agent.*

Mr. A. SPILLER, having traced the history of hydroxylamine, said he first brought it under notice about two months ago in an article published in the *Photographic News*. Since then he had made further experiments, and now took the earliest opportunity of bringing it before the Society. Hydroxylamine, he said, was one of the numerous ammonia compounds, having the formulæ NH_3O. By replacing one atom of hydrogen with hydric oxide there was a bond of affinity obtained which might be represented thus:—

$$N \begin{cases} OH \\ H \\ H \end{cases}$$

Hydroxylamine chloride or hydrochlorate could be easily produced in an aqueous solution, and it had the property of decomposing silver bromide when in the presence of a caustic alkali into metallic silver, bromide of sodium, water, and nitrous oxide, as shown by the following equation:—

$$2NH_3O + 4AgBr + 4NaOH = 4Ag + 3H_2O + 4NaBr + N_2O.$$

This was illustrated by mixing the components in a beaker, when metallic silver was shown to be reduced. Mr. Spiller further stated that, unlike pyrogallol, this substance does not absorb oxygen from the atmosphere, neither does it stain the film. It is now an expensive salt, but if in constant use there is no reason why it should not be cheap. The developer, suited to an ordinary good commercial plate, was given as follows:—

Hydroxylamine chloride	2 grains.
Caustic soda	5 "
Bromide of potassium	½ grain.
Water	1 ounce.

The caustic soda takes the place of ammonia, and hydroxylamine supplants pyrogallol. It admits of a wide latitude of exposure, and, not being an oxygen absorbent, enables better colours to be obtained—especially so with gelatino-bromide paper. The only drawback is a reticulation of the film in those plates where soft gelatine had been employed. Examples of negatives and bromide paper so developed were passed round. By modifying the proportions several colours could be obtained on gelatino-chloride plates, many of which were admirably suited for the lantern. In conclusion: he hoped photographers would give the new developer a trial, and make known their results.

Mr. W. E. DEBENHAM remarked that Mr. Wellington had shown transparencies on bromide plates, developed with hydroxylamine. The colours were very beautiful, but they had a defect, viz., a puncture somewhat like that of a needle point all over them. The plates were a slow batch, made expressly for transparencies.

Mr. J. SPILLER remembered pyrogallol being sold at 16s. per ounce. There was not the least reason why hydroxylamine should not come down from its present high price—10s. 6d. per ounce—as pyro. had done.

Mr. LEON WARNERKE inquired whether it was found to be a more powerful developer than pyro. or ferrous oxalate.

Mr. A. SPILLER, in reply, said the punctured markings referred to were caused by the use of a soft gelatine; they were due to an evolution of nitrous oxide in the film. It was not so powerful an agent as pyro. or oxalate, but by increasing the alkali there would be more detail obtained.

A hearty vote of thanks having been accorded to Mr. Spiller,

The CHAIRMAN said he was glad to find a new member making a good beginning. He hoped to hear other papers from Mr. Spiller, and that other new members would follow his example.

Owing to the absence of Captain Abney from London, his paper on *The Siemens' Unit Lamp Applied to Photography* was read by the Honorary Secretary, W. F. Donkin, Esq., M.A., &c. Captain Abney mentioned several forms of unit lamps hitherto recommended, but few worked as well as "Siemens'." The principal points in this lamp were the fixed diameter of wick 2-16ths of an inch, and a gauge fixed at a suitable distance, the top of which was 2.6 inches from the level of the flame. Acetate of amyl, a substance very cheap in Germany, was found to be best suited to burn in this lamp, and in case of draught Captain Abney suggested the addition of a glass chimney or cylinder; also an extinguishing screw-cap to prevent evaporation when out of use. He (Captain Abney) had tried it with a sensitometer 18 inches off, and obtained the same illuminating power as the phosphorescent tablet, and found it was thoroughly reliable. Any ordinary spirit lamp could be utilised if the burner was of the same dimensions as that previously mentioned; and, as acetate of amyl was easy to obtain, anyone could have a standard light much better than the ordinary standard candle.

Mr. J. SPILLER remarked that there would be no difficulty in making perfectly pure acetate of amyl, should it be required for this purpose.

Mr. W. BEDFORD referred to difficulties he met with when testing standard lights due to reflections, and said that, as so much depended on the surroundings, an absorber was required as well as a reflector.

Mr. T. SEBASTIAN DAVIS, having experienced similar difficulty, now took the precaution to place a reflector one metre behind the flame of his lamp.

Mr. DEBENHAM suggested that Mr. Bedford use the simple flame direct from the lamp, lining the lamp with black velvet and making use of a velvet-lined tube, thus cutting off all reflection.

A vote of thanks having been passed to Captain Abney for his paper,

The CHAIRMAN congratulated the following, who were awarded medals by the Society:—Mrs. S. G. Payne, Messrs. Vittoria Sella, W. P. Marsh, H. P. Robinson, The Autotype Company, Messrs. C. Grassin, G. Renwick, H. B. Berkeley, Sig. A. Tagliaferro, H. S. Mendelssohn, J. Werge, on behalf of the family of the late Mr. J. Hubbard, G. West and Sons, Adam Diston, G. Hadley, J. Lafayette, T. and R. Annan, J. Atkinson, M. Auty. Extra medals:—J. Gale (transparencies), S. D. McKellen (improvements in cameras). The medals not having arrived, the Chairman was unable to present them as usual.

The CHAIRMAN said there were many others who had sent pictures of great merit, and to whom he should like to have presented medals, among whom were the works of Miss Coteswerth, Messrs. Dixon, Willis, Pointer, Gillard, Malcolm Clerk, Sutcliffe, Captain Abney, A. and G. Taylor, Seymour Conway, Myles, School of Military Engineering, Robinson and Thompson, W. Wainwright, Jun., &c., &c., all of which were so good that he only wished medals had been awarded to them as well. Mr. Furnell's shutter was beautiful in its arrangements, and none the worse for the hard usage such things usually get. Mr. Cadett's new shutter was also good, and he could speak highly of all the apparatus shown. Their's was not a professional Society, yet professionals had a majority of the awards this year. Hitherto, amateurs had taken the majority of medals; but he must say that the amateurs were getting a little behind. He had noticed that elsewhere as well, and hoped that they would strive to keep up with, if not to surpass, their professional brethren.

Before closing the meeting he wished to congratulate the Society on its large accession of new members. He hoped they would be all workers, and that the Society would do as good scientific work in the future as it had done in the past.

It was announced that the next technical meeting will take place on Tuesday, the 25th inst., and the next ordinary meeting on Tuesday, December the 9th.

Some of the medals having arrived before the meeting closed, the Chairman presented them to the respective winners who were present; after which the meeting was adjourned, to allow the members to take a final view of the pictures.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AT the meeting of this Society, held on Thursday, the 6th instant, the chair was occupied by Mr. W. E. Debenham.

Mr. HERBERT S. STARNES referred to the proposal, brought before the previous meeting in a letter read by Mr. Henderson, to use the screens of coloured medium for dark-room illumination set at an angle to each other. He thought that the idea was of no use for the dark room.

The CHAIRMAN quite coincided with the view expressed by the chairman (Mr. W. K. Burton) of the previous meeting—that the setting of screens at an angle to each other would only be useful on the supposition that the irregularities of the medium took the form of tubes perpendicular to the surface. With textile fabrics not filled up by a glaze this condition obtained to some extent, but with glass and the mediums in general use there would be no advantage in the plan suggested, and it would occupy considerable space.

Mr. J. J. BRIGINSHAW, alluding to what had been said about toning with a solution of gold without alkaline salt, said that he had made a very dilute solution of gold and found that an ordinary washed print toned in it in the space of half-an-hour. A print that had, before being immersed in the same gold bath, been passed through a solution of carbonate of soda toned in ten minutes.

Mr. T. WALTENBERG had had a new experience with ready-sensitised paper, a batch recently taken into use giving red spots and toning slowly.

Mr. STARNES and Mr. J. BARKER had also recently found the same trouble, and the latter gentleman thought it was due to decomposition of the albumen.

The CHAIRMAN did not think that this was the probable cause. Some twenty years ago there was a paper introduced into the market that smelt horribly, but it gave particularly rich prints free from mealiness.

A MEMBER inquired whether there was any method, other than the tentative and experimental one, of finding the chemical focus of the object glass of a telescope.

Mr. J. B. B. WELLINGTON suggested sloping the plate and noting the portion that came the sharpest.

Mr. S. G. M. McKellan was elected a member.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

THE ordinary monthly meeting of this Society was held on Thursday, the 6th inst., in the rooms of the Society of Arts, John-street, Adelphi,—Mr. W. Ackland in the chair.

The SECRETARY having read the minutes of the last meeting, and these having been approved, proceeded to give the result of the circulars issued to the members requesting each to give his opinion as to whether the Society should be carried on or not. Twenty-five replies had in all been received. Of those who replied seven were against the continuation of the Society, nine were in favour of it, and nine were doubtful. He (the Secretary) then went on to say a few words in favour of the continuance of the Society, and suggested that it should be announced at the present meeting that certain proposals for alterations of the rules of the Society be brought before the next meeting. These proposed alterations were briefly as follow:—To do away with the five shillings subscription for country members, except in the case of ladies. To alter the rule with regard to members in arrears with their subscriptions. To have only three vice-presidents. To have twelve members on the committee.

It was proposed by Mr. W. M. ASHMAN, and seconded by Mr. W. K. BURTON, that Mr. Ackland be elected President.

The following gentlemen were then proposed as Vice-Presidents:—Mr. H. Trueman Wood, Mr. F. York, and Mr. T. Bolas.

The following were proposed as members of the Committee:—Messrs. W. M. Ashman, A. Mackie, W. K. Burton, E. Dunmore, W. Cobb, J. A. Harrison, J. J. Briginshaw, A. L. Henderson, E. Cocking, J. Nesbit, H. Wilmer, W. H. Prestwich, F. Hollyer, W. Brooks, and T. Bolas. The officers were to be balloted for at the next meeting.

Mr. J. TRAILL TAYLOR then gave a discursive lecture *On Florida*, illustrated by numerous photographic transparencies exhibited on a twenty-foot screen, some of which were beautifully coloured. He described the whole process of forming a plantation, from the clearing of the land to the husbanding of the orange and other crops. He spoke of that State as a paradise for sportsmen, and as one which was well worthy of the attention of those who inquire—"What shall we do with our boys?"

A vote of thanks (which was carried by acclamation) was proposed by Mr. William Cobb, who recited a poem he had composed for the occasion.

It is fitting that it should be placed on record that the lantern service was on this occasion imperfectly rendered, doubtless owing to the fact of a new and apparently-inexperienced individual being called upon at the last moment to officiate.

The annual dinner is fixed to take place at the Holborn Restaurant, on Tuesday, December 16th.

THE PHOTOGRAPHIC CLUB.

THE annual general meeting of this Club was held at Anderton's Hotel, on Wednesday, the 5th instant.

The report of the year was submitted to the meeting by the officers, showing a steady increase in the prosperity of the Club by the number of attendances, which have been largely augmented during the past year—the number amounting to 1,296, against 1,027 last year, and 872 the previous year. A laboratory has been built and fitted with the necessary appliances and chemicals, to which the members have free access. The number of members is steadily increasing and the financial condition of the Club is extremely satisfactory. During the winter months the optical lantern has been a source of interest. Many new or valuable modifications of apparatus or processes of development have been shown or demonstrated. One very useful feature is that if any new invention connected with photography or new process, &c., is laid before the Club it has its practical value fairly and impartially ascertained. These considerations, together with the thoroughly-pleasant and sociable manner in which the meetings are conducted, offer special advantages to both professional and amateur photographers that were quite unattainable previous to the establishment of this Club in 1879.

EDINBURGH PHOTOGRAPHIC SOCIETY.

THE twenty-fifth annual meeting of the Society was held in No. 5, St. Andrew-square, on Wednesday, the 5th instant, at eight o'clock,—Mr. W. Neilson, President, in the chair.

The minutes of the last annual general meeting and last ordinary meeting having been read and approved of, the ballot box was opened, and the following gentlemen declared duly elected: — Messrs. F. W. Palmer Edward Binning, Charles Waterson, and Alfred Tagliaferro, Malta.

The following gentlemen were proposed for election at next meeting:—Messrs. W. A. Bryson, G. Napier, Charles Murray, Aitken, W. Skinner, J. W. Miller, Henry Cowe, Herbert W. Bibbs, Robert Lindsay, Donald Mackenzie, and Mr. Alex. Thompson.

The Secretary read his report for the past year as follows:—

ANNUAL REPORT.

THE Council, in presenting the twenty-fifth annual report, have pleasure in congratulating the members on the continued prosperity of the Society.

At the commencement of the session the Society mourned the death of Mr. John Lessels, who for seven years had been the esteemed President of the Society. At the funeral, amidst a distinguished gathering, the Society was officially represented.

During the past session the Society had lost four members by death and thirty-seven members by removal or resignation—total, forty-one. Fifty-five new members have been elected, making an increase of fourteen. Total now on the roll, 406.

The following papers have been read:—*A Ferrous Oxalate Developer*, by Mr. Norman Macbeth, R.S.A. *Various Photographic Conveniences*, by Mr. William Crooke. *A New Lantern Carrier*, by Mr. J. M'Kean. *Camera-Lucida—Paletta Obscura*, by Mr. Hume Nisbet. *Canary Medium*, by Mr. J. W. Knolles. *Recreation in Art*, by Mr. John Simpson. *Notes on the Lime Light*, by the Rev. T. Hardwich. *Notes on the Lime Light*, by Mr. Lewis Wright. *Photographers and Sitters*, by Mr. G. G. Mitchell. *The Calotype Process*, by Dr. Alexander Hunter. *Sulphite of Soda in the Developer*, by Mr. J. J. Turnbull. *The Potash Developer*, by Mr. A. B. Stewart.

The following items have been exhibited:—An ether generator, and Dickson's improved burner for the lantern, by Mr. J. J. Turnbull. Collection of views by Mr. Foster, of Coldstream, by Mr. J. Crichton. Mr. M'Dougall's lantern carrier, by Mr. J. J. Turnbull. Collodio-chloride transparencies, by Mr. Cowan. Series of photographs by Mr. Reid, of Wishaw, by Mr. G. G. Mitchell. Landscape studies by Mr. Andrew Pringle and others, by Mr. J. Annan. Series of photographs illustrating the Passion-Play at Oberammergau, by Mr. G. G. Mitchell.

The annual display of work took place at the December meeting, and was of exceptional interest.

The Society has been presented with photographs by the late Mr. Lessels, a portrait of the late Mr. John Lessels by Mr. Bashford, and a non-actinic lantern by Mr. Wardale.

Packets of hydrokinone and samples of gloy have been distributed among the members. One ballot for photographs has taken place. A revised edition of the laws of the Society has been adopted.

Three popular meetings have been held in Queen-street Hall, and were much appreciated by large audiences:—1. A miscellaneous collection of transparencies illustrating the work of members.—2. The temples and palaces of Japan.—3. A voyage round the world with a camera, with descriptive lecture, by Mr. Andrew Pringle, of Langholm.

The annual trip took place on the 10th July, when, by the kindness of R. Dundas, Esq., a most enjoyable day was spent at Arniston.

The presentation print for 1882-3, entitled, *Brambling*, by Mr. Slingsby, of Lincoln, has been distributed, and that for the past session will be issued shortly.

The proceedings of the Society have been printed in "Transactions," a copy of which has been sent to each member; but the Council does not express an opinion as to the continuance of this publication, preferring that members should state their wishes at this annual meeting.

The large increase in the attendance at the monthly meetings noted last year has still been maintained, the crowded state of the room causing some inconvenience; but for the present the Council does not feel justified in recommending the Society to change its place of meeting.

The thanks of the Society are due to the donors of the several presentations; to the Curator, Mr. J. M. Turnbull, who, with his usual kindness, has allowed the use of a room for several committee meetings, and for still continuing to store the property of the Society; and to the retiring office-bearers.

This report was unanimously approved and adopted.

The Treasurer then read his report, of which the following is a condensation:—

Condensed Report of Treasurer's Intromissions, 1883-84.

Dr.						
To Balance from last year				£87	11	9
,, Arrears of Subscriptions from last year............				10	10	0
,, Subscriptions				106	5	0
,, Miscellaneous Receipts:—						
Advertising in Transactions, &c.	12	7	2			
Photographs sold.	0	4	0			
Interest on Deposit Receipts	1	4	5			
Interest on Current Acct. with Royal Bank	0	5	6			
				14	1	1
				£218	7	10

Cr.						
By Rents				£13	19	6
,, Printing, Postages, Clerk and Collector's Commission, and Stationery......				87	1	4
,, Expenses attending Popular Meetings				9	0	1
,, Subscriptions paid for Officials				1	0	0
,, Expenses attending Mr. Lessel's Funeral, and Secretary's honorarium for past services				2	11	0
,, Presentation Print........				9	0	4
,, Arrears of Subscriptions written off				14	10	0
,, Subscriptions in Arrear ..				10	15	6
,, Balance in Royal Bank	67	17	3			
,, Balance in Treasurer's hands....	2	13	4			
				70	10	7
				£218	7	10

Edinburgh, *3rd November*, 1884.—Having examined the books of the Edinburgh Photographic Society for year ending 31st October, 1884, and compared the entries with vouchers and other instructions, I find the books correctly stated and sufficiently vouched and instructed, and I certify that the foregoing abstracts, framed by me, exhibit a true state of the Society's affairs as taken from the books.

(Signed) A. T. Niven, C.A., *Auditor.*

This report was also approved of.

The Curator stated that he had prepared no written report, but that a sub-committee had been appointed during the past year, who had catalogued and examined all the property of the Society, and to their report he referred. The Society's property, as there specified, was in good condition.

The Society then proceeded to the election of office-bearers for the ensuing session, and on the recommendation of the Council the following gentlemen were unanimously elected:—*President:* Mr. Norman Macbeth, R.S.A.—*Vice-Presidents:* Mr. J. G. Tunny and Mr. Wm. Forgan.—*Secretary:* Mr. W. T. Bashford.—*Treasurer:* Mr. A. M. Forbes.—*Curator:* Mr. J. M. Turnbull. In room of the four members of Council who retire by rotation, Messrs. W. Neilson, Jas. Crighton, Wm. Crooke, and G. G. Mitchell were elected, and, to fill the vacancy caused by the election of Mr. Forbes as Treasurer, Mr. Hugh Brebner was proposed and also unanimously elected.

Mr. Neilson, on vacating the chair, said that it had given him very great pleasure, at the desire of the Society last year, to fill the honourable post which he was now about to vacate. It was the practice in most societies for the retiring chairman as well as the chairman elect to make a few remarks on some subject connected with the objects of the Society, and as he had omitted to perform this duty on his election he would read an article he had prepared at the request of the Editor for the forthcoming Almanac. In this he (Mr. Neilson) directed attention to the greatly-extended usefulness of photography, especially as applied to scientific research. He also stated that he had to thank the members of the Society for their support during the time he held office, and trusted that with harmony and good feeling (without which no society could possibly prosper) the Edinburgh Photographic Society would have a long and useful career. He had very great pleasure in welcoming Mr. Macbeth to the chair.

Mr. Norman Macbeth, who was received with loud applause, then took the chair, and said that last year when asked to assume office as Chairman of the Society, which post had become vacant by the death of Mr. Lessels, he, though very desirous of meeting the wishes of the Society, was, on the advice of his medical adviser, his health being far from good, reluctantly compelled to decline the office. This year, however, his health having been to a great extent re-established, he felt quite able to perform the duties, and it gave him very great pleasure to comply with what appeared to be the unanimous wish of the Society, and accept the honour which had been offered. He then read the following address:—

We have now reached the twenty-third year of our Society, and have good reason to congratulate ourselves on the life it still manifests. It has attained not only a high position in point of numbers, but many of its members have distinguished themselves in the production of beautiful work, as these walls tonight testify, exhibiting general intelligence in every branch of the art.

I had the honour of being called upon by the Photographic Club of Edinburgh during its last session to make a design for the diploma of its members. I represented photography there, not merely as a handmaid to nature, science, and art, but I designated her as the daughter—*filia naturæ scientiæ artisque*—a much higher and more endearing relationship, ever ready, ever willing, and ever lovingly endeavouring to meet the wants and profoundly respect the claims of each.

Something more than mere service is necessary in promoting the interest of any of its departments. It is love and devotion to any worthy pursuit that is felt to be the mainspring of successful effort. Any society depending upon mere awards for stimulus, apart from disinterested exertion, soon ceases to have the most wholesome influence. Emulation is good when it can be carried out without giving offence; but, in the case of many professional men competing, I find it is the opinion of several of our best members that adjudication and the giving of awards is fraught with considerable danger, apt to make shipwreck of the best of feeling, and, at least, introducing elements of unavoidable jealousy and dissatisfaction. However, there may be an exception. In the case of young beginners in the study of any profession some stimulus is not only necessary but helpful, and a prize becomes an object. It is especially for the younger members of our Society that I had in view the institution of a monthly competition, and at the end of the session to award a prize. I do not see that this could be reasonably objected to, limiting it to amateurs within (say) four years' experience with a camera. Indeed, I believe were these competitions well managed and conducted in a good spirit they would be a great inducement for many young men to connect themselves with us, forming, apart from their ordinary calling, a pleasant hobby which would gently lead them into the higher studies of chemistry and art, and so deliver them from many evils which arise from indolence and the neglect of self-culture.

A Society like this has many attractions, and none greater than the opportunities which it presents for the cultivation of taste. We cannot enter upon the smallest detail of any department of its study without feeling the need of acquiring proper methods of procedure; and we always find that the photographer who succeeds most is one who well directs his work, and spares no pains in cleanliness and great carefulness of manipulation.

It hardly becomes me to say anything regarding the education essentially necessary to a photographer. Nothing seems to me—who am but a novice in chemistry and mechanical arts—more important and desirable for anyone proposing to follow photography as a profession than by every means in his power to acquire a sufficient practical knowledge of chemistry and its nomenclature, so as to be able at once to read and work out formulæ as they come from our best authorities. I think, also, he should be well read in and familiar with some of our best books containing workshop receipts, enabling him to make good use of these in mechanical appliances, such as photogravure work or blockmaking to accompany type—arts which are fast encroaching upon the hitherto laborious and very expensive efforts made in the interests and requirements both of science and art.

As most of our young men who are following photography as a profession find, they are best educated in the manipulative part of their work when their services are engaged as general assistants. It is a long time before they are entrusted with the arrangement of the sitter—seldom indeed till they are their own masters. During this early period they should not only be watching how their employers treat their subjects, but they should have an intimate acquaintance with all artistic arrangements, as so well explained and inculcated by Mr. H. P. Robinson and others, but more especially exemplified in the works of some of our standard painters, such as Velasquez, Rembrandt, and Vandyke. The possession of a few good prints from the works of these or of men of our own country—such as Reynolds, so famous for originality of design, and also Raeburn, for great breadth of light and shade, giving effect to the more important parts of character.

The regular sizes of canvas common to portrait painters are so good that little can be advanced in the way of improvement; but the introduction of many mere fanciful sizes, irrespective of their bearing on the subject, is much to be deprecated. We cannot prevent the introduction of novelties in any art; but surely that which ministers most in giving effect to the subject is somewhat more sensible than that which subordinates the subject to inappropriate boundary lines.

Then I would have the beginner to discard all painted backgrounds with the ordinary photographic accessories upon them. As the work is derived directly from living subjects, so should the background and surroundings—if such be desired or needed—be composed from real objects, and these as much as possible conforming to the associations of general good society, Any subject is greatly lessened in interest when the same painted background crops up under every arrangement. Much ingenuity has yet to be exercised in directing the light and shade of a background, so as to give full effect to the head and figure. It is in the practice of this treatment that the photographer, apart from development, will manifest his artistic knowledge and judgment.

In making such remarks I cannot express an honest opinion without fear of offending some one. But permit me to say that photographic portraits are never finer than when thrown out in simple relief from a plain background. It may be painted in certain forms of light and shade, and by turning it round to any position it may be easily adapted to any pose. Simple dark or light cotton fabrics make beautiful drapery. Tapestry and real oak panels made plain, without ornament, are very serviceable. There is nothing more convertible nor more likely to produce variety than these. When special objects—such as the old hackneyed pillar and balustrade—present themselves you feel that they are allied to a past age in art. I hope the day is not far distant when there will be a demand for photographic portraits taken in one's home, with the individual associations about them. This would be a great advantage over the painter, unless he, too, availed himself of such. It would be telling on the originality of portraits were this more recommended and acted upon.

As an artist I have taken a deep interest in those efforts of photography which are now unquestionably making some worthy appearance in the way of artistic arrangements. I refer more particularly to the treatment of subjects of ordinary human life. Hitherto such attempts have been greatly prevented by many unavoidable obstacles; but I am now not without hope that, through general intelligence in the requirements of the picturesque, much will be apprehended, especially through instantaneous work, of many beautiful compositions as seen in the unconscious and charming incidents of everyday intercourse, which without the highly-sensitive plate would never be secured. Success in the gathering of such subjects is only to be had by the concealment of the instrument. I am told that Mr. Edwards, of London, carries nothing with him but apparently a small travelling-bag, with only the front of the lens exposed; and, the focus always being suitable, he secures some wonderfully-picturesque subjects in every way worthy of being completely treated on canvas.

"Knowledge is power." Permit me, then, to advise all young aspirants aiming at the cultivation of an acquaintance with the beautiful in nature and in art to look to the works of men famous in design, such as Sir Frederick Leighton, Burne Jones, or one of the most recent, Walter Crane, whose wonderful fertility appears in that beautiful work entitled the *First of May*. Works of such men as I have just mentioned may not be considered at all applicable to photography, because it does not pretend to be creative; but then such works make the best examples of arrangement and composition. Familiarity with good designs becomes educational; at least, to admire such makes one very difficult to please, and puts one in the pursuit of higher attainment. No photographer is to be excused who does not very frequently look at such publications as *The Century*, *Harper*, or the very cheap and interesting work, *The Magazine of Art*. A close and careful acquaintance with these will go far to foster a taste for art, and enable one eventually in some measure to imitate them.

I sincerely trust that there is much good before us this session in the study of every department which photography embraces, and that each member will find scope in the working out of his own proclivity. In the analysis and the construction of the picturesque I hope that every facility will be given to the new effort we are about to make, by setting apart, if possible, every alternate monthly meeting for a friendly conference on the works of those members disposed to submit them for that purpose. But, as knowledge is what we aim at, I do not see that we should confine ourselves solely to our own productions. Anyone in possession of a photograph which he admires should bring it to the meeting for inspection and consideration, if not for discussion; but in every case it should be distinctly labelled whether for discussion or not, always reserving the name of the author. As I have said, we cannot look for examples for discussion from professional men unless they are pleased to be generous enough; but from amateurs, who have no object but the acquisition of knowledge and experience, I would fain hope there will be no lack. I trust that they (distinctly keeping the object in view) will send in occasionally photographic pictures for the purpose.

There is no department of study in either science or art that is making more progress, or is so varied and rich in its results, as photography. From the very wide range of its adaptation and usefulness our members are most likely to be very varied in their callings in life. This fact makes our membership very interesting. Every one in his own sphere may be useful in ministering to what he conceives to be the interests of photography and the Society's success. Everyone, therefore, should feel that he may and can do something, whatever his place may be. With such a Society it may be truly said that the head cannot say to the hand—"I have no need of thee;" nor the hand—"I have no need of the head." We are all bound by mutual dependencies, and the consciousness of this should keep us from falling into conceited and vain notions of ourselves; for assuredly nothing tends more to lessen the respect we are bound to have for each other.

In closing these remarks, allow me to say one word in acknowledgment of the honour you have done me in appointing me to the Presidentship of this Society. I am deeply conscious of my ignorance in many matters affecting its constitution and working. This renders me very unable to speak with expertness. However, I am sure you will always give me credit for seeking after nothing but the interests and prosperity of the Society, and the maintenance, as far as I can, of the best of feeling amongst all the members.

Mr. Neilson, in proposing a vote of thanks to the Chairman for his paper, remarked upon the great strides which photographers had made in the æsthetic department of their profession, and he asked the members to compare some of the pictures (?) which were still to be found in some of their old albums, where the fluted pillar and the vice-like head-rest predominated, with the artistically-posed groups and other lovely specimens of the photographic art displayed on the walls. And not only that, but he observed a very marked improvement in the pictures from those of last year, both in artistic treatment and in manipulation. But there was still room for improvement, and he thought what was principally required was the artistic training of children. Nursery walls should be hung with really fine engravings instead of the vile abortions which were usually displayed. He only wished he had ten thousand children that he might train them according to his own ideas.

The Chairman then proposed a vote of thanks to those gentlemen who retired from office. He also welcomed the newly-elected office-bearers, and hoped that every facility would be afforded them and himself to do the work of the Society amicably. Nothing was gained by fighting and quarrelling; on the contrary, nothing would produce greater health and vigour in the Society than hearty co-operation and a real desire among the members to further its interests.

Mr. Neilson then, on the part of himself and Mr. Craig-Christie, expressed his gratification for the cordial vote of thanks accorded to them.

Mr. Pillans thanked the meeting for the expression of its approval of his services, and stated that while he had retired from office he would continue to serve the Society as far as lay in his power.

Mr. Simpson, as one of the retiring Councillors, thanked the members for their cordial recognition of the services of the Council. He also expressed his satisfaction at the election of Mr. Macbeth to the chair, and he believed that satisfaction was shared by every member of the Society. He believed the result of the appointments made would be that the Society would have a new lease of life, and that it would go on and prosper.

The Chairman then called the attention of the meeting to the display of pictures on the walls, which, the Curator explained, had been sent in by members for exhibition. There were altogether 113 pictures, the majority bearing evidence of careful thought; indeed the display was by far the finest that had been before the Society at any of its annual exhibitions.

The Chairman then said:—The next thing I have to call your attention to is in the form of a question. You know we have been in the habit of getting the *Transactions* of the Society printed hitherto, and a copy sent to each member. There is no doubt that by giving up this practice we should save some money; at the same time, I should like the members to express their own views on the matter. If the printing and circulating of the *Transactions* serve any good purpose, and there is a general desire to continue them, it would be a pity to give them up. There is a good deal of information supplied in the *Transactions*, and you have the advantage of reading the papers over quietly at home. At the same time, everything we do in the shape of writing appears in the journals, and I suppose most of the members take one or other of these. As to the financial aspect of the question, our late Treasurer will be able to give more information than I can.

Mr. Pillans: I hold that the publication of these *Transactions* pays. We receive payment for advertisements, and certain allowances for early proofs of the reports of meetings, and although these do not amount to anything like the cost of printing, yet if the cost of printing the billets be deducted you will find that the cost to the Society is not great, while the information afforded to the members, many of whom do not subscribe to any journal, is an inducement to many people to join the Society. I believe their stoppage now would cause the withdrawal of many of our members, especially country members, who seldom have an opportunity of attending our meetings, but whose interest in the Society is kept alive by the regular monthly receipt of our *Transactions*.

A first and imperfect proof of the presentation print for the past session was laid on the table.

Members were reminded that subscriptions for the current year were due, and, after a vote of thanks to the Chairman, the proceedings terminated.

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION.

The second monthly meeting of this Association for the season was held in Lamb's Hotel, Dundee, on Thursday, the 6th instant. Mr. J. C. Cox, President, occupied the chair, and there was a good attendance.

After the routine business had been disposed of there ensued a discussion on the advisability of holding another photographic exhibition. Owing to the great success of the previous one the idea was warmly taken up, and it was agreed to hold an international exhibition in the beginning of 1886. The Committee will be elected at the next meeting.

Dr. Tulloch then gave a lecturette on *Photographic Optics*, illustrating his remarks by means of blackboard diagrams.

Dr. Tulloch was most attentively listened to, and at the close of the paper he indicated his willingness to answer any questions relating to the subject. A number of inquiries were made and readily answered.

On the motion of the Chairman a hearty vote of thanks was passed to Dr. Tulloch.

The Council have made arrangements for a lantern exhibition to be given in December, and the Chairman also intimated that a practical demonstration of the process of development would be given in the Society's dark room on Monday, the 1st December. Members were invited to bring exposed plates with them, and an experienced member will be present to develope them.

The customary vote of thanks brought a pleasant meeting to a close.

The following gentlemen are now members of the Society:—F. C. Caffin, C.E., James Smieton, D. J. T. Gray, J. Schleselman, and A. Walker.

BRADFORD AMATEUR PHOTOGRAPHIC SOCIETY.

The first business meeting of this newly-constituted Society was held in the Free Library, on Thursday, the 6th inst., when there was a full attendance of members.

Mr. Duncan G. Law, President, delivered a short address touching on the use and development of photography down to the present time.

Mr. G. D. Scorah, Secretary, afterwards gave a lantern exhibition.

We understand the Society commenced work with a full complement of members, and we congratulate the promoters on having made so successful a start.

The following are the officers for the current year:—*President:* Mr. D. G. Law.—*Vice-President:* Mr. W. Townend.—*Hon. Treasurer and Secretary:* Mr. G. D. Scorah.—*Committee:* Messrs. F. Illingworth, F. B. Muff, W. Townend, M. B. Wallace, J. Cotton, and H. Forsyth.

COVENTRY AND MIDLAND PHOTOGRAPHIC SOCIETY.

The monthly meeting of this Society was held at the residence of Mr. C. Ambrose, 38, Crosscheaping, Coventry, on Thursday, the 6th instant,—Mr. W. Andrews, President, occupying the chair.

After the nomination of officers for the ensuing year, &c.,

Mr. H. W. Jones, F.C.S., exhibited a very convenient method of using ordinary gas in his "Lancaster" ruby lantern, with an arrangement by which he could turn on the ruby or white light at will.

Mr. A. Seymour also sent some negatives, which were thought very fine —not only for their artistic merit, but from the fact of their being developed by the soda developer.

The Chairman then called upon Mr. T. Baynton, manufacturer of the "Coventry" dry plate, for his paper on the making and development of gelatino-chloride plates.

Mr. Baynton said: I must commence by stating that I am indebted to Mr. A. Cowan for the emulsion formula, and to Mr. B. J. Edwards for the developing formula, although I have made some slight alterations in them. The members will find that they can with this kind of plate [sample transparencies from negatives taken during the summer were here passed round] make very beautiful lantern slides, and so entertain their friends and amuse themselves at the same time on these dull winter evenings. For the convenience of those members who wish to make their own emulsion plates I will now give the formula:—

Silver	1 ounce.
Water	10 ounces.
Gelatine (hard)	1 ounce.
Sodium chloride, pure	½ ,,
Water	10 ounces.

Let the gelatine soak for some time; then dissolve by placing the vessel in water at about 110 Fahr., and warm the silver to the same temperature. Now take into the dark room and mix by any well-known method so as to get a very fine emulsion. It may now be cooled by placing the vessel in running water, and when cold wash and filter in the usual way. Expose five seconds (more or less according to the density of the negative) to diffused daylight, and develope with—

No. 1.

Neutral oxalate of potash	2 ounces.
Chloride of ammonium	40 grains.
Citric acid	2 drachms.
Distilled water	20 ounces.

No. 2.

Sulphate of iron	4 drachms.
Alum	90 grains.
Distilled water	20 ounces.

Add one part of No. 2 to an equal part of No. 1, but do not reverse this by adding No. 1 to No. 2, or the effect will not be so good. If the plate be properly exposed the result will be a fine purple-black tone in the transparency, but if you want a warm brown tone expose double the time and mix the developer with an equal bulk of water. The development in this case will be much slower. Many different tones may be obtained by using the various developers given by Mr. Cowan. To fix the picture, use one part of hypo. to eight parts of water. After fixing and washing put the plate for half-a-minute in the following:—

Alum	1 ounce.
Sulphuric acid	1 ,,
Water	20 ounces.

This will dissolve the opalescence caused by the oxalate. The plate must now be well washed, dried, and varnished in the usual manner.

The transparencies passed round were very fine and much admired, especially when shown in the lantern by Mr. Ambrose.

After a hearty vote of thanks to Mr. Baynton the meeting was adjourned at a late hour.

ST. HELENS ASSOCIATION FOR THE PURSUIT OF SCIENCE, LITERATURE, AND ART.

Photographic Section.

A meeting of this Section was held on Wednesday, the 5th instant, at the Association Rooms, 4, Salisbury-street,—Mr. Heather in the chair.

After the ordinary business of the Section was over,

The Chairman showed six views of the moon, taken during the eclipse of the 4th ultimo with his camera, the exposures varying from one to five seconds.

Mr. Sherlock warmly complimented Mr. Heather on his success.

Mr. Taylor showed about twenty views of Dutch life and scenery.

Mr. Sherlock said, in regard to a difficulty some members appeared to have in filtering emulsion, he found it an excellent plan to use the vacuum pump, and suggested the use of asbestos or powdered glass for filtering through.

A few transparencies made by members were passed round for inspection.

A discussion then took place on the action of excess of H Cl in emulsion, ction of Ag No$_3$ in Fe$_2$ CC$_3$, toning bath, &c.

The meeting was then adjourned.

Correspondence.

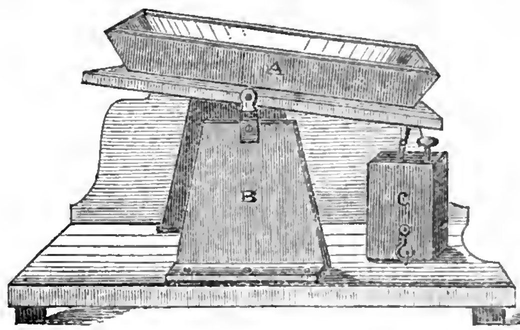
November Meeting of the Photographic Society of France:—A Socket for Lenses.—Presentation of Mr. Cobb's London Street Scenes.—An Oscillating Machine for Baths.—Instantaneous Shutters.—A New Varnish.—Flashed Red Glass for the Dark Room.—Markings in Dry Plates.—Great Photographic Proofs.—On Sodium Chloride as a Fixing Agent.—A New Solution for Plate Cleaning.—M. Laurencie on Actinometers.—A New Use for Boca's Chronometrical Shutter.

The Photographic Society of France held their *seance d'overture* on Friday, the 7th inst.,—M. Davanne occupying the chair.

M. Thierry presented a universal socket for holding a lens. By means of this socket the lens can be made to point in any direction. The inventor claimed for his idea that all swinging fronts and backs to cameras could be done away with. This assertion raised a storm of incredulity among the members, and to stop the discussion the invention was handed over to the experimental committee to report thereon.

I had the honour to present to the Society a collection of instantaneous proofs representing the street scenes of London, taken by our energetic friend Mr. W. Cobb, of Woolwich. These proofs were very much admired. Mr. Cobb was congratulated, and described under what difficulties they were taken (from the top of an omnibus, &c.). The view representing the London Meat Market caused a little hilarity, as some of the members recognised a countryman in the gentleman so closely following up the lady in the scene.

M. Léon Baluze presented a very ingenious apparatus which he calls "*balance curette.*" This is an instrument intended to keep in constant motion any solution in the photographer's tray. In these days of gelatino-bromide of silver an apparatus such as this can render great service by keeping the developing solution continually going on and off the plate to be developed; in fact, the operator can leave the plate in the bath and attend to other business, and thus a great saving of time can be secured. The apparatus consists of a flat board



A, Dish or tray. B, Stand. C, Clockwork.

supported upon an axis in its centre like a pair of scales. One end of the board is attached by a connecting rod to a strong clockwork jack, which, being wound up, continues its work for about two hours without any noise or jerks. The rapidity of its motion can be regulated at will, and it can be started off or stopped immediately. It is a very pretty apparatus, and was very much admired by the members.

M. Arwin presented an English instantaneous shutter upon the same principle as that given by the late Mr. Noton in The British Journal of Photography, November 21, 1879, and resembling very much one patented by me in conjunction with M. Collin and presented to the Society. In the first plan I employed a square opening from the centre; in the second idea I used an eclipse, and this was afterwards modified to have a parallel opening in the centre. This rapid shutter, being in the memory of the members when the other was presented as new, gave rise to much discussion.

M. Parrayon presented to the Society a new varnish for negatives, its chief value being that it can be used cold. Bottles were distributed among the members to be experimented upon.

M. Pelletier, the great glass manufacturer, presented some panes of yellow glass flashed with red.

M. Hiékel made the remark that he had employed such glass years ago, and had had fog. He now employed only cathedral-green glass backed up with yellow paper, and, although he had very much light, it was of the right kind, for he was now secure from fog and other evils.

An important discussion took place upon the best mode of lighting. I gave my opinion that it is better to use, in conjunction with any transparent medium, such as glass—whether red, yellow, or green—a sheet of paper, tissue, or ground glass in order to disperse the rays of light as much as possible.

M. Audra requested the members to inform him by what means the markings known as "slugs marks" could be cured, and what was the cause of their appearance.

M. Franc was of opinion that they were caused by a kind of scum on the surface of the emulsion, which was itself generated by the employment of silicate of potash in plate-cleaning.

I gave a method which I thought would cure it. As it had been remarked that those who measured out the exact quantity of emulsion for each plate, and spread it over by means of a glass rod, were more liable to these markings than manufacturers who spread the emulsion on by means of machinery, I suggested that more than the sufficient quantity of emulsion be poured on the plate, and that the excess be thrown into a filter. Thus, if any scum should be floating upon the emulsion, it would be taken off the plate with the excess of emulsion, and probably the repeated filtrations would at last eliminate the scum from the surface of the emulsion. In my own practice I have never had to complain of these markings, owing, perhaps, to the fact that I act as I have suggested here.

M. Chalot presented some splendid proofs, 20 × 24 inches, of the Chateau de Chantilly, the residence of the Duc d'Aumale. Such fine specimens of the photographic art are very rare, and the artist who undertakes such a task ought to meet with encouragement, as it wakens up energy and stimulates to further exertions. M. Chalot merits every praise, and has won a famous name in the profession. At first a simple amateur, his love for photography made him purchase a photographic establishment, and by his energy and perseverance he has made his studio second to none in Paris.

Dr. Liesegang, of Dusseldorf, made a communication to the Society on the value of common salt in fixing. I could not understand if this gentleman suggested common salt as a fixing agent when no hyposulphite of soda was at hand, or what advantage chloride of sodium or ammonium can have over the well-known fixing agents.

M. Frank de Villecholle informed the members that he had experienced great inconvenience in the use of the silicates in plate-cleaning. He had tried M. Audra's sugar solution and many other processes without being completely perfect; but he had now hit upon an old dodge which had proved very good and useful. He gave us the history of the discovery, which could be made romantic if desirable. He was making a tour in the south of France, and was no little astonished to see the peasants cleaning their windows so differently from the mode employed in Paris, where the panes of glass are bedaubed with whiting. He made inquiries, and found that the liquid employed was produced by making an infusion of a plant called "pariétaire." 300 ounces of boiling water is poured upon two ounces of pariétaire and allowed to infuse about two hours. Seeing that this new kind of "wash" did indeed clean the windows very well (no doubt a great deal of "elbow grease" was not wanting in the sturdy peasant girls), the thought came into his mind that as photography had succeeded in making use of coffee, honey, sugar, tannin, tea, and what not, another kind of tea could be as well introduced for plate-cleaning; so he tried the formula, differing from the generality of persons who only find very expensive formulæ good. He found the cheap one did every thing to his satisfaction, and, having found it so, most generously offered his discovery to his colleagues, who are now at liberty to try it and, if possible, gain a fortune by this imparted knowledge.

M. Laurencie, President of the Photographic Society of Angoulême, wrote a long letter to the Society on the advisability of creating a standard sensitometer, by which the different gelatino-bromide of silver plates now in the market could be controlled as to their rapidity. He said that makers of dry plates wrote indiscriminately upon their boxes twenty times and sometimes thirty times more rapid than wet collodion, and very often when tried no two boxes marked with the same number gave the same results. He proposed that the Society should adopt his method, which was to superpose forty thicknesses of dioptric paper, beginning by one and finishing by forty, forming by this method a square actinometer like a draught board—a black line to be drawn between each square. This system, according to M. Laurencie, if adopted by the Photographic Society of France, would create a standard in which we could have confidence.

To the honour of the Photographic Society of France a great objection was manifested regarding the opinion of M. Laurencie. One of the members proved that it was impossible to procure in the market three or four sheets of paper exactly alike.

I informed the members that I had long ago employed the system of superposing paper in order to make an actinometer of my own, a description of which was published in THE BRITISH JOURNAL OF PHOTOGRAPHY; but as soon as Mr. Warnerke had passed his into the market, and the trade began to adopt it, I put mine aside to employ his, hoping by this means to be able to judge of rapidity. In hearing the number of the sensitometer evoked as a standard in any journal or treatise on photography, opposition became rife against Mr. Warnerke's actinometer, as no two were precisely similar The phosphorescent surface did not give the same luminosity, &c., &c.

In reply, I said that until a better was found I would continue to use the one I had experienced to be the best in the market. I would never go back to paper machines, which were still more defective.

M. Chabanon presented a volume of his travels through the *Gorges du Jarn*, illustrated by photography.

M. Vidal drew attention to the value of photography for the true illustration of such books, and regretted that it was not more often brought into requisition. He showed the difference between a woodcut published by the journal *La Nature* and the same view produced by photography in the publication of M. Chabanon. The photographic proofs were produced by different processes—silver chloride, platinum, fatty ink, and pounne laque.

M. Vidal made a communication on the value of Boca's chronometrical shutter in measuring the rapidity of all other shutters. He takes a piece of cardboard, such as is used for visiting cards, with a glazed surface. This white surface is covered with printers' black ink, by passing it over the inked surface of a lithographic stone. With a compass a segment of a circle is drawn; the point of the compass scratching off the ink leaves white lines visible. The divisions are obtained by the same method. This dial is placed over the dial already on Boca's shutter. A long dial hand is affixed to the axis of the dial, and the instrument is ready for use. I omitted to say that the dial hand must be painted white. In order to operate the dial is placed in full light, and a camera is put in front of it to reproduce on a standard plate the whole apparatus, so as to judge of the rapidity of the instantaneous shutter to be experimented upon. Boca's shutter is now wound up, the plate is in the camera, and the shutter is placed upon the lens. Everything is ready. Boca's shutter is set going, and when the needle or hand has traversed three parts of the dial the exposure of the plate is made with the instantaneous shutter the speed of which requires to be known. When the plate is developed the distance travelled over by the dial hand of Boca's instrument is carefully measured, and knowing that it requires three seconds for the dial hand to make a revolution one needs not be a very great mathematician to make the calculation as to the rapidity of the motion of the shutter to be tried.

As for myself, I see another use for this instrument as arranged by M. Vidal. It will make an excellent machine for judging the rapidity of dry plates. For instance: a *standard* light is thrown upon the apparatus, the plate or plates exposed are developed, and the distance travelled over by the dial hand in each case will give the different rapidity of each plate. The correctness in conjunction with Warnerke's actinometer can thus be judged of. E. STEBBING, *Prof.*

25, Rue des Apennins, Paris, November 11, 1884.

APPARATUS AT THE EXHIBITION.

To the EDITORS.

GENTLEMEN,—You have been kind enough to mention in your Exhibition critique a developing dish or frame accidentally left by me in the room at Pall Mall. The prime idea of it is, of course, to make the plate the bottom of its own dish. About 1878 I had made a frame on this principle, but, having no rubber padding, the developing liquid was apt to run out if the plate did not fit accurately. At the studio of Mr. Carruthers, photographer, in Langholm, I saw a printing-frame adapted for the same purpose, whereby the liquid was kept from escaping; and afterwards, with the help of my gardener, I adapted a cheap travelling printing-frame in the same way. Being satisfied that this frame did not after considerable use stain the plates, as I feared it might do, I got Mr. Hume, of Edinburgh, to make the frame now on the Exhibition table. I am told that Mr. McGhie, of Glasgow, has made several, with the advantageous addition of a "well."

To those who wish to economise solution, who like clear edges to their plates, who are afraid of frilling, and who do not want dirty fingers while examining their plates under development, I can heartily recommend this dish, and, if desired, will describe the method of making one.—I am, yours, &c., ANDREW PRINGLE.

Craigcleugh, Langholm, N.B., November 10, 1884.

P.S.—I claim no priority in this matter for either myself or Mr. Carruthers. I neither know nor care who first adopted the main principle. Mr. Warnerke told me he had used a similar dish for his films, but I did not inquire to what time he referred.—A. P.

A NEW DEVELOPER.

To the EDITORS.

GENTLEMEN,—I should last week have sent you a correction of the obvious error in my former week's letter, for which I think the "printer's devil" is responsible; but I hesitated to take up any more of your valuable space on a matter that did not appear to be of sufficient interest to your readers. However, if your correspondent will send me his address I shall be happy to reply to him.—I am, yours, &c., W. T. F. M. INGALL.

Greenhithe, Kent, November 7, 1884.

MEDAL AWARDS AT THE PHOTOGRAPHIC EXHIBITION.

To the EDITORS.

GENTLEMEN,—I thank Mr. W. P. Marsh for the exquisite delicacy of his satire. It is certainly worthy of the reign of Queen Anne—the golden age of polite literature. But may I be allowed to take a little exception to the "dog in the manger" illustration contained in his playful letter. I shrink *in toto animo* from the implied compliment, inasmuch as I had no vested interest whatever to protect like that lucky dog. If he had selected another of the animals of Noah's ark his genial banter would have been more to the point. However, that is neither here nor there so far as the real issue is concerned.

Was the negative in question retouched, or was it not? We have Mr. W. P. Marsh's own statement to the effect that it was not. For my own part that is quite sufficient to allow me to offer to your successful and distinguished correspondent my most unqualified apologies for doing him an unintentional injustice. I did not write as I have done in any haste, for I gave (I was going to say) a monopoly of my attention to that special instantaneous study of breaking waves, and left it with a distinct impression that it was "faked." Certainly I no longer entertain that disagreeable impression, and I am heartily glad of it for everybody's sake.

There is another point in Mr. Marsh's letter which leaves no margin whatever for either surprise or apology—that is, his doughty advocacy of the Hanging Committee. He, however, in his usual vein of satire, unconsciously misses the thrust of his foil when he suggests that the gentlemen of that Committee "ought to be executed;" and he assigns to me the congenial office of "executioner." In this wish we are entirely of one mind. Although the apostle of mercy by profession, I think I would at a pinch compromise my apostleship and lean to the side of inflexible justice, condemning them, one and all, without hope of a reprieve.

It is awfully kind of Mr. Marsh to suggest that next year I should hang all the pictures as well. Here, gentlemen, I must draw the line of refusal. The office of hangman to a committee would be an easy task compared with that of hangman to the photographic masterpieces of the amateur nd professional artists of England and Europe! I shrink from the responsibility so unselfishly suggested in my honour.

With reference to Mr. J. Harmer's defence of Mr. Marsh's *Sea Study* negatives, I have only to remark that his rhetoric is more consistent than his logic; for in his letter he lovingly vindicates the unsophisticated quality of his friend's work by the very slipshod defence that "in consequence of having made transparencies from *most* of his plates I am in a position to state that *they* are not retouched." *Verbum sat sapienti.*

However, in spite of the loose logic of Mr. Harmer and the loving banter of Mr. Marsh, I reiterate my tender of full apology and make *pro bono publico* the *amende honorable.*—I am, yours, &c.,

H. VICTOR MACDONA, M.A.

The Vicarage, Cheadle-Hulme, November 1, 1884.

[This letter was inadvertently omitted from our last issue.—EDS.]

MAGIC LANTERN TRANSPARENCIES.

To the EDITORS.

GENTLEMEN,—As I have experienced considerable disappointment in the results obtained in my experiments with transparencies on gelatine plates, I hasten to give corroborative testimony to all that one of your contributors has said in favour of the use of common washing soda in the developer.

Having placed one of Eder's German plates in contact with a fairly-plucky negative, I gave it an exposure of six seconds to an ordinary gas burner at a distance of about four feet from the jet, and then immersed the plate in a dish containing about three ounces from the following stock solution:—

Washing soda	1 ounce.
Water	10 ounces.
Bromide of potassium	8 grains.

For each ounce of this solution I added one grain of dry pyro. When development was completed I rinsed and fixed as usual, and after a further operation of the same kind I placed the quarter-plate in the following clearing solution:—

Alum	1 ounce.
Citric acid	1 ,,
Sulphate of iron	3 ounces.
Water	20 ,,

When I removed it from the dish, judge of my delight to find as clear and sparkling a transparency as I could possibly wish to see—quite as plucky and brilliant as any I have ever seen from those of the plates now in the market advertised as a speciality for transparency work.

This is a formula the credit of which is entirely due to Mr. H. Norwood Atkins.—I am, yours, &c., H. VICTOR MACDONA, M.A.

The Vicarage, Cheadle-Hulme, Stockport, November 7, 1884.

PACKING SENSITIVE PLATES.

To the EDITORS.

GENTLEMEN,—It has been the common practice of makers of dry plates to put a piece of *tissue* paper between them to prevent contact. This, if kept in its place equally, is all right; but the plates not being all flat—some being thick and some thin as they come up in cutting—when sorted into dozens for packing, in the turning them up to get them square the paper shifts, and in many cases goes awry across the plate, leaving an insensitive mark, which necessitates the cutting off from the picture when printed from a-quarter to half-an-inch all round—more or less according to the displacement.

This may be obviated easily by the adoption of a pure *felt* paper, which, not being rolled, but of the nature of blotting-paper, keeps in its place and enables every plate to truly tell its own tale. The price of the plates need not be altered thereby for those who like a first-rate article.

It is to be hoped that this may catch the attention of manufacturers and lead to the general adoption of a paper which shall make all plates perfect. —I am yours, &c., W. HARDING WARNER.

November 5, 1884.

Notes and Queries.

P. G. writes:—"Kindly inform me what is the cause of a circular spot of brightness which I sometimes get in the centre of my negatives?"——In reply: This is owing to an image of the aperture in the diaphragm. To effect a cure, let the distance between the lens and the diaphragm be altered.

GEORGIUS asks if it would not be permissible, when strengthening a negative by means of bichloride of mercury, to add to this salt one which had an acknowledged reputation for stability.——In reply: We have had some experience with such admixtures, and can recommend one of chloride of platinum, the proportions being nearly equal parts.

VERAX has a number of proofs which have been much over-printed, and he is at a loss to know what steps to take so as to prevent their being altogether lost.——In reply: He can either use them as transparencies, or reduce them by immersion in a weak solution of cyanide of potassium for a period of time varying from a-quarter of an hour to three or four hours.

B. T. inquires if a registration which shall be legal, and consequently valid, cannot be procured for the design of a new camera.——In reply: A design can be registered, but what good would be a *design* in the case of a camera if it were not supplemented by some description of its various parts? These (the latter) cannot, however, be protected under the Designs Act, but must form a subject for a patent.

B. J. T. writes:—"I have heard much concerning the Fothergill process. What is it?"——We answer: It is a dry collodion process not now used, or, if so, to only an exceedingly limited extent. A plate of glass having been coated with collodion is excited in the usual way; then partially washed, flooded over with diluted albumen, and finally washed in a very thorough manner. Many admirable negatives have been obtained by this process.

"WHAT are the simplest and best means of getting rid of blisters in prints. —G. G. B."——We reply: Let the prints, after washing, be transferred to the hyposulphite of soda, and after that to a solution of chloride of soda the strength of which is less than that of the hyposulphite. This is the way that is recommended by several practitioners. Still, it is difficult to indicate one method as being either simpler or better than another, for different samples of paper require different systems of treatment.

"WHAT system would you recommend for cleaning plates with special reference to the adhesion of collodion emulsion, which, as you doubtless know well, shows a strong tendency to leaving the glass, especially if the development be protracted?—O. G."——To this we reply that an application of powdered French chalk answers every purpose. It certainly has done so in our hands. We have seen a rather neat way of applying it which may have been published, although we do not remember having read it. This consists in mixing the chalk with alcohol and pouring a little of the mixture upon the plate of glass, followed by firm friction with a linen cloth.

"I HAVE been told that in America they have some dodge for producing dimples. Can you tell me anything about this, or any other "wrinkle," as it would be rather a good thing to be able to send out one's fair sitters' portraits with a pretty dimple upon each face, particularly with those where nothing of the sort has been seen for the past half-dozen years. I have tried no end of retouching, but cannot find out any satisfactory method.—VERAX."——Our correspondent's signature is belied by the tenor of his note. A certain amount of retouching is a legitimate addition to a good photograph; but such pictorial falsehoods as he suggests are, to our mind, illegitimate—to use a very mild form of words—and are to be deprecated by all right-thinking artists. Still, there are little plans in the direction he indicates that may with advantage be made use of, and they will be found treated in a leading article in another portion of our columns.

"CANNOT the front lens of a portrait combination be made to answer quite as well for taking landscapes as a lens specially constructed for such purpose? I have tried it, and do not see anything specially amiss in the system. Kindly enlighten me on this matter, and oblige—OLD SUBSCRIBER."—In reply: When a single achromatic lens has been ground with special reference to landscape purposes it is usually somewhat deeper in its external curves than the front of a portrait combination. This being the case, it can the better transmit an oblique ray than a lens of a plano-convex form, which form, subject to scarcely appreciable modifications, is that preferred in the case of a regular portrait combination. The deeper the meniscus form of a lens the less it is qualified for becoming part of the anterior element in a portrait combination; but, on the other hand, the better is it adapted for fulfilling the requirements of a landscape lens required to transmit a wide angle.

Exchange Column.

Wanted, negative or enamel collodion in exchange for 10×8 and $7\frac{1}{4} \times 4\frac{1}{2}$ water-tight baths.—Address, PHOTO., Bridge-street, Usk, Mon.

I will exchange the *Photographic News* for THE BRITISH JOURNAL OF PHOTOGRAPHY, posted on Monday.—Address, G. SMITH, The Castle-hill, Dudley.

I will exchange two splendid gasometers for anything useful in photography, or musical instrument.—Address, G. B. BRADSHAW, Oxford-road, Altrincham.

I will exchange my 40-inch "Meteor" tricycle, in good condition, for a first-class dry-plate apparatus.—Address, J. LIGONIER, 106, Corbyn-street, Hornsey Rise, London, N.

I will exchange a whole-plate portable landscape camera, two double backs, new, for a gas bag, pressure boards, and safety jet.—Address, FRED. DAKING, 108, Bramford-road, Ipswich.

I will exchange THE BRITISH JOURNAL OF PHOTOGRAPHY for the years 1882 and 1883 for the following books:—*Art and Practice of Silver Printing*, by H. P. Robinson and Captain Abney; *Pictorial Effects in Photography*, by H. P. Robinson; *Instructions in Photography*, by Captain Abney, fifth edition.—Address, W. STUART, 53, Chapel-road, Worthing.

I will exchange a large truck, box wheels (sides to take off), useful for tent travelling, cost £4 10s., in good order, and about a-quarter of an ounce of eighteen-carat gold for chloride.—Address, Photo., 14, High-street, Wincanton.

What exchange offered for a six-lens gem camera, takes eighteen in three shifts, and a four-lens gem camera, takes twelve in three shifts, both in perfect order?—Address, A. Hopkins, photographer, 21, Bartholomew-street, Exeter.

Wanted, a first-class burnisher, about half-plate, or portable whole-plate camera, in exchange for Woodbury and Marcey's patent sciopticon lantern in case complete.—Address, H. C., Jevens Hall, Milnthorpe, Westmoreland.

Wanted, ferrotype plates, cabinet mounts (no consequence if printed on one side), and outdoor background, in exchange for a quick-acting short-focus *carte* lens or gem camera and nine lenses, or cash.—Address, Photographer, 28, East John-street, Exeter.

I will exchange an exterior background, in oil (new), desk with three changes, good half-plate camera, one dark slide, four carriers, also two glass baths, full-plate and half-plate, for a good full-plate lens.—Address, H. Wootten, 128, Ellen street, Preston, Lancashire.

Wanted, Dallmeyer's 1B and 2B lenses and good archimedean camera stand in exchange for a nearly new $7\frac{1}{2} \times 7\frac{1}{2}$ sliding-back camera and about 800 clean negative glasses, and make up the difference with cash. —Address, N. E. White, 77, Crofton-road, Camberwell, London, S.E.

I will exchange a 10×8 Kinnear camera complete, half-plate rigid camera, half-plate retouching-desk, Squire's cabinet portrait lens, Grubb's half-plate view lens, Jamin's quarter-plate portrait lens, quarter-plate instantograph complete. Wanted, studio accessories.—Address, Fritz Camera, 41, High-street, Sydenham, Kent.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

Photographs Registered.—

William Henry Batten, 4, Oxford-grove, Ilfracombe.—*Photograph of James Whitehead, Wesleyan Minister.*

Horace Dobell, Sheate-place, Bournemouth.—*Four Photographs of Water-Colour and Pencil Sketches of Bournemouth.*

J. J. K. will find the information he requires in another column.

York.—We shall write to you privately after trying the experiments.

Arthur C. Heilbroun.—The matter is really not worth any further consideration.

G. Austin (Birmingham).—The address of Mr. Lewis is 12, Clerkenwell-green, London.

Lens.—No photograph of the machine was sent, nor is it so stated in the letter. You have evidently misread the letter.

Ajax.—See article on the subject in the Journal of October 24th, and leading articles in the same and following numbers.

W. W. A. (Notts).—Too much alum has been added to the gelatine solution in the first instance. You can do nothing with it now. You will have to prepare a fresh batch.

Several Correspondents this week have not complied with our rule by sending their names and addresses; hence, as usual on such occasions, no notice is taken of their communications.

G. Bailey.—Write again and give a fuller description of your troubles. We have no doubt that we can assist you; but it is impossible to do so at present from the scanty material supplied.

Camera.—1. The leather enclosed will answer the purpose very well.—2. Quite a matter of taste. For our own part we prefer the rack and pinion. —3. Messrs. Nettlefold and Sons, High Holborn.

A. Simms.—If the prints refuse to leave the glass when they are dry it is clear that it has been imperfectly waxed. Try treating the plate with French chalk. Perhaps you will get on better with that.

Ferrotype.—The light will no doubt answer quite well for the purpose. Whether its cost will allow of a profit on cheap pictures will, of course, depend upon the price charged for such "cheap pictures."

M. S. Y.—Read the article in which the preparation of the albumen is described, and you will at once perceive the cause of your failure. Throw away that you have, and prepare fresh according to the instructions.

A. S. S. B. complains of the bad glass that some manufacturers employ for their dry plates. This is true as respects some makers, but not all. It is an old grievance that has been well ventilated from time to time in our columns.

T. Wilson.—A copperplate press will answer quite well for rolling photographs. Such presses are frequently to be met with second hand, and at a comparatively low price. An advertisement would, doubtless, secure what you require.

J. C. Winsor.—There is no question whatever, notwithstanding the name on the mount, that the lens is a very inferior instrument. Take the lens to the maker whose name it bears and we doubt not he will repudiate it. From your description it is doubtless a forgery.

A. B. C.—Get "French chalk litho. ink No. 3." From what you state we imagine the fault is in the plates, and not in the ink. Judging by your description of their behaviour we should say that from some cause or other they are insoluble, and therefore do not absorb the water when it is applied.

Sep. George.—We are not aware that tissue suitable for the Woodburytype process is an article of commerce at all, so cannot say if it be supplied both in a sensitive and insensitive condition. You had better communicate with the Woodburytype Company. No licence is necessary for working the process.

Wm. G. McGregor.—In the studio, of which you send a photograph, you should certainly be able to produce much better specimens than those forwarded. It is true the studio may not be one of the most convenient in which to work, but still excellent results are turned out of many which are infinitely worse in design than yours.

Z. Z.—The failure in your reducing operations is due to insufficient heat. The small lump you have forwarded shows this clearly. The application of the heat from the blowpipe for a few minutes proves it conclusively, and also that plenty of flux has been added. The sole cause of trouble is the want of sufficient heat to ensure the reduction.

Artist.—From the plan we should say the studio will answer very well, and the price quoted for erecting it very moderate. We should prefer felt, in preference to the other material, as a covering for the opaque portion of the roof; but zinc is to be preferred to either. In such a studio, if you do not turn out first-class work it will not be owing to any fault in its construction. The portrait enclosed is very good, but it wants a little more brightness.

Received.—Andrew Pringle; Benjamin Wyles; J. H. Harvey. In our next.

Photographic Club.—The subject for discussion at the forthcoming meeting of this Club, at Anderton's Hotel, Fleet-street, on Wednesday next, the 19th inst., will be—*On Collodion Emulsions.*

Lantern Catalogue.—We have received from Messrs. Wilkinson and Company, Sunderland, their new illustrated catalogue of lanterns and slides, models of steam engines and parts, opera glasses, microscopes, and other optical instruments, together with magneto-electric machines and mathematical instruments. It forms a useful and instructive compendium of works, artistic and mechanical, in the directions named.

The Late Mr. J. Hubbard.—Many of our readers will learn with regret the death of Mr. J. Hubbard, whose picture, *Mother's Love*, was awarded a medal at the exhibition just closed. Mr. Hubbard was originally a portrait painter, but some quarter of a century ago bought from Mr. England the photographic business in Oxford-street, with which his name has been connected almost up to the time of his death. Having been for some time in failing health he was ordered by his medical man to seek a change of air, and in consequence of this advice so recently as September last he removed from Oxford-street to New Wandsworth, where he died on the 5th instant, at the age of 60; and was buried on Monday last, the 10th. Mr. Hubbard will be remembered chiefly by his pictures *Stolen Moments*, *Pensive Thoughts*, and his last one, *Mother's Love*, over all of which he spent much time and lavished a great amount of artistic care. For some years past he had done very little practical photography, but devoted his time chiefly to the production of negative varnish, for which he had acquired a considerable reputation.

OUR FORTHCOMING ALMANAC.

We shall be glad to receive at once the contributions of those friends, English and continental, who have already promised articles for our Almanac for 1885. Those who intend to contribute to its pages, but have not yet signified their intention of doing so, we would ask to forward their valued *quota* by an early post.

We have been informed by the Publisher that he can receive a few more Advertisements, if forwarded not later than Friday next, the 21st instant.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician,
For the Week ending November 12, 1884.
These Observations are Taken at 8.30 a.m.

Nov.	Barometer.	Wind.	WetBulb.	Dry Bulb.	Max. Solar Rad.	Max Shade Tem.	Min. Tem.	Remarks.
6	30·02	SE	50	50	—	57	49	Raining.
7	29·86	SW	50	56	—	62	49	Bright & Clear.
8	30·35	W	42	44	—	55	40	Hazy.
10	30·63	E	48	51	—	56	48	Foggy.
11	30·45	SE	45	47	—	51	45	Foggy.
12	30·29	SSE	45	48	—	—	45	Overcast.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1281. Vol. XXXI.—NOVEMBER 21, 1884.

THE PRODUCTION OF PLEASING TONES IN COLLODION TRANSPARENCIES.

The subject of lantern transparencies is one that has been a good deal before the public of late, and the present is the season when that class of work is most in favour with amateurs who employ their winter evenings in the production of, perhaps, the most pleasing form of picture that can be produced by photography. The recent tendency appears to be in favour of albumen plates for the purpose; but, beautiful as undoubtedly are the results obtained by the Taupenôt or collodio-albumen method, we are by no means sure that the majority of amateurs will not prefer a simpler process if results at all approaching those of albumen are obtainable.

Next to albumen it is generally conceded that the best results, both as regards quality of image and beauty of tone, are rendered by collodion emulsion. We do not mean to say that *any* collodion emulsion will answer the purpose; for such is not the case, as those preparations which are best suited for landscape work from their rapidity are, as a rule, unsuited for the highest quality of transparency. But a specially-made collodion emulsion has scarcely a rival in the field. Wet plates still hold their own—rather as a matter of convenience than because they are capable of giving the highest class of result—in the commercial production of lantern slides. Their ease of preparation as compared with albumen, and rapidity in comparison with emulsion plates, render it almost necessary that for production on a large scale for the market the wet plate should retain its position; but the comparative coarseness of the image and the limit of tone obtainable is distinctly inferior to what can be produced upon the dry plate.

Recent experiments have demonstrated that by judicious variations of the exposure and development almost any class of tone is obtainable upon gelatino-chloride and even gelatino-bromide films; and what is true of gelatine is at least equally so in the case of collodion, but with this addition—that by altering or modifying the "organifier" a still further range of colour is attainable. This is well known to all the older workers of dry plates, though not, perhaps, to the newer generation, whose alpha and omega in dry-plate work are gelatino-bromide and gelatino-chloride. The beautiful variety of *colours*—for they are something more than variations in *tone*—which have been produced upon gelatino-chloride films have nearly all had their prototypes produced by means of collodion and of silver bromide.

Thus tannin, as the organifier, produces various shades of brown, and Major Russell, in the first edition of his *Tannin Process*—published upwards of twenty years ago—directed attention to the alteration in colour which the combination of tannin, gallic acid, and pyrogallic acid (in the preservative and the developer) effected. Gallic acid alone gives red shades, pyro. black or blackish-brown, coffee rich brown, while a combination of "beer and albumen" (at one time a favourite organifier) gives greenish-brown or olive tones. In some extreme cases we remember the colours being a pure, rich green. All these tones, however, are modified in character by the exposure and development just as in the case of gelatino-chloride, the same rule prevailing, viz., the longer the exposure with a correspondingly-restrained developer the redder or warmer the tone.

But the most remarkable colours we recollect in connection with developed and untoned images—colours, moreover, which were eminently suited to the purpose of transparency making—were some we obtained on the early plates of the Liverpool Dry Plate Company in 1867. These varied from a rich, clear claret colour to a nearly pure scarlet, and were the invariable result of long exposure and well-restrained development. Under those conditions it was easy to reproduce these colours at will; shorter exposure of the same plates produced a pleasing warm brown. The development almost invariably employed at that period was a two-grain solution of carbonate of ammonia, with pyro. and bromide of potassium to taste. What preservative or organifier Mr. P. Mawdsley employed we do not know, but it was mainly tannin with, we believe, gum and gallic acid. Whatever it may have been, very similar colours are obtainable with a combination of tannin and gallic acid.

The emulsion best suited for transparency work is a slow one. A collodion composed of pyroxyline five grains, crystallised bromide of cadmium six grains, and bromide of ammonium three grains in each ounce will answer well, if treated as we shall direct. The pyroxyline may be any good wet collodion sample, and the solvents which are used in equal parts should be as highly rectified as possible, in order to permit of the addition of a few drops of water without producing crapiness or texture in the film. To sensitise the collodion: for each ounce take eleven grains of silver nitrate, and dissolve it in a test tube or small flask in a very small quantity of water by means of heat; five minims of water will suffice for each eleven grains of silver. When dissolved add half-a-drachm of warm alcohol, bring the solution to boiling point, pour it in two or three doses into the collodion (which should be in a bottle capable of holding at least twice the quantity), and shake well after each addition. Transfer the emulsion to the flask, or, at anyrate, rinse the latter out with a portion of the emulsion so as to secure every trace of silver, and then set the preparation aside to ripen. After a few days two grains of bromide of cadmium are added (in crystals), and the emulsion will then keep indefinitely and go on improving.

In preparing the plates the glass is first polished with powdered talc, dusted, and coated with emulsion, which should be allowed to set very thoroughly, but not to become dry. When sufficiently set the plates are passed through three or four changes of water to remove the free bromide. The last change may, with advantage, be hot, as it then opens the pores of the collodion film and causes the latter to absorb more of the organifier when plunged into the cold solution.

The organifier we prefer is made as follows:—First of all prepare a *cold* saturated solution of gallic acid. Do not use heat in the preparation of this solution or it will become supersaturated, in which condition it is liable at any time to deposit minute crystals of gallic acid *in* the film, causing spots. To each ounce of this solution add ten or twelve grains of tannin and filter. The solution will probably not be clear, however carefully it may be filtered; in which case add a few drops of dilute albumen, 1 : 5, shake up well, and again filter. The plates are removed from the hot water, plunged into this organifier, and allowed to remain for from three to five minutes, drained thoroughly upon blotting-paper until surface dry, and then allowed to dry in a closed cupboard or box free from draught.

Instead of the tannin, a solution of coffee, made by infusing one ounce of freshly-ground coffee in a pint of boiling water, may be used; this is filtered, and saturated when cold with gallic acid. This gives very good brown tones.

The exposure of the plates so prepared will be comparatively long if warm tones are required—probably from thirty seconds to a minute (by contact) before a good fish-tail burner. For very red tones a brief exposure to daylight will answer better.

The development is performed with equal parts of solutions of pyro. and carbonate of ammonia, each of four grains to the ounce, and as much of a ten-grain solution of bromide of potassium as the exposure may necessitate; but in this experience only must be the guide. Fix in hypo., wash well, and tone if necessary with very weak gold.

The process, of which the above is a brief *résumé*, will yield results which are little inferior to albumen, without one tithe of the trouble the albumen process involves.

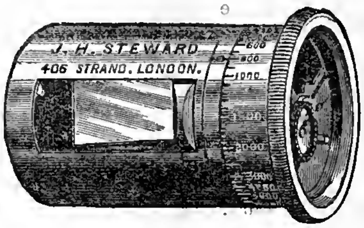
TELEMETRY FOR PHOTOGRAPHERS.

While photography was still young, and long before it had attained its present advanced state, it was predicted that it would ere long assert its usefulness to the traveller and explorer in so marked a manner that the camera would form a cherished *vade-mecum* with this class. This prophesy has been fulfilled. No tourist or explorer would now think of journeying into distant and unknown regions without the means of reproducing the scenery and salient features of such countries.

But the estimation of form is one thing, while the ascertaining of dimensions of such form is quite another. There has hitherto been insuperable difficulty interposed in the way of this estimation of dimensions, on account of the fact that the camera cannot estimate or indicate the distance of the objects it can so faithfully depict. The late Sir David Brewster devised a telescope—which, however, was never made an article of manufacture—by which the distances of objects from one another, and these from the point of observation, were so distinctly marked as to render it possible to pronounce with a tolerable degree of accuracy upon the distance of any object under observation.

If an inaccessible object were photographed from a point of view at a distance, and if this distance were accurately known, then, by having also a knowledge of the precise focus of the lens, the dimensions of the inaccessible object might be ascertained from the two factors mentioned superadded to the size of the image, which would, by a rule-of-three process, enable the dimensions of the inaccessible object to be ascertained. But the obstacle to be overcome has been to obtain the second term of the proportionate rule, which may be thus roughly expressed:—As the focus of the lens is to the distance of the object, so is the dimension of the object depicted in the photograph to that of the natural object. This rule may be considered as correct—to a suggestive extent, at least. But a difficulty has hitherto been experienced in ascertaining the distance of objects far removed from the camera. We are quite well aware that by the aid of a sextant the distance of any inaccessible object can be ascertained with a tolerable degree of accuracy; but we need scarcely point out that the employment of such an instrument is attended with some trouble, and involves much subsequent calculation.

We are pleased to be able to state that, through the enterprise of Mr. J. H. Steward, optician, Strand, a very neat little instrument has been introduced—so small as to be capable of going into the waistcoat pocket, yet by which the distance of objects can be ascertained without any calculation whatever. It is designated the "Labbez telemeter," and it forms a surveying instrument as well as a pocket range-finder. Heretofore range-finders have required not only calculations but also the services of two qualified individuals to use them; but in this telemeter—which is in the form of a tube little more than the thickness of one's middle finger, and scarcely exceeding half its length—everything is arranged in such a manner as to enable a single individual to ascertain, in the brief period of thirty seconds, and without assistance or any calculation whatever, the precise distance of an object, no previous training being required.



We shall not here attempt any description of the mechanical construction of the telemeter beyond saying that, by rotating a small toothed wheel on the end, and placing the zero mark upon the zero line, the object is viewed by looking in a direction at a right angle to it, the conditions for this being supplied by a small mirror placed at an angle in an opening in the side. The observer then walks a short distance in the direction towards which he looked, and once more brings the object that is being examined in the same line as before, this being effected by rotating a movable portion of the tube, on which are divisions, until coincidence is effected. He then finds that one of these divisions is opposite the zero, and that is the actual distance of the object in question given in yards.

We have in this description omitted some small details, but the whole operation is substantially as described. The value of this tiny pocket telemeter is evidenced by such men as Colonel Maurice, R.A. (special officer of Lord Wolseley's staff), Sir C. Warren and his A.D.C., Sir Bartle Frere, and others of equal eminence, having secured them for use during campaigns in distant countries. We contend that they may be rendered as serviceable to the photographer as to the military man; and we hope to see them in general use as an accessory to the camera of the tourist photographer.

PHOTOGRAPHING THE NATIONAL PICTURES.

Allusion has frequently been made to the alleged superiority of the copies of works of art produced on the continent over those produced in this country. Indeed, in the eyes of some, English photographers appear to possess but a second-rate reputation as copyists of oil paintings, or at least of those in our national collections. One thing seems pretty certain, namely, that photographic reproductions of the pictures in foreign collections are to be obtained commercially of a far superior quality to those procurable in our own galleries. In fact, so far as we are aware, there are really no copies of our national pictures of moderate dimensions, or, at anyrate, comparable in size to those from foreign galleries.

Various reasons, more or less erroneous, have at different periods been assigned for the alleged superiority of foreign over our home productions—such as the superiority of the light abroad, secret processes of working, greater skill on the part of the operators, elaborate retouching, and the like. But practical men, who have had experience in this class of work both here and abroad, affirm that the superiority of the continental reproductions is principally due to the greater facilities which are afforded for photographing the pictures in the foreign galleries; also, that if equal facilities were granted by the custodions of our own pictures, similarly good results would be produced.

All who have had experience in copying any of the pictures in our national collections knows full well the difficulties with which they had to contend. Very great difficulty is usually experienced in obtaining the necessary permission in the first instance, and when it is obtained the restrictions placed upon it are generally such as to render it quite impossible to produce anything like a presentable reproduction. For example: the painting must not be removed from the building; that is quite out of the question. Neither may the glass be taken off, or in many instances even the picture removed from the wall upon which it is suspended. Hence, if the picture be copied at all, it must, perforce, be done as it hangs, and through the glass, should it happen to be glazed. With such restrictions it is by no means surprising that the copies when made—if they be made at all—are far inferior in character to those seen in the shop windows, and produced on the continent. In the face of such facts it is not very astonishing that publishers, competent to execute work of the first order, have not undertaken the reproduction of the paintings in our national collections on a scale similar to that of other countries.

Now, we are not for a moment going to suggest that there should be no restrictions placed upon photographing these pictures, or that anyone should have *carte blanche* to do as they liked, simply because the paintings are public property. Such an idea would be simply absurd on the face of it; indeed, no one would dream of entertaining such a thought. But when application is made by a respectable firm prepared to incur considerable expense in the execution of the work, and whose reputation must, at least, be a guarantee that it would be creditably carried out, while every care would be taken of the pictures, permission should be accorded, and at the same time the restrictions placed upon the due execution of the work should not be of such a nature as to render the permission equivalent to a refusal.

Some few months back considerable excitement was created by the erection of a mysterious and exceedingly ugly iron building in front of our National Gallery in Trafalgar-square. It was soon explained that this building was simply a photographic studio erected for the purpose of copying the paintings, and that in due time students and others would be able to obtain copies of our national pictures of a character much superior to any hitherto produced, and this by reason of the greater facilities given for copying them. It was also commented upon at the time that the trustees had at last seen the advisability of giving similar facilities to photographers for reproducing the pictures to those afforded to them in continental galleries.

Many were under the impression that this unsightly erection was put up expressly for the use of any one who could obtain the necessary consent of the authorities to make copies of the paintings—similarly as the trustees of the British Museum have provided a studio and dark room for the use of photographers in making copies of the ancient prints and manuscripts in their collections. Not so, however, for it soon became rumoured in photographic circles that this iron building was only of a temporary character, and was erected solely for the use of a certain foreign firm of publishers in photographing the pictures. Also, that the restrictions hitherto imposed as regards taking the pictures from the main building, removing them from the frames, &c., were not to be enforced in this case, and that this firm could do pretty much as they liked in the matter. In a word, MM. Braun and Co., of Dornach, had obtained concessions which had hitherto been denied to English photographers.

It is by no means unnatural that some persons should feel somewhat aggrieved at this, particularly after the rumours that were afloat some time ago that certain foreign photographers had acquired privileges in copying the paintings in some of the royal palaces which could not be obtained by English photographers. If all this be true, it is scarcely to be wondered at if the work of foreign artists should get the credit of being superior to that of the English in the reproduction of works of art, and that the latter are compelled to occupy a lower position in the estimation of the public.

In the daily papers, last week, the Secretary of the Fine Art Society published a correspondence between himself and the Director of the National Gallery. This we reprint in another column. From these letters it will be seen that the Fine Art Society obtained permission, some time back, to reproduce by the process of photogravure a series of pictures in the National Gallery. But the permission was, as usual, accompanied by such restrictions as regards taking the pictures from the frames, removing the glass, &c., that it was practically valueless. It is manifest to all that it would never do for any firm to incur the expense of reproducing the works by such an expensive process as photogravure unless they could ensure such results as would sustain their reputation, and this would simply have been impossible under the circumstances. Hence the idea had to be abandoned.

Since then MM. Braun and Co. have not only obtained permission to photograph the pictures, but to take them down from the walls, remove the glasses, and actually carry them out of the building into the temporary iron shed erected for the purpose. With this the Fine Art Society and, we believe, other English publishing firms very naturally feel aggrieved. The correspondence shows that the privilege denied to the Fine Art Society, though granted to the German firm, had also on a previous occasion been accorded to a French firm. The explanation of the director of the National Gallery is one that we have little doubt will not be accepted by English photographers as altogether satisfactory.

As the matter now stands, many of our readers will fail to see why privileges, which under the circumstances amount to nothing less than a monopoly, should more than once be granted to foreign firms in photographing our national pictures, while they always have been, and—as will be seen from the correspondence given in another page—are even now, though not solicited, denied to their own countrymen.

TELESCOPES AND PHOTOGRAPHY.

In the early part of last month we gave a brief sketch of the connection between photography and astronomy, as seen by American astronomers, and we ventured to express our dissent from the very depreciatory tone which they used in regard to the capabilities of photography for some kinds of observational work. The position we took has been amply and fully justified by one of the first of living astronomers, Mr. Norman Lockyer, who, in one of the Cantor lectures—only recently published though delivered some months ago—gives a very complete account of the past records of photographic progress in its application to astronomy, and speaks in a tone of complete enthusiasm as to what it may achieve in the future. Concurrently with the publication of Mr. Lockyer's lecture we find in the columns of *Nature* the commencement of a series of articles by Mr. Common on *Telescopes for Astronomical Photography*, and in both the paramount importance of the science to astronomy is lavishly admitted; indeed, each gentleman goes further, and points out in no uncertain language that astronomical observation has been revolutionised by its aid. In a very brief manner we may, therefore, bring before our readers some description of the mode in which photography has enabled such progress to be made, of the modification of the instruments employed for the various purposes indicated, and the difficulties attendant upon the work.

In effect a telescope is used as a camera, putting the dark slide in place of the eyepiece, and special arrangements have to be made for, on the one hand, solar, and, on the other, stellar photography. The difficulty with regard to the sun is the intensity of the light, while with stars, nebulæ, &c., its feebleness has to be counteracted.

Mr. Lockyer, in his lecture, exhibited and explained Dr. Janssen's arrangement for securing views of various portions of the sun's surface. It is as simple as ingenious, and its action will be readily understood by photographers who are familiar with instantaneous shutters, as it simply acts as a drop shutter, but is actuated by a spring whose accelerative action ceases the moment the exposure commences, and so an equable rate of movement is obtained. The aperture of this drop shutter is a mere slit whose width is capable of adjustment, and thus the action is but momentary over any one part of the plate. The advantage of the "brutal copy," which Professor Young describes that given by the sun camera, may be understood upon reading Dr. Janssen's statement that "an interval of two seconds is quite enough to change the physical distribution of the bright and dark portions of the solar surface near the spots." "Dr. Janssen finds," said the lecturer, "alone by this means—it is not a thing visible to the eye, the eye gets too tired and strained—that these markings are distributed over the whole sun's surface," &c. Here we see that but for photographic aid we should have absolutely no knowledge of these and many other important phenomena.

With regard to the stars a very opposite state of things exist. Their light is so feeble that with the full aperture of the lens, so to speak, acting at once, a considerable length of time is required to obtain an impression, and in the meantime the object, the star, is not stationary. For eye observation, however, a requisite amount of motion can be given to the telescope by clockwork to cause it to follow the moving object automatically, and thus for hours the star can be kept in sight. "In sight," we say advisedly, for, though the image of the star remains in about the same place in the field of view, it is not exactly stationary; hence any star picture, including, of course, clusters and double stars, would be quite useless for scientific purposes, either as representations of a portion of the heavens or as records of magnitude.

Here the trained human eye and hand are found to act better than any mechanism hitherto devised in keeping the image of a star exactly stationary in the field of view. The telescope is provided with two wires crossing one another, and the object to be attained is to bring and keep a star's image continually bisected by the cross wire for as long a time as possible. Mr. Common, in making his photographs, arranges an eyepiece for his own use and a prepared plate for the photographic action; and his gigantic task was to keep his eye at the telescope the whole time the plate was being acted upon, and so supplement the action of the clock by a set of adjusting screws he had devised to be worked by his hand as he found necessary, that for no appreciable time did the star leave the one point.

If our readers will devote a little consideration to the magnitude of this task they will see the enormous strain it must be upon the faculties of the observer. Mr. Lockyer gave half-an-hour as the probable length of time the average human observer could stand such a strain without breaking down; yet, he informs us, Mr. Common was able to keep it up for an hour and a-half.

Dr. Huggins adopted a somewhat similar method for obtaining spectroscopic records of the stars. He also had to supplement the driving clock by manual adjustment, and keep the image of a star upon the slit of the spectroscope; but in his case the only harm which happened when the image of the star wandered from the slit was that, as no photographing went on at all, the exposure was thus increased. In Mr. Common's pictures the photographing would still continue if the image moved, and the effect would be that well known to the photographer when his camera moved during exposure—a worthless doubled image.

Then there are difficulties of varying colours in the stars, of which Mr. Common says:—"Though such pictures may differ slightly from eye observations, owing to the different colours of light not affecting the eye and the sensitive plate in the same manner, they would have the enormous advantage that they could be compared directly with other pictures taken after the lapse of any number of years under conditions that there would be no difficulty in making almost identical." Mr. Lockyer says the same thing in language, showing that colour need be no difficulty:—"It is perfectly simple to get one photographic plate and to put on it a dozen or twenty images of different stars, which will give you, in terms of a certain salt of silver, at one epoch the different radiant energy of those stars for comparison in future time."

The effects of differing exposures has been well seen in a series of Mr. Common's celebrated photographs of the nebula in Orion. When one minute's exposure was given nothing of the nebula was seen, and only a few of the brightest stars. With two and a-half minutes the brightness was increased, and a trace of the nebula shown. Four minutes gave more stars—ten minutes the nebula fairly starting into sight. Twenty minutes increases its brilliancy, and an hour shows the nebula in all its beauty.

The Rev. T. E. Espin, who has been so successful in Liverpool, points out the difficulties of—(1) the instrumental errors; (2) temporary cloudiness of one part of the field photographed; (3) unequal absorption—the latter a very difficult and complex matter. He gives a neat calculation showing the various influences of length of exposure, aperture of lens, and sensitiveness of plate as affecting these conditions. But though he is doubtless right in indicating on condition, governing the apparent amplification of stars given by photography, we think that by far the larger share of the increase in size following increase of exposure beyond a certain limit may be placed to the credit of reflection from the back of the plate, and internal dispersion.

In our next issue we propose to conclude our survey of the subject by treating further of this point on the instrumental conditions governing the various problems.

We thought the days of baby shows, barmaid shows, *et hoc genus omnes*, were over, but our Gallic neighbours do not appear to think so, as a little while ago they organised a baby show in Paris, which, however, was ruthlessly prohibited by the police. Not to be cheated out of the opportunity of rewarding the possessor of exceptional beauty, the baby show is to be replaced by an "International Beauty Show," the candidates for fame not having to appear in person, but by means of a photograph. Well aware of the fictitious beauty retouching is able to impart, the projectors of the show have made a rule that the competitors are to sit to one photographer, who is appointed for the occasion, with instructions not to touch up or improve the portrait in any way. The photographs are to be of uniform size, the sitters to have low-necked dresses, and the head to be left uncovered. A jury of distinguished artists is to award the laurel, which is to be of a very substantial character—no less than a diamond tiara—while twenty unsuccessful candidates will receive diplomas. The pictures will be publicly exhibited, and the general public offered an opportunity of registering their votes. We pity the unfortunate photographer who is to be entrusted with this task. We apprehend he will for many months following the exhibition have to be guarded by *gendarmes* to protect him from irate lovers. Our very strong advice to him is that he should wear a mask and stipulate that his name be kept an inviolable secret, otherwise he will have several bad quarters of an hour.

The action of light on selenium has formed an interesting study to electricians and others for some time past. Our readers may remember that a method of transmitting photographs by electricity was founded upon this property of the light-sensitiveness of selenium. We now read that Professor Bell states he has been successful in conveying speech five hundred feet by means of a strong ray of light acting upon a selenium cell. We suppose the turn of photography will come next.

The precipitation of gold is by no means a matter of small importance, though it is too frequently one of indifference to most photographers. Waste toning baths contain large amounts of gold, which, as a rule, are thrown away; yet nothing could well be simpler than to precipitate the valuable unused metal by adding a little sulphate of iron, which throws down metallic gold ready for immediate solution after the supernatant fluid has been decanted. The best methods for precipitating gold under various conditions have lately been under investigation by German chemists; and, according to the *Chemiker Zeitung Gœthen*, the old method of the photographers has superior advantages, and is only indicated by the presence of chlorine, bromine, nitric acid, and the hypochlorites of calcium, magnesium, and sodium—substances unlikely to cause any difficulty to photographers.

White shellac is generally difficult of solution under any circumstances, even when new and in good condition; but the difficulty can be remedied by getting rid of the included water, this admixture of water being one cause of the white appearance the lac presents. It is introduced during the process of manufacture, the lac after its precipitation by chlorine being washed and pulled into ropes under water. The best method to adopt is to break the lac into small pieces, and then spread them out to dry in a warm place. After the lapse of a short time it will be found much more soluble than before, owing to that portion of the spirit in proximity to the resin not being diluted with the contained water, strong alcohol being a necessity for the solution of lac.

Considerable attention has lately been given to the obtaining of magnesium in a pure form, the metal hitherto procurable being very impure. The well-known film which so quickly appears upon the surface of the ribbon after keeping a short time is a function of the impurity, the effect—due to the combination of the metal with the atmospheric oxygen—not being seen, it is stated, when pure magnesium is employed. New methods of purification by electro-deposition have been devised, and at a recent meeting in Berlin of the Electro-Technische Verein a pure ball of magnesium of superb brilliancy was exhibited.

Mr. Brashear writes to our contemporary, the *English Mechanic*, giving some cautions about the processes of silvering glass from silver solutions. He says—"Don't let your solutions set around;" he did so once, and almost lost his life. In making some of the silvering liquid on one occasion, as he could not dissolve the precipitate readily, he left it open to the air in a vessel on his desk, forgot it, and left the room. Fulminate of silver was thus formed, and was exploded by the mere jar of a closing door as he left the room. A terrific explosion ensued, the room was wrecked, and the open vessel was driven half-an-inch into the hard wood. When the silver surface is satisfactorily made Mr. Brashear says it will stand a considerable amount of rough usage, and he recommends it to be cleaned by rubbing gently for ten minutes with a piece of cotton wool under a stream of water from the tap, blotted off with a piece of blotting-paper, and when dry the fluff brushed off with a camel's-hair brush before polishing. He states that in making the silvering solution he prefers equal parts of silver and potash, instead of half the quantity of potash as recommended by other authorities.

According to a writer in the same journal, Mr. Gorham is to be credited with an important discovery in optics. By means of a little instrument Mr. Gorham has devised he is able to measure the pupil of the eye, and the results of his measurements, which have been made several hundreds of times, show that the pupil of the eye can be made use of as a photometer. The little instrument is made as follows:—"On a circular plate fitted on to the end of a cylinder about two inches long, and one inch bore, were marked radii—the more the better. On each radius are made two small holes, varying from ·05 to ·28 in. apart. This circular plate is covered over with another which has a slit in it, and which is capable of being twisted round the first-named disc. On looking through the cylinder at any light two holes will be seen. Twisting the outer circle round till these two holes just touch, we may read on the scale at the other side the width of the diameter of the pupil. Applying the well-known rule that the intensity of light varies inversely as the square of the distance from the luminous body, we may thus compare the intensities of any sources of light." We are rather hazy as to the exact meaning wished to be conveyed in this sentence we extract; but it is by no means unlikely that the germs of some useful photographic instrument may be found.

FIXING SILVER PRINTS WITHOUT HYPOSULPHITE.

A short article in last week's Journal by Dr. Liesegang bears the above startling title. I suppose the next thing to expect will be "sensitising paper without a silver bath." Truly, we are advancing with rapid strides! But, joking apart, any novelty that promises to eliminate the only drawback to our beautiful silver process, namely, the really wearisome, never-to-be-contemplated-without-a-shudder washing operation, is (few will deny) of the utmost interest to us. The article in question I eagerly read with beating heart and bated breath, and I felt that at length the goal had been reached, that our necessary yet treacherous friend "hypo." had received his death blow, and that the photographer's "golden age" had at last come.

I congratulated myself that henceforth there would be an end to those weary washings and changings, and tearings and ——— (it rhymes with tearings); an end, and for ever, to faded images, and ———. But my elation at this bright prospect was but momentary, for on nearing the end of the said article I realised that a cruel *ignis fatuus* had come to torment us with its lurid and unsubstantial beams, the writer informing us that "albumen prints lose their chloride in the bath, but the albumenate of silver remains and deepens in colour by light." Would that the happy dream had proved a reality, and that henceforth every household would afford us both developer and fixer—the former in our homely "washing soda," and the latter in that useful culinary compound, "common salt."

But the illusion is dispelled when we see that Dr. Liesegang is only talking of collodio-chloride prints, and as no one imagines that this process will ever supersede that on albumenised paper his communication will prove of little benefit to the majority of workers.

If I mistake not, now that mechanical have superseded manual methods of coating, *gelatino*-chloride paper can be manufactured of uniform quality and at a much lower cost than can *collodio*-chloride; and this paper has been shown to give prints almost, if not quite, equal to those on albumenised paper. Why should not such a paper be put into the market at the same price as the ordinary sensitised paper now used? Then, indeed, we might reap the benefit of our foreign *confrère's* ingenious discovery; for, there being no albumenate to "remain and deepen in colour by light," we should at length have a printing process possessing, as Dr. Liesegang has shown, the immense advantages of rapidity, economy, and permanence. Locke Macdona, B.A. (*Oxon.*).

MODERN "DARK ROOM" IMPROVEMENTS.

No. II.

A handy sink is one of the chief points in a well-fitted-up room. Plenty of space for splashing about freely without splashing over, and some well-contrived adjuncts for conducting at least the more usual operations, are absolutely necessary. Not least important is it that entire safety should be ensured against leakage and overflows, especially if the studio be situated in the upper part of a building—perhaps with other peoples' offices or shops below. Woe to the luckless photographer who, at the mercy of not too careful *employés*, has had the water left "on" with a defective outflow pipe. A peremptory message from the irate Mr. Blank demands that he will instantly go down and see the destruction his carelessness is causing. The vocabulary of expletives is turned full upon his devoted head; and, although the mischief may have arisen from something in which his commands have been directly disobeyed, it will be well for him if his neighbour after cooling down prove a reasonable man, or the annoyance has been arrested in good time. A few simple precautionary measures to prevent this nuisance arising will be far better employed than vain regrets after the occurrence. Memories of stores of cigars *galore*, "meerschaums," and similar articles taken and paid for because "spoiled," or at least said to be so, by infinitesimal damp prompt an earnest recommendation to *see to the outflow*, and over and above that have a gridded overflow, and again and beyond that a second and larger overflow. *Experientia docet.*

But to return to my sink. A leaden trough, four or five feet long and from two and a-half to three feet wide, in days of old was rather a capacious affair, and sufficiently so even when large plates had to be manipulated. But with flat dishes for developing, for fixing baths, to say nothing of a washing tank—all these being liable to spillings, more or less—the sink space requires very considerable extension nowadays. It is not at all requisite, however, that the sink itself, or what may be called its main body, need be altered. My own plan has been to add about three feet of wooden slope at each end draining into the sink, and of similar width. A board along the front of the whole comes sufficiently high to catch splashes and protect the clothes of the operator. Of course the whole must be made secure by a lining of some impervious material. Providing the sink itself is well leaded, a cheaper material serves every purpose for any sloping extensions where liquids are not retained. Willesden paper leaves nothing to be desired. It is cheap and easily cut to suit, though, of course, it wears out in time if chemicals are constantly getting to it; but its power of endurance is really marvellous. If anybody be very anxious to make it for themselves it is said that copper in small pieces (nails or filings) digested in liquor ammonia for some time and the solution applied to stout paper answers perfectly; but the Willesden Company supply it so reasonably that it is not worth while to try it.

On the "wings" described the fixing and alum baths can be conveniently placed, and another bath of gutta-percha contains Mr. M. Carey Lea's bichromate and sulphuric acid solution. Into this waste plates are thrown, and easily washed clean at leisure. The water pipe is forked, each branch having its own tap—one supplying general requirements, the other connected by a flexible pipe with the grooved washing tank standing in the sink proper. A shelf over and at the back of the sink and immediately below the window holds developing solutions, pourers, a box for soap and pumice stone, and any article very frequently required, not omitting a supply of table salt for cleaning the backs of gelatine negatives, which should always be attended to before passing them into the washing tank.

Comfort and convenience in developing and similar dark-room operations will be largely helped by combining plenty of what may be called "table" space with the sink space. Over all the sink and its side wings I have a pair of wooden rails, forming a sort of miniature tramway. On these travel—so that they can easily be brought forward for use, pushed out of the way, or even taken off and set aside altogether,—three or four conveniences, such as a good, stout table top about three feet square and *level;* another board with a slope to hold a large plate under a stream of water for washing, and an iron cross frame on which dishes can be run over an atmospheric gas burner. The sink may seem rather a queer place to have a gas burner. Its service is obvious in such a place for carbon and platinotype work. It should be of such a kind as will not be extinguished, nor the burner holes corroded by dropping water or chemical solutions. There are probably various patterns which meet the case; the "American retort stove" answers well. All this may seem rather complicated, perhaps, in recital, but is really not so; for it is time and energy saved in the long run to spend a leisure hour now and then in perfecting one's working appliances. With such an arrangement as the above work may be made a pleasure, which, if inadequately provided for, would involve worry and inconvenience. I have found it quite easy to manipulate thirty-four-inch opals, and opals may certainly be allowed to be rather awkward things when they are nearly the size of a kit-cat painting.

An *enlarging arrangement* attached to the upper part of the window, converting the dark room into a camera, needs no description. Of course in establishments having separate enlarging rooms it is not a *sine quâ non;* but the majority are, perhaps, not thus fortunate, and to them comes the consolation that nothing can be handier than the power of popping a negative or transparency into its place and securing the product without any running about or waiting. In my own case the enlarging apparatus traverses the room overhead. Indeed, I have had two side by side, and another in a separate room; but it is found that one will do a vast amount of work, and the extra ones are not needed. When much of this sort of work is going on the question naturally presents itself—Does light get diffused through the room so as to affect the gelatine plates while being changed or developed? I have never found it do so, but of course it would be foolish to have the plates filled into the slides near where the light from the lens would fall. One corner of the room, as far as possible from *all* sources of light, is best devoted to the operation of plate changing.

A *drying closet* is a useful convenience in the room, and perhaps the less it has of complications the better. So long as it is a fair size, has plenty of light, safe holes at the top, and a "hit and miss" perforated sheet-iron bottom, with a ring burner some distance below, it will meet most ordinary requirements. The drying of gelatine plates in any quantity is another matter, and needs a separate room where other operations are not going on. But short of that there are many operations for which a cupboard of this sort will be found very useful, whilst any sensitive plates about can be popped into it in a moment if it be desired to open the window to admit daylight.

Subsidiary drying shelving will be needed, especially where much enlarging is done. Nothing is more convenient than, instead of a plain board, to make the bearer of a pair of rails, and behind them fixed to the wall a "slotted" narrow board or broad lath, so that plates can be stood up perfectly straight resting on the two rails, and with one side held in the narrow slot or nick in the back lath, this being fixed so as to touch at about two-thirds the height of the plate used. There should be a series of them to take plates (say) from whole-plate to 12×10; from that to eighteen or twenty inches, and so on. Of course, being quite open, air circulates readily amongst them. These are for finished negatives of large size, glasses flowed with albumen, and other work where spontaneous drying is used. I have said "*spontaneous* drying;" but if another gas burner be permitted for boiling water and such like, and it can conveniently be placed a good distance below, the one thing is rightly fixed for helping the other by the currents of warm air passing upward.

Over this last-named stove varnishing is done in the summer when ordinary fires are out of use; and as there is a possibility of a plate just catching the flame when drying off, and also of kettles boiling over and evaporating pans breaking, I adopt the plan of setting this little stove by itself in the middle of a large metal shallow tray, which is isolated on a stone-topped platform raised a foot or so from the floor. If wet collodion be used for enlarging, as it no doubt generally is, then all collodions should be kept as far as convenient from this as well as any other flame. A good boiling pan with a copper bottom over this stove provides hot water for carbon work. Many will have the luxury of a separate room for carbon development, but where space is limited it can be very well done without. A far more important thing is a separate room for *sensitising and drying* tissue. The atmosphere of the dark room, even with the best of ventilation, seems to be most prejudicial to the keeping quality of tissue.

Whilst speaking of carbon I might mention a use for a by-product that I have not seen mentioned before. The floor of the dark room is usually of bare boards, and if it be over another room the ceiling of the latter is pretty certain to suffer from solutions spilled being partly absorbed by the boards and partly percolating between them. If the yellow backing stripped from a developing carbon picture be laid face down on the floor it adheres with great tenacity, and becomes so hard and impervious that it forms an effective protection against intruding solutions. Of course it takes some time to cover a floor; but, once done, and the stuff carried an inch or so up the skirting-board, the room floor practically forms a sort of safe tray. The only precaution needed is not to disturb it whilst wet and soft. If a pigment picture (on paper of course) prove a failure from under- or over-exposure, or any other cause, down it goes the same way. I hope nobody will suggest unpleasant comparisons with another dark abode said to be "paved with good intentions." In any case those who try it will find this sort of chromated gelatine and paper "floor-cloth" will stand being walked upon, washing when required, and that a bath of silver spilt on it would be more easily mopped up than on bare flooring-boards. BENJAMIN WYLES.

PHOTOGRAPHIC INDUSTRIES.

THE ARGENTIC BROMIDE WORKS OF MESSRS. MORGAN AND KIDD.

SEVERAL persons had spoken of the application of gelatino-bromide of silver to paper soon after it was known to have succeeded upon glass, and probably many more who kept their thoughts to themselves had indulged in surmises as to the feasibility of such application; but to Mr. Morgan, of Greenwich, was reserved the privilege of announcing to the public that he had reduced it to a commercial, practical form. Scarcely had he made public the application of "argentic bromide" to the production of positive prints upon paper than the prospective value of the process was perceived, and persons in other countries even secured it for themselves by patent. Out of this invention arose, in the country of its birth, a great industry, of which we shall now give a brief description.

The premises of Messrs. Morgan and Kidd are situated in Kew Foot-road, Richmond, being readily accessible from the various railway stations in that town. On entering the office we found ourselves in the midst of enlargements, in every style of finish, made on argentic bromide paper and opal glass. The latter in some instances were of goodly dimensions, not a few being 24×18 inches.

What appeared to be an exceptionally useful application of the process was the preparation of canvasses for the use of the painter in oils; and in the course of our visit we saw the process of preparing these canvasses. In this the great care was to have its surface in such a state, by its texture being previously impregnated with some special size, as to ensure the sensitised gelatine which is subsequently applied becoming part and parcel of the canvas, thus rendering its peeling and cracking off quite impossible. Some canvasses stretched on frames which we saw measured 50×40 inches downwards, but there seemed no difficulty in the way of preparing them of much larger dimensions whenever such should be required.

The paper is all coated by hand. Sheets of plain Saxe paper are formed into trays by having their margins turned up. They are supported below by large slabs of plate glass of the proper dimensions, loosely set in wooden frames. This ensures the paper being retained in quite a flat position. Let us follow the fortunes of one such sheet.

Upon being placed as described the frame was passed through an aperture in the partition into an adjoining room, from which all light was carefully excluded save that from gas lamps screened by red paper, aurine being the colouring medium employed. On a series of tables ranged round this dark room were placed levelled pegs at suitable intervals, on which to lay the glass plates after the paper had been coated. This latter operation was performed by the operator taking up a small vessel containing a measured quantity of emulsion, and pouring it into the paper tray. As soon as it was found to flow properly over every portion of the surface the supporting plate was then placed upon the levelled stand, and allowed to remain there until the gelatine was sufficiently set to permit of its removal. In the meantime, however, a second, third, fourth, and other sheets were being treated in like manner, and so on in succession, the number of plates being so adjusted as to ensure a succession of plates being set and ready for removal, thus keeping up the continuity of the coating and removing. When set each sheet was lifted from its glass support, attached to a light lath by one end, and suspended upon a frame which, when charged in this manner, was sent up into a drying-room overhead by the agency of an elevator or "lift." After being allowed to remain in the drying-room until quite dry—which occupied about twelve hours, more or less—the sheets, after having been examined for defects or specks, were trimmed, rolled up, and placed in the long, round cardboard boxes so familiar to those who employ argentic bromide paper. From first to last no other light had access to them than the subdued red light transmitted through the aurine paper by which the gas is carefully protected.

Recognising the impossibility of obtaining uniformity or even good quality when the emulsions are prepared with ordinary water, Messrs. Morgan and Kidd make it a strict rule to employ nothing but distilled water; and in one room we saw a large and beautiful copper boiler with its condenser, from which the distilled water was pouring continuously in a small stream.

In this room, too, we witnessed the preparation and cleaning of the opal plates. These are of the class of glass known as "pot opal," and, so far as we saw during this visit, one side was ground. This matt surface undoubtedly imparts a fine tooth for subsequent artistic work. The plates after being unpacked are laid down upon a flat slab in a sink, and subjected to smart friction with soap and water, after which they are plentifully rinsed with plain water.

Precautions are taken to ensure the temperature of the emulsifying room remaining at a uniform rate. The quantity of emulsion used daily is twelve gallons. The nitrate of silver is received in quantities of two hundred ounces every few days. Care also is taken to ensure the recovery of every particle of silver from the residues, some special means, which we are informed are to be hereafter published, being devised for this purpose. The amount recovered from residues last year netted £150.

When we visited the enlarging-room we witnessed the exposure and development of a sheet 23 × 18 inches. The enlarging cameras stand in a horizontal position, the light of the sky being thrown through the negative by a plain glass mirror erected at an angle outside; in short, the luminous sky forms the background to the negative being enlarged. At a suitable distance in front of the lens (inside of the enlarging-room) stands an easel having every adjustment and capable of taking sheets of paper of any dimensions within a reasonable range. The exposure given to the sheet referred to was thirty-four seconds, a *carte* lens being employed as the objective. At the end of this time it was placed in a dish and developed with the following:—

Saturated solution of neutral oxalate of potash... 4 ounces.
" " sulphate of iron.............. 1 ounce.
A sixty-grain solution of bromide of potassium... 6 minims.

The image came out slowly, but soon acquired great vigour and a fine colour, after which it was fixed and washed. An enlargement on a 30 × 25 sheet had just been made from a quarter-plate before we arrived, the exposure given having been a minute and a-half. But the atmosphere was thick with a brownish vapour during the day of our visit, so that the figures here given as representing the exposures must be viewed as calculated from that light.

Certain rooms upstairs are devoted to artistic work, and we there saw several lady artists engaged in finishing the enlargements under the supervision of Mr. Wake—a gentleman whose name is well known to many of our readers.

The whole of the dark rooms are lighted by gas, shielded by red paper, in preference to daylight, which has been found to be unsteady. The premises are all heated by hot-water pipes, of which there are no fewer than two thousand feet employed for this purpose. The conductors of this establishment evidently entertain the sound opinion that, in order to get the various classes of work executed in the best manner, those to whom such work is entrusted must be made to feel quite comfortable as regards temperature.

We may close by remarking that, until we were shown through the extensive and well-appointed premises of Messrs. Morgan and Kidd, we had no conception that such a large and important "industry" had been formed in connection with the sensitising of paper by the agency of argentic bromide.

A NEW DEVELOPER: FORMIC ACID IN THE DEVELOPER.

[A communication to the Glasgow and West of Scotland Amateur Photographic Association.]

There has lately been much correspondence in the photographic journals on the merits of various substances as preservers of pyro. Sodic sulphite has been well discussed, some swearing by it and others swearing at it. The truth seems to be that pure sulphite is a capital thing when you can get it, but difficult to procure and to keep when you do procure it.

For my own part I prefer formic acid. Here is a red-coloured concentrated solution of pyro. in alcohol, with the addition of formic acid. It has been kept ten weeks, yet when diluted with water for use gives a colourless solution. On the addition of ammonia and bromide, as for developing, you see it becomes a very deep ruby colour, and in a few seconds clears to the colour of very pale sherry. It will remain like this for an hour. Here is some mixed two hours and a-half ago, which is not yet dark enough to stain a plate.

In using this developer the image comes up with the same rapidity and vigour as with plain pyro. Formic acid is not in any sense a restrainer, but has itself been proposed as a developer. It, however, neutralises a small part of the ammonia, so that rather more may be used than with plain pyro. The following is a convenient stock solution:—

Pyro. .... 240 grains.
Formic acid .... 1 drachm.
Methylated alcohol .... $1\frac{1}{2}$ ounce.

Each drachm contains twenty grains of pyro. Dilute as required for the plates you use, but leave out of your formula any nitric or citric acid it may contain, as the formic acid replaces them.

W. Goodwin.

TWO POINTS AND A LITTLE PHILOSOPHY.

At various times, and from different quarters, the removal from gelatine of that abomination "grease" has formed the subject of inquiry, and articles have emanated from the pens of various gentlemen having for their object the removal of this annoying though most natural adjunct of the now indispensable stock article—the holder and recipient of the silver bromide. It was but very natural that this substance, productive as it is of the numerous opaque spots which still crop up in many makes of plates, would draw attention, and that a suitable remedy should be sought for. Even Dr. Eder had, if my memory serve me rightly, a hand in the matter, and subjected gelatine to a special treatment in view of its purification from the individual point of view now in contemplation.

Among the remedies suggested—one that I saw adopted by a professional plate-maker—was ammonia. A two-per-cent. solution of the alkali in plain water filled a jar, in which the gelatine was placed to soak for a while, the alkaline solution poured out, and the glutinous mass washed in repeated changes of water until, in fact, all smell of ammonia had disappeared. Whether this remedy was or was not fully efficient I am not prepared to say, as the answer were best elicited by actual experiment, which anyone is open to make if he choose. I believe, however, that this special mode of treatment was ultimately abandoned and some other, which I did not inquire after in that particular quarter, adopted.

As I personally object to the use of ammonia, it was in another direction I had to seek to overcome the difficulty, if possible. My plates, just the same as other people's plates, would insist now and then upon having the horrid pest—little, round, opaque spots that would have tried even Job's patience when discovered, on issuing from the laboratory, on a pet negative, promising most unprofitable labour on any proof of value it was desirable to see perfect. Ammonia is not by any means the only thing that will track out grease. There are others—spirits of turpentine, for instance, which is the inveterate enemy of oleaginous and fatty matters. It wrestles with them then and there, and has the upper hand in no time. But, then, if applied to the substance in question, with the end in view—what about its effects on sensitiveness? I confess that I did not think it advisable to try it, though it might happen that some unlooked-for results might have come forth. Such strange and unexpected things do crop up in the laboratories of even tyro experimentalists! In the golden days of the search after the philosopher's stone, quaint things sometimes came about in the alchemist's sanctum, more than one discovery of a valuable nature being made unexpectedly, and while seeking after a totally different object. Thus it might be with the search for the most suitable reagent to effect the present purpose. By the way, it is not always safe, even for those well versed in chemistry, to rashly handle chemicals and bring them in contact. A gentleman of my acquaintance (a doctor of chemistry) was much ill-used once while carrying on investigations with substances of an apparently innocent character; and in the columns of The British Journal of Photography I have at different times seen the record of possible accidents furnished by the Editors, with a view to serve as a warning to the unwary.

To return to the subject: while it was not at all unlikely that a thorough search might have led to the discovery of a better agent than ammonia, other means no less efficient might be found, and in this direction why not investigate likewise? There are more ways of killing a dog than by hanging. Why not see what might be done by various ways of filtering? I originally filtered my emulsion, to rid it of objectionable residues, with the once orthodox chamois leather

Unfortunately chamois leather, while being very useful in many ways, is heir to various disadvantages only recognised with protracted experience; and as a strainer, even under the best of conditions, it is far from being perfect. I tried swan's-down calico. One sample worked fairly so far as residues were concerned, but that was all. Another sample proved inefficacious altogether. Two, and then three, folds of muslin next had a turn, proving quite effective in checking the passage of any rather coarse particle; and, in fact, a plate coated with emulsion thus strained was free from any *grittiness* to the touch, but on the application of the developer the crop of spots came out as impudently as ever. Clearly, then, of the three kinds of strainers used there was not one that would perform the twofold duty required. The number of textile fabrics that might still have been tried would, perhaps, prove unlimited. Then there was mohair, floss silk—I was going to say wool, forgetting that it would have to be of a special kind; for ordinary wool, as most people know, is itself of a greasy nature, and might have imparted some of its own viscousness to the already-existing evil. Since animal products had that peculiar character of enhancing, in all probability, instead of destroying, the malady, it led me to lay my hand again on an old friend—a great favourite in days fast disappearing, when collodion filtering was a frequent necessity. Need I name the famed product of the Southern States of America, where, at the proper time, it is seen oozing out of the husk awaiting picking, putting into bales, and shipping to the textile manufacturer of Manchester, &c.?

I, too, had found it, and could exclaim—"Eureka!" Cotton wool (medicated) not only filtered nicely in the usual way, but it, moreover, quite effectually removed the objectionable grease from the gelatine, giving as fine and perfect an emulsion as could be desired. And why should it not, when one comes to think of it? Why? What about its fibres? Are they not so many tentacles eager to firmly lay hold of whatever they choose to forcibly retain? And this, indeed, they do with a power that would put the octopus to shame. This is at least my experience on a small scale; and, if twenty ounces of emulsion can effectually be filtered in this wise, why not more, even if one had to renew the cotton when once fully charged? It is advisable to loosen the fibres a little prior to commencing filtering operations, and it is needless to say, I presume, that the cotton ought not to be moistened if one desire to retain in the fibres the necessary elasticity. My own *modus operandi* is simply to put a plug of the cotton in the neck of the funnel—not too tightly—and to filter away.

For use on a large scale it is highly probable that layers of cotton wool, with fibres loosened as advised, placed on silver wire, mohair, or some fabric or other fixed as the wire-work is fixed in sieves, and of any desired diameter, would effect the end quite well; however, this can easily be tried. Now all this is exceedingly simple, and yet it is like the egg of Columbus—it merely wanted to be thought of and realised.

There is a point I now wish to touch upon, and which has nothing to do whatever with the one just elucidated, and that is—chrome alum: its use and its real functions. Professed chemists, many of them at least, are, I daresay, in a position to define the nature of chrome alum. There may be, for what I know, an axiom—a formula—about it. Some symbol might represent it, and all this would be very fine; but, as a simple matter of fact, I would fain ask what chrome alum is beyond the mere symbol, beyond the mere equivalents, beyond its being chrome and alum of chromated alum, if you will.

It is proved past controversy that, associated with gelatine, it gives this last an unwonted hardness, and enables it to resist that disastrous tendency—frilling. It is, in fact, usually said to tan this, as it does cognate substances. So far as I am aware the knowledge of this form of alum goes no further, photographically speaking. Now I would venture to call for a closer examination of this substance, but more especially of its effects when embodied in gelatine for photographic purposes, and when the developer is brought to bear upon the same. I would ask that two plates be coated with the identical self-same emulsion; but one prior to the addition of chrome alum, and the other after the said addition has been made. I would advise their being developed with a mild developer, so that no frilling arise with the first plate; also the two to be developed side by side in the same dish with the same solution, and, after fixing and proper washing, to be carefully examined. It will then be seen that a considerable difference exists between the two. There will be a characteristic most pronounced on the alumo-plate, and a species of harshness and strength of which the other will be *minus*. I like the alumo-plate; I much prefer it to the other, while ready to concede that it is quite possible that the plate void of alum would be appreciated for special purposes where softness would be a desideratum, as in the case of the portraits of especially delicate women and children. But for most purposes, I repeat it, I like an alumo-plate; and, what is more, I prefer it well charged with alum. Experience has shown me that it does not at all slow a properly-made plate.

I have raised this question wittingly and advisedly. I think there is much more in it than might be suspected *primâ facie*. I should like to see it examined and discussed by one of the London photographic societies, for instance. I think something useful might arise out of it. Of the secondary ingredients that find room in emulsions I scarcely think any have more sterling value; but what that exact value is remains still wrapt in a mystery which it were desirable to see dispelled.

I do not believe I am far wrong in thinking that much is yet to be learnt of the real properties of the agents in daily use in photography. Diligent as past investigators, such as the Rev. T. F. Hardwich and Mr. M. Carey Lea, for instance, have been, there is yet a wide field to explore. Some of the properties are known; others not yet as much as foreshadowed. It is when combinations take place especially that the problem becomes complex—often times manifold; and a very sagacious eye is frequently required to penetrate, determine, and fix that which had hitherto remained unperceived and unsuspected. Moreover: are we quite sure that our conception of even so simple a combination as

$$AgNO_3 + KBr + KI$$

is perfect, or, rather, complete?—that the reactions are grasped in all their bearings? This may, to say the least, be questioned. I take it that we merely have a legible formula, comprehensible as such to those versed in chemical science; but I contend that, beyond, far more lies than is apparent at the mere reading of this otherwise simple formula. The formula proper is nothing more than the various terms of a plain addition, so far requiring no interrogative note, the outcoming and usual answer to which is palpable at a glance to the initiated; but I must insist on the all-important fact that much more lies beneath than on the surface. Let us deflex two beams of light—one yellow and one blue—on a white strip of paper, and we shall certainly obtain a green strip as the result. Then on to this deflex a beam of orange and we shall obtain a deep, warm, neutral green, or, rather, olive. Now describe exactly, first of all, the absolute character of the yellow, blue, and red, characterise to a dead certainty the successive compounds, if you can, and, taking into consideration the nature of the light that passed through each coloured medium, try and find out an adequate definition. Now the chemical problem is still more intricate, still more complicated, no less abstruse. How, then, is the simple, attempted equation to give forth, and at once, all desirable answers?

Moreover, the chemical formula lacks *aqua distillata*. The respective quantities should be defined that ambient heat kept account of, and its thermometric value should be recorded as well as any change of the same during the period of contact. If artificial heat be resorted to, it likewise must be studied and registered, as each additional degree and duration of action under the individual circumstance will naturally go to influence and modify results; and while most carefully following the reactions with all known scientific instruments and knowledge, much will still wholly escape your observation which on some future day may be detected by a closer investigator. What is received currently and accepted now in science will be demonstrated some years hence as either fallacious or deficient. Such is human science happily excused by our predecessors in these curt words—*humanum est errare*.

If asked for the drift of this disquisition I shall not have to go far to seek the answer. It lies in the fact of my having sought for an inquiry into the action of chrome alum in the bromide of silver solution. I detected more in it than others have apparently done—or think I have, for one should never be too sure of anything. I think good may result from the inquiry, and that must be my apology for leading my Pegasus further and in a more disorderly manner, perhaps, than is allowable in the field of scientific speculation. A. F. Genlain.

EMULSIONS IN COLLODION.

[A communication to the Photographic Club.]

The collodio-bromide emulsion process and its various modifications for several years engaged the attention of experimentalists, but without arriving at the degree of rapidity attainable by its formidable rival, gelatine. This has been pressed into every phase of photographic practice with a kind of feverish assiduity, whilst the good features of the older forms are almost ignored. There seems, however, to be some reaction setting in, as was evinced by your favourable reception of the albumen process given recently by Mr. Ackland. In re-introducing the process, for which we are indebted to the genius of one of the members of this Club, Mr. W. B. Bolton, I shall make no apology, and in no way as a competitor with any other system; let each stand on its own merits. I would willingly have ceded the position of exponent to other hands, so now I ask your indulgence whilst I prepare the emulsion in what may be termed its incipient form.

The formula stands thus:—

Plain Collodion.

	oz.	gr.	dr.
Methylated alcohol	2	6	0
,, ether	2	2	0
Pyroxyline, H. T.	0	0	60

Bromising Solution.

Methylated alcohol	1 ounce.
Water (about)	100 minims.
Bromide ammon. (58 and 5 grs. exc.)	63 grains.

Sensitising Solution.

Nitrate of silver	100 grains.
Distilled water	60 minims.

The mixture is made.

It will be observed that there is in the above a large proportion of water, but as our purpose is to obtain a finished and washed product this is of no consequence. If it were to be used in its present form it would be quite necessary to use a bromide wholly soluble in alcohol, such as zinc or cadmium, as even the water imported into it with the silver has the effect of inducing reticulation in the film. Still, many good plates have been done by the simple emulsion process. They were coated with a mixture similar to this, washed singly, and flowed over with an organifier, such as tannin, &c. Now the washing of the whole bulk of emulsion, as afterwards proposed by the discoverer, was perfect in principle, as exemplified by the procedure with gelatine at the present day. As I cannot in the time at our disposal tonight go through the whole of the operations, I have brought examples of the different stages up to the final result. We have here our emulsion, which should be allowed to stand for a day, with an occasional shake. It should be then poured into a dish to set into the condition as found in this washing vessel. After soaking, the first water is tested to find if the bromide be really in excess, and then the washing continued till all trace of soluble nitrate of ammonia and excess of bromide has disappeared. The pellicle is now placed in a strong piece of calico, the water and remains of the solvents are squeezed out, and gathered up for drying. This may be done either in a water-bath or spontaneously. As it is now sensitive to light, care must be taken to let no white light reach it.

I showed you a dried specimen that is soluble in equal proportions of ether and alcohol—together about eight ounces—which will keep good for several years.

This is a small quantity of filtered emulsion made by the above formula. The plates are prepared by simply pouring over in the usual way with collodion, and are ready for use without further treatment. I also put in a plate to show the contrast between it and an ordinary gelatine film, a negative, and a transparency.

The reason I have given a formula divested of all the complications introduced subsequent to the first publication is that I never found any appreciable advantages resulting from their adoption, whilst many difficulties arose, such as spots, fog, thinness of image, tenderness of film, &c. There are other salts capable of emulsification in collodion, chiefly iodide, chloride, and their combinations. For the first no satisfactory developer has been discovered. I hope some day to find the iodide yielding up an image to appropriate treatment. I shall leave Mr. Doods to deal with the chlorides. J. Nesbit.

MR. NORMAN LOCKYER ON ASTRONOMICAL PHOTOGRAPHY.

[Abstract of a Cantor Lecture before the Society of Arts, May 5, 1884.]

We will begin by referring to what may be included under the term "spectrum photography." In this we have to do naturally in the day with the sun, and at night with the stars and with the nebulæ. I have not much in this present lecture to bring before you with regard to the sun, because it is not necessary that a large telescope should be used for that body, for the reason that its light is so great that the small telescope will do just as well. Parenthetically, however, it is as well that I should refer to the sun somewhat, and draw your attention to some new optical methods and arrangements, which are exquisitely beautiful in their way, with reference to that body. The light of the sun is so very overpowering, and the light of the stars is so dim, that you may easily, without my telling you, come to the conclusion that the difficulties which have to be overcome in the two classes of research are of an entirely different character; and that is so. We have to succeed in solar photography by battling with the excess of light. We have to succeed in stellar photography by battling with its defect.

I have here, by the kindness of Dr. Janssen, what in France is called a "trap," and what we call a "slide," and this instrument will give you an idea of the way in which the excess of light in the case of the sun has been dealt with, perhaps, in the most satisfactory manner. It is a complicated instrument in appearance, but really it is simple when we look at it. It is intended to deal with the excess of light of the sun by only allowing that excess of light to fall upon the plate for an excessively-minute portion of time. This apparatus, therefore, is placed in the telescope between the object-glass which collects the light and the photographic plate, and the only light which can fall on the photographic plate has to pass through an aperture. Now, in front of this aperture is arranged a sliding slit, the jaws of which can be regulated by means of a screw, so that I may bring the jaws together until they are almost in contact in case the excess of light is very great, or I may separate them still more by moving the screw in the opposite direction. Then, when I have got this slit as fine as I think it necessary to have it for that particular day, I can, by means of a trigger, allow this slit to snap very rapidly over this aperture, through which alone the light of the sun can fall on the photographic plate. There are several very beautiful contrivances in this instrument. One of them I will show you when I have again set the trigger.

Here is the point at which is the opening which allows the light to fall upon the photographic plate, and this is the spring which produces the movement. Now you will see in a moment that if this spring were acting during the whole time that the light is passing over the aperture the motion of the slit would be constantly accelerated, so that in passing through the solar image one part would be more exposed than the other, and in that way you would never get a proper photograph of the sun, because to get a perfect photograph you want the quantity of light passing through the slit to be always the same. Now, that is managed by the length of this spring. The spring ceases to act the moment the slit is in front of the aperture, so that, while the slit is passing over the aperture it only travels by means of its acquired velocity, its velocity is not being accelerated. I shall show you presently two or three photographs which Dr. Janssen has been good enough to give me, which show the magnificent results which have been obtained in this way. The most striking result is that he finds that an interval of two seconds is quite enough to change the physical distribution of the bright and dark portions of some parts of the solar surface near the spots. The instrument, in order to demonstrate that, must be so arranged that it will allow two exposures at an interval of two seconds. This is done very beautifully. I am now about to make one exposure. I have now made it, and want to make another. The slit brings with it a shield to prevent the light falling through the aperture until the trigger is again set. The instant that is done the shield flies back, and in that way it is possible to obtain photographic records over a part of the sun's surface at an interval just long enough to enable you to do this. That, then, is the way by which the excess of light is got over.

The little patches of light and dark, which on the photographs are something like half-a-second of an arc apart, have a distinct existence on the sun, and have a spectrum of their own. That we learned from Sir William Herschel, although, of course, in his time he was not able to photograph them. But what we have learned from these beautiful photographs of Dr. Janssen is that they are associated with cyclonic lines, and form part, in a great many cases, of thoroughly well-marked and developed cyclonic curves. Dr. Janssen finds, and finds alone by this means—it is not a thing visible to the eye; the eye gets too tired and strained—that these markings, such as you see here, are distributed over the whole sun's surface, and that they vary frequently in exactly the same way as the sun's spots themselves vary. That is one of the results of that method of dealing with an excess of light.

You will understand, of course, that when we have to deal with the stars—and there Dr. Huggins has been as successful in one direction as Dr. Janssen has been in another—we have no longer to deal with an excess of light, but with its defect. And here comes in another beautiful optical method. For photographing spectra of stars, of course we want a spectroscope and a slit in the ordinary way, and what we have to do in order to get the best possible result is to get it by reducing the part of the plate added on to the smallest possible extent. And while we reduce its exposure to the smallest possible extent we use as large an instrument as we can, and then see that during the whole time the instrument is pointed to the star the light at the focus shall really be entering the slit. Now, it may be a familiar fact to most of you here that if that exposure has to be (say) for an hour, and some of Dr. Huggins's were for some hours, no ordinary clock controlled by electrical influences will allow the image of any body to remain on slit or on a fine point for that time or anything like it. Dr. Huggins's method, therefore, was to use a Cassegrain reflector in an arrangement by means of which he could, with another telescope, observe the image of the star, and see whether it was the slit or not, and if it varied however little from the slit to bring it back to its proper line of duty. In that way you see the defect of light was battled with by the time of exposure. The more feeble your light the longer the exposure; and that the longer exposure might be effective he wanted a process by which the light should be compelled during the whole time to pass through the slit, and through the system of prisms on to the photographic plate. Dr. Huggins has been good enough to allow me to show you tonight some of his beautiful photographs taken by this means; and I am sure you will be none the less glad to see them when I tell you that that part of the optical method which depended on keeping the image of the star on the slit for an hour together was played—not in all cases by Dr. Huggins, but very frequently by Mrs. Huggins.

This, in sum, is what we have learned of late years in spectrum photography in the case of a defect of light, and you see it is equivalent to what we have learned from Dr. Janssen in the case of spectrum work and ordinary work—in fact, when it is a question of light.

But there are other things to do besides observing the spectra of these different heavenly bodies. We want to observe the heavenly bodies themselves. We want to see what they look like, and to know about them telescopically as well as spectroscopically. Now, in this direction I have to refer to Mr. Common's photographs, which have recently been crowned, I am glad to say, by the Royal Astronomical Society by the award of their gold medal. The photographs of nebulæ and clusters which he has recently succeeded in bringing before us are just as valuable in their way, and are fully as important as a method of optical work, as those others to which I have just referred.

When we come to inquire into Mr. Common's work we find that he is dealing, in some cases, with the very faint markings of nebulæ, and that some of his exposures have been upwards of an hour long; so that we may at once come to the conclusion that in his case also we are dealing with a defect of light. Now, how does he get over it? You see there is a very great difference between using a spectroscope, as Dr. Huggins did, and a slit, and using simply a photographic plate, as Mr. Common does, on which to receive an image. If we have our spectroscope and the slit, if the image of the star does not fall fairly on the slit it does not matter, except that you have to let the exposure go on for a longer time, because the image of the star must fall on the slit for a certain time to get a photograph. But Mr. Common's task was, so to speak, more heroic than that, because in his attempt to get images of nebulæ and clusters of stars—the nebulæ, also, of course including stars—it is a question absolutely of hit or miss. Dr. Huggins's star, if it were off the slit, did nobody any harm; but if Mr. Common wishes to take a photograph of a nebula with some stars in it, or of a cluster, if he cannot keep each star absolutely rigid on one point of the plate it is perfectly certain that we shall never get a photographic image, either of a nebula or of a star. Mr. Common, therefore, having a clock perhaps no better and no worse than Dr. Huggins, was compelled to invent a new optical method or arrangement, and this is it. He has been so kind as to bring it here in order that you may see exactly what it is. In the photographs of spectra which you have seen on the screen correction was made by altering the movement of the clock slightly, but Mr. Common, after a great deal of trial, found that would not do. You must let the clock take its course, and you must get some other means of correction. What he did was this:—On a plate which had two motions on the eyepiece of the telescope, you have separately first a photographic plate and then an eyepiece. Underneath the eyepiece is a piece of platinum supporting a system of cross wires, and then a system of rectangular screws, by which, when you have once got the image of a star on the cross wires supported by the circle of platinum, you can keep that cross wire bisecting the image of a star for as long—in fact, as long as you can. Human effort probably would break down, generally, in half-an-hour. Mr. Common's human effort, I believe, has already extended to about an hour and a-half. You have then a fine delicate star, bisected by a still finer delicate web. Your clock has to be going as well as it may, and your corrections are made by these two screws, with this important consequence—that if you can catch and keep your cross wire on your star in your eyepiece, you have kept the images of the stars absolutely rigid on the photographic plate which is beside the eyepiece.

In this way Mr. Common has obtained a photograph of the nebulæ in Orion. Of course we cannot determine the perfection of the method by the nebula, but we can determine it by the images of these smaller stars. This photograph was exposed for exactly one hour; that is to say, during sixty minutes, or sixty times sixty seconds, the eyepiece had to keep the image of some particular star (necessarily on one side of the photographic plate), by means of the two rectangular co-ordinates worked by the screws, exactly bisected by the fine cross wire, the cross wire being illuminated by a lamp.

This photograph I consider to be one of the greatest achievements of modern astronomy, and I have taken occasion elsewhere to say what I believe to be perfectly true—that if all the human efforts which have been directed, so to speak, to this group of nebulæ in Orion for two and a-half centuries were put in one scale, and this photograph were put in another, it would weigh them down; in fact, that sixty minutes of nature are worth two and a-half centuries of art. But that is not all. Not only has Mr. Common, by means of this photograph, shown us that his new method is good for taking a complete picture of that kind, but he has shown us that photography contains within itself, fortunately, the elements of its own correction. What do I mean? I mean that one of the points which now for two and a-half centuries—for the work on the nebulæ of Orion began more than two and a-half centuries ago—has occupied the minds of observers has been this—Does the nebula change or does it not? And from their drawings astronomers have not been able really to determine whether there has been any change or not. Professor Holden, in one of the most voluminous, luminous, and beautiful memoirs ever devoted to the consideration of one celestial object, a few months ago only, discussed every drawing which is extant, and his conclusion was that really you could not say from any one of those drawings whether the nebula was as it was first observed, or whether it had considerably changed. Now it will be obvious to everybody in a moment that by such photographs as these it will be quite easy to determine in one year, or one century, or a thousand years—art is long—if any change takes place. But we can do very much better than that. Mr. Common has shown that, by employing this method for different exposures, you have a perfect system of correcting the photographic record itself. If you change the salt of silver which you use, of course you may change at any given time the picture you get. You may be using different kinds of light, and you may imagine a nebula of Orion painted by every wave length, you may get an entire belt of F light, G light, A light, *a* light, H^1 light, and so on; but, without going into experiments on variation so far as wave lengths go, Mr. Common's method shows us that by a system which I have called a system of "contouring," to make things quite clear, you will be able in future times to get comparative results, quite independent, or almost independent, of the salt of silver which you employ. Let us see, for instance, how Mr. Common has beautifully built up a nebula. We have here a photograph taken in one minute's exposure, one taken in two and a-half minutes, one in four minutes, one in ten minutes, one in twenty, and then we have the one of sixty minutes' exposure.

With an exposure of one minute we have nothing of the nebula, but we have simply a few of the brightest stars. That is the beautiful trapezium which has been a test object, time out of mind, for observers with small telescopes, and that beautiful line of three stars to the right. Now, passing to the one with two and a-half minutes' exposure we get them a little brightened, and just a little bit of the nebula round the brightest region. Now the four minutes' photograph shows you some of the other stars coming out, which were not visible in the first photograph. The next brightens the nebula and also brightens the stars, and we have the nebula in full swing, so to speak. With the twenty minutes' exposure it is again increased; and now with the sixty minutes' we have the nebula in all its beauty. We have there established an absolute system of contouring, and that can go on quite independently of place—independently of everything except the salt of silver you employ.

There is one more photograph I wish to show you. You will see that this method is as good for clusters as it is for nebulæ. This is not so good a photograph—the method has not worked quite so truly—but it will show us all how important it is for science that it should work well in subsequent cases. The stars should be quite round, and as a matter of fact they are a little elongated, but you see what an immense engine Mr. Common has placed us in possession of, if you take things as you find them; for an astronomer to measure a cluster of stars like that, and give the number of them and the intensities, is a matter which would take years. The photograph I suppose took, perhaps, thirty minutes.

These beautiful photographs have been taken by Mr. Common in a mirror with a three-feet aperture. Now, if you were dealing with a mirror of eight-feet aperture of course we should be dealing with a quantity of light as 64 to 9, and as Mr. Common uses a flat, and as I have shown that a flat is not necessary we may say practically that with an eight-feet telescope we get ten times more light, and, therefore, the exposure would be one-tenth; so that you see an exposure of sixty minutes would be reduced to six minutes, and, therefore, the labour of keeping the delicate star on the delicate cross wire would be reduced in the same proportion. Further: with such a light-grasping power as that to which I have referred, we may hope that some of the stars would give us absolutely instantaneous photographs, and, if that were so, we might not only by this means get observations of spectra, but we might get observations of double stars.

With regard to observations of double stars, there is just one point which may be argued, and it is this:—Mr. Dawes, years ago, showed us that, working gradually upwards from apertures of one inch to apertures of thirty inches, we enormously increased our separating power on double stars. For instance: he held that with an aperture of one inch we could only separate a double star with a distance of 4¼″; and at ten inches we could separate stars ½″ apart; and then he calculated that for twenty inches you could separate two stars ¼″ apart; twenty-six inches, ·175″; twenty-seven inches, ·169′; and thirty inches, ·152′. But what would that ·152′ become with an aperture of ninety-six inches? We should get down to an exceedingly small fraction of a second indeed, and with a perfect mirror and Mr. Common's perfect system, I believe that the time will come when we shall get double star observations added, as a matter of course, to the observations which I have ventured to bring before you.

So that it comes to this:—First, with regard to the telescopic observations of the heavenly bodies, if we take the nebula of Orion as an example of them, we find that we have in this method certainly a better one than any eye method which the last two and a-half centuries have produced; that a system of contouring which we can apply in a few hours will replace the work of months, and give us a record on which we can absolutely rely; while the work of months, and of years, and of centuries, has turned out to be absolutely unreliable, because it is human. In doing this, then, we establish nebula photometry, but we deal with stars in the field of the nebulæ. We must, therefore, deal with the photometry of stars in the field of the nebulæ, and if we can do that why should we be limited to that field? Why should we not take the average over the whole visible heavens, and bring star after star on the same plate, in the same way as has been suggested by Dr. Huggins and myself in other fields of work? It is absolutely unnecessary, so far as stellar photometry is concerned, that we should limit ourselves to any one nebula or to any one hemisphere, and it is perfectly simple to get one photographic plate and to put on it a dozen or twenty images of different stars which will give you, in terms of a certain salt of silver at one epoch, the different radiant energy of those stars for comparison in future time. Now, it is perfectly certain that if this be so, work like that is far superior to any work which any observer, however eminent, might accomplish, because the thing would be absolutely beyond all doubt, whereas one might doubt the observer.

If we pass to spectroscopic work the spectra might be chosen from every part of the sky, and you may have, as you have hypothetically for the intensities of the luminosities of the stars, the spectra of different stars culled, so to speak, from any part of the heavens you choose; and if you can get a dozen spectra of stars, culled from near or far regions of the heavens, on one photographic plate in a single night, is not that better than any work that one observer can do with that telescope? So I would propose that, with this eight-feet telescope, the observer should be absolutely abolished, that you should not allow the telescope's time to be wasted by being employed by an eye which can only see one thing at a time, and which after all may not be quite certain what it sees, or give rise to doubt when other eyes in future years come to examine what it has seen. This eight-feet reflector I would make an instrument fitted only for such researches as those which Dr. Huggins and Mr. Common have shown us to be possible. I would then, by means of electro-magnets or what not—it is a perfectly simple thing to settle—get an arrangement by which a photographic plate could be sent up, capable of coming down again after a certain time, with ten, twenty, or thirty different images impressed upon it if you wished. If it came down with one photograph as good as those Mr. Common has enabled me to show you tonight, I, for one, should be perfectly content; but if you want quantity it is quite easy to get it by lengthening your plate. Why do I insist upon this? For this reason: that the observatory is no longer necessary. This enormous instrument, with an eight-feet aperture and sixty feet focal length, can be sheltered by a hut costing £100, instead of being rendered useless by an observatory which would cost £40,000; and I, for one, believe that if we had such an instrument as that, made on such lines as I have indicated tonight—thanks to the specimens of work which Dr. Huggins and Mr. Common have allowed me to bring before you—one year's work with it would make the year's work with more expensive instruments absolutely ridiculous.

Then, to conclude, I refer to my text, and wish to bring pointedly before the Society of Arts the fact that this dream—this beautiful dream—lacks all chance of realisation at the present time for want of glass—for want of the applications of the arts to astronomical research.

THE FINE ART SOCIETY AND THE NATIONAL GALLERY.

The following correspondence was forwarded to the daily papers one day last week:—

To the Editor.

Sir,—We take the liberty of enclosing you a copy of certain correspondence which has taken place between this Society (the Fine Art) and the Directors of the National Gallery. We venture to think that in these days when English businesses have to meet so heavy a competition from foreign countries, the balance should at all events be held evenly by those who have the care of the national property.—We beg to remain, yours obediently, THE FINE ART SOCIETY.

148, *New Bond-street, W., November* 13, 1884.

You may be aware that the iron house which has for some months disfigured the front of the National Gallery is erected by the German photographers of whom we speak in our letters.

148, *New Bond-street, October* 27, 1884.

SIR,—In the spring of last year we applied to you for permission to photograph a series of pictures in the National Gallery, with a view to their reproduction by means of photogravure and subsequent publication by us. You were so good as to give permission, but the permission was coupled with the restriction that the pictures were not to be taken down or their glasses removed—a restriction which made the permission tantamount to a refusal. We endeavoured, but without success, to obtain the removal of this restriction, although we proposed to employ any persons whom you might suggest, so as to ensure the pictures from injury, and although, as we pointed out, the restriction which was imposed upon us had not been made in the case of a French firm. We are now given to understand that these restrictions have not been enforced in the case of the German firm, Messrs. Braun and Co., who have further been permitted to erect an iron house in front of the National Gallery for the purposes of their business. It certainly seems a hardship that facilities which are afforded to foreigners should be withheld from English publishers, and we think that we have some claim to trouble you by asking for an explanation of the course followed by the trustees.—We beg to remain, yours obediently,

The Director, the National Gallery. THE FINE ART SOCIETY.

National Gallery, October 29, 1884.

SIRS,—In reply to your letter of the 27th inst., addressed to the Director of the National Gallery, I am requested to explain that the privilege of having certain pictures in this collection temporarily removed from the walls for the purpose of being photographed was accorded to M. Braun and Co. in very exceptional circumstances. That firm has been engaged for some time past in photographing pictures in the great public galleries on the continent, where also, owing to the high importance of the undertaking, unusual facilities has been afforded to them. They undertook to erect at their own cost, and with the sanction of Her Majesty's Government, a photographic *atelier* for their use, as well as to defray all expenses incurred by the removing and rehanging of the pictures. Even then, several works, the removal of which would have been hazardous, were photographed in their places on the walls. The trustees and the Director feel that to renew the special permission thus granted in favour of every application which may be made for a similar purpose would involve great risk to the pictures in this collection, and they regret, therefore, that they are unable to comply with your request.—I am, Sirs, your obedient servant, CHARLES. L. EASTLAKE.

The Fine Art Society.

148, *New Bond-street, W., October* 31, 1884.

SIR,—Our letter of the 27th inst., to which you have been so good as to reply, was not intended as a renewal of our application to photograph the pictures. We felt that to allow at one time a French firm to remove pictures from the gallery, and take away glasses—at another time a German firm to do the same—and in the interim to refuse to permit an English house to remove one single picture from its frame, is not to hold the balance fairly between all parties. It may have been, as you say, of "high importance" that English pictures should be photographed by these foreign publishers. It was without doubt a very valuable monetary concession to give them, and one that is enhanced by your refusal in the present instance; and, therefore, as the series of engravings which we propose to issue would, from an artistic standpoint, have been of equal importance with theirs, we think we are justified in complaining that privileges which were granted to them should have been withheld from,—Your obedient servants,

The Director, the National Gallery. THE FINE ART SOCIETY.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 14,122.—"Measurement and Estimation of Amount of Light Emitted from a Luminous Body." J. JOLY.—*Dated October* 25, 1884.

No. 14,457.—"Actinometers." C. GREEN and L. V. FUIDGE, 128, Colmore-row, Birmingham.—*Dated November* 1, 1884.

No. 14,885.—"Photographic Engraving." J. R. SAWYER, Ealing Dene. —*Dated November* 12, 1884.

No. 14,886—"Method of Showing Dissolving Views and all kinds of Slides, and Producing Life-Like Effects with the Optical or Magic Lantern." J. A. R. RUDGE.—*Dated November* 12, 1884.

No. 14,951.—"Oxyhydrogen and Other Microscopes." LEWIS WRIGHT, 7, Beaumont-road, Hornsey Rise; H. C. Newton, 3, Fleet-street, London. —*Dated November* 13, 1884.

No. 15,026.—"Separation and Obtainment of Oxygen from Atmospheric Air." L. L. BRIN and A. BRIN.—*Dated November* 14, 1884.

IMPROVEMENTS IN PRODUCING VIGNETTED PORTRAITS.

By HENRY VANDER WEYDE.

MY invention relates to the production of photographic negatives, particularly of portrait negatives. It has for many years been recognised by all photographers that, in printing from negatives, instead of exposing the entire surface equally to the light, and thus printing in all high lights and shadows in full strength to the very edge of the print, a more artistic and pleasing effect is produced by the process of vignetting to a half-tone by first masking off the edges or margin of the negative by means of a mask applied over the negative and leaving only the centre fully exposed, and then taking the paper from under the negative and reversing the masking process by shielding the centre of the print from the light and exposing the white margin so as to tint it or tone it down.

This vignetting is only practised, however, in printing by the evanescent silver process; and, in addition to the ordinary chemical manipulation, it requires considerable mechanical skill and artistic judgment on the part of the printer (as each negative often requires a different size and shape of mask), while it more than doubles the amount of time and labour necessary for plain printing. The increased beauty resulting from this extra mechanical manipulation is, however, so great that nearly every photographer practises it, a considerable additional charge being made for these vignettes.

The difficulties of producing vignettes by any of the permanent printing processes, such as the autotype or carbon process, the Woodburytype, the photogravure, and all other photo. printing processes, are evidently so great that those commercially engaged in them refuse to attempt it, and I am not aware that it has ever been done. Many of these permanent printing processes would long ago have superseded silver printing had it been possible to give them the additional delicacy and beauty obtained by the vignetting and printing process.

Now, by my invention I overcome all this difficulty, and am able not only to produce the most delicate vignettes in any of the permanent processes, but I produce them just as cheaply and easily as plain prints, and without any of the additional mechanical labour or skill hitherto requisite in vignetting. Moreover, by my invention the means of controlling and determining the beginning and ending of the gradations, and their depth, is placed in the hands of the artist or operator while he is focussing the image in the camera, instead of being left to the judgment of the printer.

My invention consists in the employment of a translucent or reflecting screen or screens, illuminated and interposed during exposure between the negative and the sitter or object being photographed, the shape of such screen being determined by the form of gradations desired.

Opaque screens having neither translucent or reflecting power have before been tried, and they have the power of graduating the image on the negative into utter darkness—*i.e.*, that condition of the film on the negative which will be perfectly transparent and consequently yield the deepest tone in the print.

In my improved method of vignetting the screen employed has the power, although placed in the same position as those above referred to, of replacing every ray that it obstructs by other rays which it reflects or transmits into the camera, so that instead of producing a gradation into darkness it produces a gradation into a light or half-tone of any depth desired. The negative when finished will then print only vignettes.

In order to enable one skilled in the art to use my invention, I will now describe the operation. I place my sitter and proceed to take a head and bust portrait. Having posed, lighted, and focussed the sitter, I place the screen well out of focus, either outside the camera between the sitter and the lens, or inside the camera between the lens and the negative. If I use it inside I construct the screen of a translucent material with an aperture in the centre. The material may be gauze or net or other open work fabric, or tissue paper, or opal glass or other translucent material, the aperture being sufficiently large to allow the image of the head and the top of the shoulders to be transmitted uninterruptedly to the negative. The edges of the aperture may be graduated of different thicknesses or density, or the edges of the aperture may be jagged, the effect aimed at being to obtain a soft vignette into half-tone extending to the very edges of the focussing glass. I then give the negative the ordinary exposure and develope as usual. If the screen be placed outside the camera I may use either a translucent or opaque material. If translucent I fashion it in the same manner as that just described, but on a much larger scale, as it is placed much nearer the sitter. Or I may use a reflecting instead of a translucent screen of a white or light-coloured though opaque material, such as white cardboard or white opal glass or metal. The reflecting side should face the lens, its surface being exposed to either direct illumination or to reflected light from a mirror or mirrors suitably arranged. In this case the edge of the mask nearest to the centre should be cut in the form of long V-shaped teeth.

For varying the shape and size and depth of the vignettes I employ screens of different materials and forms; and in order to obtain the desired gradation I may use two or more screens of different sizes and shapes placed in front of one another.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—

1st. The herein described process of producing a vignetted photographic negative, graduated off into a light or half-tone, by the interposition during exposure between the lens and the sitter or object being photographed of a translucent or reflecting screen or screens, having an aperture of suitable shape and dimensions, substantially as herein specified.

2nd. The herein described process of producing a vignetted photographic negative graduated off into a light or half-tone, by the interposition, during exposure, between the lens and the sensitive surface of a translucent screen or screens, having an aperture of suitable shape and dimensions, substantially as herein described.

3rd. As a new article of manufacture a vignetted photographic negative graduated off into a light or half-tone, substantially as herein described.

Exhibitions.

PHOTOGRAPHIC SOCIETY OF IRELAND.

THE first exhibition of this Society was opened on Tuesday last, the 18th instant, in the fine rooms of the Royal Hibernian Academy of Arts, Dublin, which, by the courtesy of that body, had been placed at the disposal of the Society.

Their Excellencies the Lord Lieutenant and the Countess Spencer had intended to be present at the opening, but were prevented by unavoidable absence in London. A large number of the members of the Society and their friends were assembled in the afternoon to do honour to the occasion, which is a novelty in Dublin. Very general surprise and satisfaction was evinced on all sides at the magnitude of the collection gathered together, and which will compare favourably with the well-known Pall Mall display.

The number of exhibits, as shown by the catalogue, is 739, contributed by 135 exhibitors, and one recognises in the list the most famous English artists, sprinkled with a few foreign friends, and the more generally-known names of our best Dublin studios; while many well-known faces and suburban views beautifully rendered are there to charm those whose limited knowledge of the differences of platinotype, Woodburytype, and other processes deprives them of the technical pleasure only experienced by a photographer. To those familiar with the displays of recent years at Pall Mall and other well-visited exhibitions, many old friends are recognised with renewed pleasure, and most of the medal pictures of this year are to be seen amongst the collection. Photographic novelties like Mr. C. V. Shadbolt's *Balloon Views* (Nos. 159 and 164), and *Lightning*, by Mr. Auty (No. 140), open up the question as to where the possibilities of photography may stop.

In walking round the rooms, with so much to admire, it is difficult to avoid omitting to notice much conspicuous merit; but No. 7, entitled *The Young Dodger*, by Mr. W. W. Winter, is a clever *genre* group; and *The Miser* (No. 10), by Mr. W. Gillard, recals the well-known scene in the *Cloches de Corneville*. A fine frame of *Yachts* (No. 14), by Messrs. West and Son, of Cowes, shows what may be done in this particular direction; and the *Chittywee*, of Pall Mall fame last year, which is amongst them, has in our opinion more than one rival. A beautiful frame of *Fans* (No. 16), by the Autotype Company, is hung too high for comfortable inspection, which is much to be regretted; and, although it is usual to abuse the hanging by those to whom its difficulties are mainly theoretical, we must say No. 240 hardly deserves a place in an art exhibition. With this and a few other trifling exceptions—which, we suppose, are unavoidable, owing to the short time usually at the disposal of the Committee—the work has been exceedingly well done, and the general effect is decidedly good, while the exigencies of the individual frames as to correct placing has not been overlooked.

Mr. W. H. L. Skeen. of Ceylon, we are pleased to see, by his contributing so largely to the Exhibition, has not forgotten his old photographic hunting grounds with incidental friendships, as shown in his pictures of tropical vegetable life (Nos. 297, 364, and 312); and, in his landscapes (Nos. 15, 64, and 18), his lines are cast in apparently pleasant places.

Mr. Booth Pearsall, in *Clouds*, on small plates (No. 24), and *Boats* (No. 269), has secured many pleasing studies which we may fairly expect to see reproduced on canvas.

Mr. George Mansfield contributes a collection of pictures in France and Spain (in all twelve frames) of high merit, and it is extremely difficult to make a choice; but Nos. 71 and 76, in our opinion, are the most worthy of praise for their technical as well as for their artistic merit. This is the best collection shown by any of the thirty-three members of the Irish society who exhibit.

Mr. McLeish (in Nos. 69 and 77) shows two of the best frames of landscapes in the room, amongst which the well-known *Misty Morning on the Wear* is certain to attract general as well as expert attention.

A Portrait of a Lady (No. 82), by Messrs. Robinson and Sons, of Dublin—a carbon enlargement—attracts and pleases very considerably, while the pose, or want of pose, leaves a sensation of something to be desired. It is, however, a fine work, and seems to command attention and praise.

Messrs. Marsh Brothers' *Study of Swans* (No. 191) and *Pigeons* (No. 195) are charming—the centre of a crowd whose attention is divided by *The Brighton Cats* of Mr. H. Pointer, who also shows in No. 98 some more of his favourites. We may mention that this latter is put down in the catalogue as a collodion plate. With the exception of some of the Glendalough pictures in 241 and 243, and a few others, wet collodion is practically unrepresented.

Mr. T. J. Dixon shows the well-known enlargements of the inhabitants in the Regent Park Gardens, and, as novelties in Dublin, are being much admired as well as for their photographic qualities. A fine enlargement (No. 112) by the Autotype Company (of whose magnificent contribution we shall have more to say hereafter) stands in a commanding position at one end of the large room, placed at just the right height for true effect.

Messrs. Chancellor, Lafayette, and Crantfield have each large portrait work, which will fully sustain the credit of Dublin studios as regards direct portraiture, and it is difficult to award the palm. Indeed, as the medals are to be given on the votes of the individual members of the Society, we think that the recording of the votes will not be such an easy matter as may have been originally intended; for in several sections, after some days' study, we are still undecided as to what is, for instance, the best portrait or instantaneous picture. We shall continue our notice next week.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.

THE third Exhibition of the above Association has been confined to members' work only, its main objects being the selection of a presentation picture and displaying the views taken at the outdoor excursions. For the latter the medal has been awarded to Mr. J. P. Gibson for the best set of three pictures. Any of this artist's work, except, perhaps, his Bywell views, might have been selected. *The Blasted Oak*, and *On the Allen Starward*, are notable for the juicy tone and careful treatment of the shadows. The *Barbican, Alnwick Castle*, is a very telling instance of the good which competitions of this nature may effect. The startling light piercing through the dark sky and the brilliant illumination on the side angle of the old tower quite throw into the shade others of the same subject taken on that particular excursion. Mr. Gibson's pictures in the main are, perhaps, complete, but the introduction of figures into one or two would have been acceptable.

Mr. J. Pike has a choice collection of his summer work, full of richness and transparency. *On the Devil's Water* is greatly aided by several barelegged urchins enjoying themselves among the boulders and pools. His bromide enlargement from *A View on the North Tyne* is remarkably soft, and its peculiar greenish tint caused by the glass on which it is mounted is rather pleasing in this case than otherwise.

Mr. E. Goold has won the extra prize with his *View of Bywell Castle*—an expansive, airy picture of the ruin on the Tyne. It is much enhanced by the treatment of two figures in a boat in the foreground. The poses are excellent and of bold size, and show another instance of the value of these competitions. In other views of this subject the boat is hauled up on the shore, serving no purpose but that of overbalancing an already one-sided composition.

Mr. Auty, besides his well-known *Lightning* picture, has some interesting scenes. *Shields Harbour* shows the steam ferry and crowded shipping very ably rendered. *The Iron Gates* is a fine composition of rock and trees, full of gradation and circling ripples on the water.

Platinotype prints are abundant in the Exhibition, but Mr. J. W. Robinson's, with the clear whites, deep blacks, and fine gradation in the skies carry the palm. *A View on the Tyne*, with the dark river, the massive shipping, and the old spires of Newcastle rising into a troubled sky, is very successful. *The Old Milkmarket* is also a superior production, and also many of his old Newcastle scenes.

Mr. Pae has some good effects. One is a *Sunset on the River*.

Mr. T. G. Gibson's *English School Life* shows admirable grouping of girls busy at their desks, with their teachers overlooking. In *Quarrying* two men are seen actively engaged in hewing out the huge stones. One of these men was killed half-an-hour after the view was taken. The earth came down with a sudden rush and buried him.

Mr. A. L. Steavenson is represented by some Welsh scenes and a sparkling view *On the Conway*.

Mr. Galloway's exhibits are numerous and original. *The Return to the Village* is well chosen, showing a light trap running along the sea shore to a prettily-situated village ahead. His instantaneous farm scenes and fishing subjects will be invaluable to painters. *Looking Out* is very good. Two strong-armed young fishwives are leaning over the railings looking wistfully out to sea. They stand boldly out against a light sky.

Mr. Proctor's *Picture Without a Lens* has attracted considerable notice. It is a view of buildings, and it would be interesting, if taken again the same size with a lens, to compare the perspectives. The exposure was a-quarter of an hour with a pin-point aperture.

Mr. Templeton's exhibits must not be overlooked, for among them is a little gem of children wading and playing among the waves and rocks, entitled *Common Objects of the Sea Shore*.

Altogether the collection of exhibits has been satisfactory, but the number would have been greater if the restrictions had been less. Several members have been placed *hors de combat* in the presentation picture competition, owing to the conditions. The result of this latter has been determined by members' votes, the picture chosen being Mr. Edgar Goold's *Bywell Castle*.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
November 25 ..	Bolton Club	The Studio, Chancery-lane.
" 26 ..	Bristol Amateur	Studio, Portland-st., Kingsdown.
" 26 ..	Photographic Club	Anderton's Hotel, Fleet-street.
" 27 ..	London and Provincial	Masons' Hall, Basinghall-street.
" 27 ..	Liverpool Amateur (Ann. Meet.)	Free Library and Museum.
" 27 ..	Oldham (Annual Meeting)	The Lyceum.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AT the meeting of this Society, held on the 13th inst., Mr. A. Haddon occupied the chair.

The CHAIRMAN, in opening the proceedings, observed that the special object of the meeting of the evening was to judge of the transparencies which had been produced by different methods from identical negatives. Members would be able to form an idea of the capabilities of the various processes illustrated, both for the purpose of making lantern slides and of producing enlarged or reproduced negatives.

Messrs. C. and F. DARKER provided a pair of oxyhydrogen lanterns, and the plan adopted for making comparison was to throw upon the screen the image of one transparency alternately with that from another. Any two that were thought to be similar in quality were repeatedly compared, and upon the first set (those from a negative of a steamer and shipping on the Thames) being gone through, the three which were considered to be the best, and the quality of which was considered to be equal, were handed to the Chairman, who announced that two of them had been produced by the collodio-albumen and one by the wet collodion process. The portrait series was then passed through the lantern, with the result that three were selected. One of these, which was, except as to colour, generally considered the best, was stated to have been produced by the Woodbury process, and the other two, which were very warm in tone, were by the gelatino-bromide process and the gelatino-chloride process respectively. Others showing a certain beauty of tone, which caused inquiry to be made as to the method of their production, proved to be upon bromide plates of a slow kind, expressly prepared for transparency making and developed with hydroxylamine. The formula for development being inquired for, it was stated to be—

Hydroxylamine	1 grain.
Caustic soda	2 grains.
Bromide of ammonium	4 ,,
Water	1 ounce.

After the display a hearty vote of thanks was accorded to Messrs. Darker and the members who had prepared the slides.

It was announced that at the December lecturetto night Mr. W. E. Debenham would discourse upon the subject of *Avoiding Reflections and Granularity in Copying.*

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PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

On Thursday evening, the 13th inst., the Exhibition of the Photographic Society of Great Britain was open in aid of the above Association. With a charge of sixpence admission the gallery soon presented a very animated appearance, over 300 visitors passing the barrier.

At nine o'clock the Society's optical lantern was brought into use, and a series of most excellent transparencies were exhibited. Mr. W. F. Donkin, the Hon. Secretary of the Photographic Society of Great Britain, very kindly described the different scenes.

At the conclusion an admirable transparency of Mr. J. Glaisher, taken by Mr. Mayall, was put upon the screen.

Mr. H. J. Thorne, Deputy-Chairman of the Photographers' Benevolent Association, in a short speech informed the visitors that it was owing to the kindness of the President and Council of the Photographic Society of Great Britain that the Photographers' Benevolent Association were receiving the benefit from the Exhibition and the use of the lantern, and asked them to join him in thanking those gentlemen, and also those who had very willingly lent the slides which they had seen that evening. The request was most cordially responded to.

For the information of those unacquainted with the facts, the objects of the Association are to assist members, their wives and children, when in distress through sickness, death, or want of employment, by means of immediate grants of money; to grant annual pensions to aged members, and to aid the unemployed members in obtaining situations. Employers requiring assistants are requested to communicate with the Secretary. Photographers, professionals and amateurs, and assistants are eligible for membership, on their own application, subject to the approval of the Board of Management. *Subscriptions* — Members 10s., payable yearly, half-yearly, or quarterly. Donations of any amount will be received. Further particulars may be obtained upon application to W. Harland, Secretary, 181, Aldersgate-street, London, E.C.

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GLASGOW AND WEST OF SCOTLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

The usual monthly meeting of the above Association was held in their rooms, 180, West Regent-street, on Tuesday evening, the 11th instant,—Mr. Hugh Reid, President, in the chair.

The following new members were admitted:—Messrs. J. R. Reid, David McSkimming, J. Bertram, Jas. Lumsden, Wm. Gray, John Conbrough, Arch. Auld, A. Brown, G. Logan, A. McDonald, Jas. Logan, and Geo. Sheriff.

Mr. W. Goodwin then read a paper on *Isochromatic Plates,* and passed round some very interesting results, which impressed the members very favourably. He (Mr. Goodwin) also read a short paper on *A New Developer* [see page 743], and demonstrated the change of colour before the meeting.

At the request of several of the younger members of the Association,

The Chairman repeated his demonstration of the platinotype process with great success. He gave all particulars regarding license, paper, printing, &c., and developed a number of prints, which were distributed amongst the members present.

The nomination of officer-bearers for 1885 was then proceeded with, the voting for which will take place on Tuesday, December 2nd.

It was agreed that ladies be admitted members of the Association at a reduced rate Ladies joining in December will have the right of exhibiting at the forthcoming exhibition in the middle of December.

This being all the business, after the usual vote of thanks the meeting was adjourned.

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MANCHESTER PHOTOGRAPHIC SOCIETY.

The ordinary monthly meeting of this Society was held in the Society's rooms, at the Manchester Technical Schools, on Thursday, the 13th inst., —Mr. John S. Pollitt, President, in the chair.

The minutes of the previous meeting were read and confirmed. The following gentlemen were elected members of the Society: — Messrs. Thomas Parkinson, James Brown, William Oram, William Hartley, Thomas William Steventon, O. E. Taylor, Deakin, William H. Farrow, W. Linnell, J. T. Foster, George Sington, John Stephenson, Abel Heywood, Jun., J. E. Iliff, and C. T. Faulkner.

Mr. J. W. Leigh exhibited a negative in illustration of the method of effecting local reduction by means of friction with methylated alcohol, and the same mixed with Tripoli powder.

In fulfilment of a promise made some time since, Mr. A. Brothers, in a few words, described the daguerreotype process, and showed how the silvered plates were polished, sensitised, developed, and fixed. Mr. Brothers then proceeded to explain the collodion process for the benefit of those members of the Society who had joined since the discovery of the gelatine process, and to whom it was supposed the older process was almost unknown. A portrait of the President, Mr. J. Pollitt, was taken by magnesium light, and a number of photographs were shown in the lantern to illustrate the value of the process for making lantern slides. The lantern was manipulated by Mr. Greatorex, and many of the members, including the President, showed many beautiful slides—those of swans, by Mr. Pollitt, being much admired. One of the members was heard during the exhibition to exclaim—"Wet collodion has scored one this evening!" and there could be no doubt that the process is well adapted to produce the most perfect results.

The meeting terminated with the customary vote of thanks to the gentlemen who had contributed to the interest of the meeting.

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BOLTON PHOTOGRAPHIC SOCIETY.

The November meeting of this Society was held at the Baths, on Thursday, the 6th inst.,—Mr. R. Harwood in the chair.

Messrs. J. Lomax, Jun., J. A. Walker, G. W. Walker, and R. Dickinson were elected members of the Society.

Dr. Johnston exhibited a number of prints from negatives taken during a recent visit to Norway.

It is intended to hold an "open" meeting on December 4th. Members are requested to bring as many *good* slides as possible.

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PHOTOGRAPHIC SOCIETY OF IRELAND.

The annual general meeting of this Society was held on Friday last, the 14th instant, in the Royal College of Science, Dublin,—Mr. Herbert Bewley in the chair, The report of the Council was presented as follows:—

Annual Report.

In once more presenting to the members of the Photographic Society of Ireland their annual report, the Council have again to announce the increase of members of the Society, who now number seventy-three, without counting those to be elected this evening.

The following papers were laid before you during the session:—*Isochromatic Plates*, by Greenwood Pim. *Enlargements on Gelatine Argentic Paper*, by McGhie and Bolton. *A Visit to the Pall Mall Exhibition*, by A. Conan. *On the Relative Value of Stops*, by Dr. Scott. *Further Notes on Isochromatic Plates*, by Greenwood Pim. *A Retrospect of Photography*, by C. W. Watson. *On Enamelling*, by J. V. Robinson. *Willesden Paper*, by Greenwood Pim. *A Home-made Actinometer*, by Dr. Scott. *On Photographic Lenses*, by Howard Grubb. *Through Derbyshire with the Camera*, by C. W. Watson. In addition, a varied collection of apparatus and photographic novelties have been exhibited at our meetings, which, on the whole, have been fairly attended.

The Council would prefer to see the work of contributing papers for the meetings more generally distributed amongst a larger number of members, and have to express their thanks particularly to those on whom this duty has devolved.

The annual lantern exhibition, held in March last, was as usual a great success, all the pictures shown having been taken from negatives the work of members of our Society.

It having been thought advisable to hold several short excursions on Saturday afternoons instead of the annual field day, arrangements were made, and Howth, Lucan, the Valley of the Liffey, and Glen Druid were visited. We regret, however, that the attendance at the last of these meetings was not sufficient to justify their continuance to the end of the season. We consider that we may with great confidence congratulate you on having been the means of organising the photographic exhibition, which is to be opened on Tuesday, and which, in our opinion, is one of the best collections of photographs that has ever been brought together, and we feel confident that it cannot fail to elevate the standard of our art, and be of considerable service to photography in Ireland.

The annexed statement of accounts shows our financial position:—

Statement of Accounts for the year 1884.

Dr.	£	s.	d.	Cr.	£	s.	d.
To Balance from last year	£39	19	1	By New Lanterns	£18	0	0
,, Subscriptions	34	10	0	,, Lantern Slides	6	10	6
,, Entrance Fees	6	0	0	,, Lantern Exhibitions	6	13	8
,, Arrears	8	0	0	,, Stationery and Printing	3	15	5
,, Subscriptions in advance	3	10	0	,, Attendants	2	13	0
				,, Stamps	3	13	0
				,, Incidentals	0	5	6
				,, Balance	50	8	0
	£91	19	1		£91	19	1

We have examined the above account and compared it with the vouchers, and find it correct. The balance to credit of current account is £50 8s.

Samuel Baker,
Thos. H. Curtis.

14th November, 1884.

The following gentlemen were elected members of the Society:—S. Geoghegan, C.E., H. Magee, and Francis S. Hall.

Mr. John L. Robinson then read a paper entitled *A Week in Suffolk*, being an account of the trip of the British Architectural Association for the present year.

Mr. Greenwood Pim, Hon. Secretary of the Exhibition Committee, announced the particulars as to the opening of the Exhibition on the 18th inst., and the meeting was adjourned.

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SHEFFIELD PHOTOGRAPHIC SOCIETY.

The monthly meeting of the above Society was held in the Masonic Hall, on Tuesday, the 4th instant,—Mr. W. B. Hatfield, President, in the chair. After the usual business,

The Chairman preceded Mr. Foxon with a few remarks on what he thought the best way of spreading useful and practical assistance among the amateurs of the Society. He hoped the members would assist him in keeping closely to the subject selected for each evening, and bring forward in the term any experience or knowledge on the subjects they could, trying on all occasions to avoid expensive apparatus, complicated formulæ, and technical symbols. Most of these members had plodded through their homely experiments on the many subjects that would be brought before them, and the plain statement of the results would in many cases be of great use.

Mr. Foxon gave a lecture and demonstration on *Enlarging on Argentic-Bromide Paper*, and made a very careful description of the apparatus he was going to use. He spoke on the many different ones in vogue, but for simplicity and cheapness, combined with good results, it was generally admitted that his was a very good one.

Many of the members took part in the questions and discussions, among whom were Dr. Morton, Councillor Firth, Messrs. Pilley, Turner, Gilley, Bacon, and others.

Two excellent enlargements were made and finished from half-plate negatives, the light being a two-wick paraffine lamp and a six-inch condenser. A square bellows camera and a Ross's symmetrical whole-plate lens was used, the paper being pinned on an ordinary drawing board.

After the lecture a vote of thanks was proposed by Mr. Firth and seconded by Mr. I. S. Yeomans.

The subject for the December meeting was then discussed, and decided to be *An Exhibition of Photographic Lantern Slides, and How to Make Them.*

The meeting, which was the largest the Society ever had, was then adjourned.

LEEDS PHOTOGRAPHIC SOCIETY.

A meeting of this Society was held on Tuesday, the 11th instant, at the Yorkshire College. The alteration in the date of meeting was made to enable the members to spend the evening with Messrs. Bridge and Brooks, of the South London Photographic Society, who were in the town on that day.

The President (Professor Thorpe, F.R.S.) invited the members, with Messrs. Bridge and Brooks, to tea at five o'clock. There was a very large attendance. After an excellent tea a very hearty vote of thanks was passed to the President; after which the members, under the guidance of Dr. Thorpe, proceeded to view the various departments in the new college, and much admiration was expressed at the completeness of its arrangements.

At eight o'clock the ordinary business of the Society commenced, Dr. Thorpe in the chair.

Mr. J. W. Reffitt, Treasurer, then read his financial statement, from which it appeared that £21 15s. had been received as subscriptions, and £11 19s. 1d. expended in printing, postage, &c., leaving at the date of the audit £9 15s. 11d. in hand. The books having by rule to be audited in October, several items of expenditure were not included in the above, by means of which the balance will be reduced before the close of the year.

Mr. Butterworth was elected a member.

The Chairman then called upon Messrs. Bridge and Brooks to give their lantern demonstration. The lantern—a triple oxyhydrogen—was manipulated by Mr. Brooks with his usual ability. Mr. Bridge exhibited slides on gelatino-chloride plates showing the different tones to be obtained by this process; Mr. Brooks, slides prepared by his collodio-emulsion process; Mr. Pocklington, some very peculiar results obtained by toning gelatino-bromide plates with gold, uranium, &c.; Mr. Ramsden, transparencies on gelatino-bromide plates, his own preparation; Mr. J. W. Reffitt, slides on gelatino-bromide plates.

Mr. W. Teasdale showed some detached gelatine films, prepared experimentally by Mr. W. B. Woodbury some years ago, which could be produced on a large scale at a very reasonable price if there were a demand for them. He expressed regret that such a convenient means by which a lecturer could have all his illustrations consecutively arranged in one small portable roll, and so pass them panorama fashion through the lantern, had not met with such recognition and adoption as it merited.

A very hearty vote of thanks was passed to Messrs. Bridge and Brooks for their demonstration.

Votes of thanks were also passed to F. Ritson, Esq., and E. Schunck, Esq., for allowing the members of the Society the privilege of photographing in their grounds.

The technical meeting of the Society will be held on Thursday, December 4th, and the Secretary (Mr. Thomas. W. Thornton, 22, Carr Road) will be glad to receive for exhibition novelties in apparatus, &c.

Correspondence.

MAGIC LANTERN TRANSPARENCIES.

To the Editors.

Gentlemen,—In your issue of today I notice that the Rev. H. Victor Macdona gives the result of some experiments on the production of lantern transparencies on ordinary gelatino-bromide plates. I am very glad to see his letter, as every successful experiment in this direction proves that amateurs have the power in their own hands of producing beautiful slides from ordinary materials. The utmost credit I deserve in the matter is that of again reminding your readers of the real value of the two formulæ in combination. The soda developer I have to thank Mr. Genlain for, and the clearing solution is known to me as that of Mr. B. J. Edwards. The two in conjunction enable any one possessed of the necessary skill to produce admirable transparencies, and to entirely overcome the effects of over-exposure.

I may inform your readers who are interested in this question that another old formula aids materially in producing clear transparencies. Take—

Sulphite of soda (pure)	120 grains.
Water	30 drachms.
Pyro.	30 grains.

Before adding the pyro. make the sulphite of soda solution neutral to test paper with citric acid. I have tried this, using one drachm of this solution to one ounce of the soda developer. The pyro. solution is so clear that a clever friend has suggested that I have omitted the pyro. altogether. It, however, developes perfectly, and stains neither the plate nor the fingers.—I am, yours, &c., H. Norwood Atkins.

Liverpool, November 14, 1884.

LANTERN TRANSPARENCIES AT THE EXHIBITION.

To the Editors.

Gentlemen,—I have to call your attention to the extraordinary action of the Photographic Society of Great Britain in respect to the medal offered for lantern slides at the late exhibition. The medal has been awarded to Mr. Gale. I have written to the Secretary to protest against it, on the following grounds:—1. That the slides exhibited by Mr. Gale were not qualified for competition. 2. That if they were they were not worthy of the medal. 3. That they were not submitted to the whole of the jurors.

The first of these objections is founded upon the conditions under which the medal was offered—that the slides for competition should be sent in by a certain date. They do not appear either in the original uncorrected catalogue or the second corrected edition. I am also in a position to show that they were not in the possession of the Society at anyrate up to the 6th October, 1884, the day upon which the exhibition was opened to the public.

A series of slides by Mr. Gale were exhibited *on the screen* on that evening, I believe; but they were not the slides which were afterwards shown, and for which the medal was awarded.

The second objection applies, of course, still more forcibly to the first series of slides which were shown on the screen as Mr. Gale's, as they were in every respect far inferior to the final selection. I wish to give Mr. Gale every credit for the real artistic feeling which dictated these slides, but affirm that their technical defects were sufficiently great to render them unworthy of the distinction of a medal.

As to the third objection, I am in a position to prove the fact. To this the Photographic Society may reply that the medals awarded to Mr. Gale and Mr. M'Kellen were extra medals. I should also add I have no objection whatever if *the* medal had been awarded for the slides actually sent in for competition. It is absolutely impossible for any one knowing anything at all of the subject to deny that there were at least two frames of slides, which were entered strictly in accordance with the regulations, worthy of a medal. The fact is that I—and I believe all the other exhibitors without exception—feel deeply aggrieved at the want of consideration or common courtesy allotted to us by the entire management of the lantern show, both last year and this.

Professional slide makers know that the optical lantern must become the great educational instrument of the future, and sent their slides in for exhibition on the faith of the Society's prospectus, fully expecting that their merits would be fairly judged and that the public would thereby become acquainted with the progress made in so very important a branch of photography. Neither they nor the public wanted that ridiculous nightly apology for directing the Society's lantern from its special purpose (of spectrum analysis in connection with photography!) to the comparatively base use of showing photographic transparencies.

The conditions laid down—that the negatives and transparencies should be the work of the same operator—were extremely ill-advised. The proof is that the exquisite slides of Mr. Brooks from Mr. Donkin's negatives would have been thereby shut out. The complete absence of all other conditions show either consummate ignorance of, or utter indifference to, the great importance of the class. However, many excellent slides were sent in for competition, strictly in accordance with the Society's conditions, and the manner in which their claims have been ignored is an unpardonable insult to others besides.—I am, yours, &c., George Smith.

Colebrooke-row, London, N., November 17, 1884.

To the Editors.

Gentlemen,—Some time before the opening I received a prospectus of the coming Exhibition of the Photographic Society of Great Britain, and in it I saw there was a medal offered for lantern transparencies, and thereby I was induced to send. In the prospectus there was a special notice, printed in blue ink—no doubt to give it importance. *It was to this effect:*—"Special notice.—By order of the Council. The rules and regulations respecting the Exhibition are to be strictly adhered to; therefore no picture will be received after nine o'clock p.m. on Thursday, September 25th."

All this is plain and straightforward, and its meaning cannot be misunderstood. The judging and awarding of the medals were in due course, except in the department for lantern slides, and the judges did not, or would not, meet—from some unexplainable cause—to make the award, which entirely deprived all the competitors of any criticism from the outside press, which is of very great value at times to the professional photographer. Such being the case, the medal or award is almost valueless. When I found that no award had been made I communicated with the Hon. Secretary on the matter, asking whether the judging would take place, as I hoped it would not be a "sell." His reply was that the judges would meet as soon as convenient and make their award.

After a time I received another note stating that the judging would take place on Monday, November 3rd. I also received a notice in due course from the Assistant Secretary, asking me to select not more than twelve slides from my *present* exhibits in the Exhibition to go before the judges. I replied to the effect that as I had only twelve slides on exhibition I would submit the whole to the judges. Living some twenty-five miles from London it is not convenient for me to go there at a short notice, and I am not in town every day. I did manage to look in about eight o'clock in the evening, but could not get a sound as to the result of their judgment; but it was being whispered about that several others were included in the competition, including Mr. Gale. I at once asked the Assistant Secretary whether it was a fact that Mr. Gale had been admitted as a competitor, which he acknowledged. I then made the remark that he was not an exhibitor of lantern slides. His reply was "Indeed he was," *which I knew to be absolutely incorrect.* His name does not appear in the corrected edition of the catalogue as an exhibitor of lantern slides, neither could I find anything on exhibition on the tables with the other competitions. The corrected edition of the catalogue I received about three weeks after the opening of the Exhibition.

I think, in admitting parties in this way, to say the least of it, is disgraceful and unfair. I contend that all awards ought to be made before the opening of the Exhibition, *or not at all*, for the reason that the judges mix up with the general public and hear their opinion, which has an undue influence on them—I do not mean intentionally. I should like to ask, through the medium of your columns, who else was admitted to the competition in a similar manner, and why was any one admitted after reference to the special notice which I referred to, printed in blue ink? The fact is simply this: intending competitors sent in their exhibits in due time, in accordance with the prospectus, as the written law. The judging was not done at the proper time. It was open to other parties to see all that was in competition, and then bring in what they considered better, as has been done. I should also like to ask who invited Mr. Gale to send in under these unfair conditions. Some one must have been at the bottom of it.

As for myself I should scorn such an action to send things in under these conditions and accept an award; but, apparently, others are not of my way of thinking. I believe the President is morally responsible for the very unfair way in which this competition has been conducted. One of the Lantern Committee told me that the Monday evening lantern exhibitions were a paying concern, and I should suppose that that led them to offer a medal as a bait to get slides on purpose to make capital out of the exhibits at the expense of the contributors. I know for a fact that my slides have been paraded on the screen night after night. I now leave the matter in the hands of your readers for their verdict.—I am, yours, &c.,

Laurel Villa, Wray Park, Reigate, WM. BROOKS.
November 15, 1884.

RECENT RESEARCHES IN STELLAR PHOTOGRAPHY, &c.

To the EDITORS.

GENTLEMEN,—On re-reading the very interesting paper *On Stellar Photography*, by the Rev. T. E. Espin, which appeared in THE BRITISH JOURNAL OF PHOTOGRAPHY of the 7th inst., it strikes me that there are several points which, for the sake of clearness, should be further explained, some of the statements appearing contradictory.

At the top line of page 715, Mr. Espin says:—"Increased sensitiveness of the plates is more important than either size of aperture or lengthened exposure;" while a few lines lower down he says:—"It is obvious that the increase of aperture is of more consequence than either increase of exposure or sensitiveness." These sentences appear to me to be so contrary and so "mixed up," as our American friends would say, that I fail to see at what the Rev. Mr. Espin is driving.

Again: he says—"But increase of aperture means increase of focal length." This does not necessarily follow, the focal length depending entirely on the quality of the glass and the curves to which its surfaces are ground. Those of your readers who take an interest in this branch of science would, I am sure, appreciate any explanation of these paradoxical statements.—I am, yours, &c., W. HORSEMAN KIRKBY.
November 18, 1884.

THE SOUTH LONDON PHOTOGRAPHIC SOCIETY.

To the EDITORS.

GENTLEMEN,—Kindly allow me space for a few lines on behalf of the above Society, because I am afraid, in my anxiety not to keep the audience waiting for Mr. Taylor's lecture on *Florida* at our last meeting, I scarcely made myself as plain as I could have wished.

What I intended to point out was that the present "scare" about the Society ceasing to exist is the result of a groundless and unauthorised report circulated some months since to the effect that the Society could not be kept on after the loss it had sustained by the death of its late President, and would cease at the end of the year; and so widespread has this idea become that, although we have held our meetings as usual, everyone seemed to consider the Society as practically dead.

As a matter of fact there is no more reason for the Society ceasing to exist now than there ever was; and if half as much exertion had been used to improve its meetings as to circulate reports of its dissolution it would never have been in such good condition as at present.

That a difficulty sometimes exists to obtain papers is, of course, true, and always will be, while those to whom we used to look years ago for help take all their interest and information to the societies meeting weekly. But there must be many who do not belong to these societies who would be willing to help, and it is to these we mainly look for assistance.

I have already received several promises and many valuable suggestions; and if our new Committee will only be unanimous in their desire to make some personal exertions for the Society's benefit, and endeavour to increase the number of really useful members, there is no reason why the Society should not yet enjoy many years of prosperous existence. It has in times past done much for the art of photography and introduced or popularised the efforts of most of our best-known men, and, if properly managed, will continue its useful work.

Trusting that as many members as possible will attend our annual meeting on the 4th December, and that we shall have a large number of pictures sent in for the artistic competition,—I am, yours, &c.,

East Lodge, Dalston, London, F. A. BRIDGE,
November 18, 1884. *Hon. Sec. and Treasurer.*

HYDROKINONE.

To the EDITORS.

GENTLEMEN,—After many experiments and meeting difficulties, which I need not specify here, but which I have overcome, I beg to offer the following formula:—

Saturated solution of carbonate of potass	4 ounces.
,, oxalate potass	1 ounce.
,, oxalic acid	10 minims.
Or,	
Liq. potass, B. P.	25 minims.
Solution of hydrokinone............................	2 drachms.
	= 2 grains.

The curious part of the above is that either alkali or acid will do to mix with the other ingredients. You can develope with carbonate of potass and hydrokinone alone, but it seems impossible to avoid "comets," and is slow. The addition of the oxalate, if it do not prevent development, takes so long that it would be useless as a practicable developer.

Hitherto the difficulty in all my experiments has been to avoid comets, or spots, and no amount of care and filtering prevented them. But with the above formula there is nothing of the kind; I get a clean, even negative. I have fixed with cyanide of potassium, fifteen to twenty grains to the ounce.

In conclusion: I think the great superiority of hydrokinone over pyro. is that, whatever density you may develope the negative to, the just and true relation between the shadow and high lights is maintained. After fixing I still find a soak in alum (saturated solution) improves the negative.—I am, yours, &c., W. T. F. M. INGALL.

Notes and Queries.

A. E. COE inquires concerning gas bottles and condensing pumps. He ought to put himself in communication with Messrs. W. H. Oakley and Co., Grange-road, Bermondsey, who are the makers, so far as we know, of appliances of this nature.

F. JOSEPHS writes for information concerning the class to which certain photographic lenses named by him belongs.——In reply: We have not the advantage of being acquainted with the lenses he specifies. A note to the maker will doubtless secure the information.

"CAN nitrate of magnesia be mixed with nitrate of silver? and is there any advantage in this admixture when employed in photographic printing?—W. D. S."——In reply: we have never heard of this mixture except in the form of "*sel clement*"—a photographic nostrum which, about fourteen or fifteen years ago, was brought to this country from France. There is no doubt that the two nitrates can be mixed, but we do not consider the magnesia addition any more useful than the nitrates of soda and potash which, twenty years ago, elicited several letters and clever articles in the pages of this Journal.

"I HAVE been making some attempts at portraiture by magnesium light, but am baffled by the light going out just when wanted. Is there any way of preventing this?—YORKS."——The magnesium lamps sold contain a small spirit lamp combined with them, which, once alight, helps to keep the magnesium always burning. There is, however, a mode of treating the magnesium ribbon (which we suppose you use) so as to cause the combustion to continue without a break. This is simply to sandpaper it on both sides till quite bright. The treatment removes the film of oxide formed, and materially assists even combustion.

M. FRASER desires us to submit the following to the readers of our *Notes and Queries*:—"I wish to know how to produce a photograph on a dry plate having the acted-on parts of a pure semi-transparent white, the marked parts being clear glass. If it can be done on a dry plate I should prefer it, as I am only a dabbler in photography, and have not the means of working collodion, nor the skill. The nearest I have seen to what I want is the collodion positive on glass, but any I have seen are not pure and translucent enough in the white. I thought of trying a white pigment in the Woodburytype, but found on trial that the colour of the acted-on gelatine completely spoiled the colour of the white, white being so easily dirtied. According to what appears in the Journal, so many different tints can be obtained with gelatine plates that I have some hope you may be able to assist me."

"WHAT remedy have I against a professional photographer who fraudulently advertised a wide-angle lens for sale, which, when I fitted it in my camera after I purchased it, I find will not take a wider angle than my old landscape lens?—VICTIM."——Are you a victim to anything but your own ignorance? You accuse a man of dishonesty because you say his wide-angle lens will not take a wide-angle view in your camera. We recommend you, before making such a strong accusation, to borrow another camera capable of taking a picture twice as large as your present camera will hold, and then to report to us. The chances are that the lens will then take a wide angle. If a man sold you a telescope capable of showing objects twenty miles away you surely would not accuse him of fraud if, upon trying it in your own billiard-room, you could not see beyond the opposite wall? Yet this is precisely what you are doing. A "wide-angle" lens means a lens that is *capable* of taking a wide angle; but you must give it a chance by using a plate sufficiently large. If your size of plate be circumscribed you must get a shorter focus lens, which may still be a "wide angle."

Geo. Smith (Dudley).—Our correspondent is thanked for th information concerning the trial of lenses.

G. G. inquires—1. What kind of quarter-plate lens is the best to use to enlarge from quarter-plate negatives?—2. I have a 12 × 10 Dallmeyer's triplet. Would that be suitable to enlarge from cabinet negatives?—3. Is it an advantage to use a diaphragm in enlarging, or not?—4. Would it be injurious to use zinc dishes in enlarging work?—5. Will you kindly tell me why the enclosed picture is yellow, and what is wrong with it?——In reply: 1. Any good quarter-plate portrait combination.—2. The triplet will answer the intended purpose, but it will be much slower than a portrait lens.—3. This is a question involving judgment. If the lens employed will not define sharply all over the picture, make use of a diaphragm.—4. Zinc dishes may be employed when working with chemical solutions which have no action upon zinc.—5. We are unable to reply to this query unless supplied with a full statement of the circumstances under which the picture was produced.

"Bromo" puts several queries concerning eyepieces for focussing, to which we shall reply as plainly as possible. He wishes the eyepiece to be sufficiently long to enable him to keep his head beyond the tailboard of the camera, and yet to transmit an image from a wide-angle lens which falls near the margin of the focussing-screen. The former of these conditions can only be secured by employing, as the glass for focussing, the eyepiece of a tolerably large terrestrial telescope of low power—such a telescope, for example, as that known as a "one-draw marine," in which there is good light but a low degree of magnifying power. If our correspondent possess mechanical ingenuity he will be able to devise and construct means whereby he can, when examining the image at the margin, be enabled to direct the eyetube towards the lens to an extent sufficient to have the image transmitted to the eye. Otherwise a single lens, such as that employed by watchmakers, will have to be employed.

Phileus inquires:—"On what does the principle of aplanatism in a lens depend?"——We reply: As popularly understood, an aplanatic lens is one in which the corrections are made in such a perfect manner as to cause the marginal rays to be brought to a focus at the same point as those transmitted through the centre. Were we inclined to be hypercritical it would not be very difficult for us to show that the term "aplanatic" (without error) is correct in only a modified and very limited sense, because, as a matter of fact, any lens may be rendered practically aplanatic if its diameter be reduced to a sufficient degree. Aplanatism ought to have relation to aperture—by which we mean that some standard proportion between diameter and focus should be determined upon as regulating the subject of aplanatism. For example: One lens—say, an object-glass of a telescope—of three inches diameter and a certain focus may be aplanatic, and to render a second lens of the same focus aplanatic its diameter would have to be reduced to two inches, while in the case of a third a still further reduction would have to be effected. And yet they may be all said to be "aplanatic," as the current phraseology goes.

"I use a lot of gold in the course of a year—more, I think, than I ought. Is there no way of recovering the gold that does not get used up? My printer says it is no use doing anything.—J. Hicks."——Your printer makes a great mistake, more particularly if your consumption of chloride of gold is, as you believe, in excess of the actual requirements of your prints. A print toned to a certain stage will only take up a given amount of gold, no matter how large or how strong or weak your toning bath. If your bath be frequently renewed or replaced by a fresh one the chances are that you throw away a residue of considerable value. For the future, though you need not save wasting water after toning, by all means save every particle of old toning bath. Pour it all into a large bottle and, if left long enough, it will precipitate without help; but it is better to expedite matters by adding some strong solution of sulphate of iron. A bluish-looking precipitate which makes its appearance is pure, or nearly pure, gold. It must be allowed to settle well (being a fine precipitate a day or two may be needed), the supernatant liquid poured off, and the precipitate collected in a filter. This precipitate may either be washed and redissolved in *aqua regia* or sent to the refiner when a sufficient quantity of it has been collected. In the former case it will be desirable to weigh the gold—which can be readily done by "tearing" the filter first—so as to know the amount held in solution when dissolving, as it is of no practical use to evaporate to dryness for the sake of finding the amount of chloride. The simplest method is to reckon two grains of chloride for every grain of gold, that being the proportion usually guaranteed in commercial samples.

Exchange Column.

I will exchange the fifth edition of Captain Abney's *Instructions in Photography* for small tin plate boxes to hold sizes up to half-plate.—Address, C. W. Clarke, 32, Market-place, Devizes.

I will exchange a *carte* rolling-press, by Cox, for a good pair of small scales, glass pans, or hand magnifying glass.—Address, J. T. Peters, E. Stephenson-street, North Shields.

I will exchange copies of my medal picture for any other medal picture exhibited in Pall Mall this year, size 12 × 10 or 24 × 18.—Address, Geo. Renwick, 20, Station-street, Burton-on-Trent.

I will exchange a Marion press, for *cartes* and cabinets, or a whole-plate portrait lens, or a 12 × 10 set of autotype apparatus, for anything useful.—Address, J. H., photographer, 1, St. Mary's-place, Castle Gate, Berwick.

I will exchange a thermometer for testing liquids up to 220, by Dring and Fage, warranted correct, for a standard scales and weights from one grain, glass pans complete.—Address, George Bunn, 26, Gensing-road, St. Leonard's-on-Sea.

I will exchange an excellent nine-foot bagatelle board, in mahogany, with panelled back and pockets, nine ivory balls, and two cues complete, worth £9, for a first-class modern portable camera and lens, whole-plate or 10 × 8 preferred.—Address, E. C., 365, Lodge-road, Hockley, Birmingham.

A pair of telephone transmitters and receivers, with batteries and bells complete, in exchange for a biunial lantern of the best make; also a Francis's photo-chromoscope, for testing stereoscopic slides, for anything useful photographic, lantern slides, &c.—Address, J. Schofield, Heaton Mersey, near Manchester.

Answers to Correspondents.

☞ Correspondents should never write on both sides of the paper.

Photographs Registered.—

William Pankhurst Marsh, Norfolk Cottage, Bognor.—*Five Photographs of Breaking Waves;* also *Photograph of Upper Bognor Road.*

Lux.—Your former letter must have miscarried. Kindly repeat the query.

T. T.—Yes, if the pictures bear your name and address, and really have been made copyright.

P. R. S.—1. No. The boiling process has superseded it.—2. The method does answer, but it is not largely practised.

Lantern Slide.—We may possibly have an article on the subject on some future occasion. We cannot do justice to it in this column.

D. W. G.—Full details of the manipulations have appeared quite recently in the Journal. You cannot do better than read them carefully.

Col. Gubbins.—The glass mentioned by you will be perfectly safe to use. We imagine you will get an ample supply of light without glazing the whole of the window with the expensive glass.

John H. Astley.—We have had no practical experience with the instrument in question. We do not know if the maker will exchange it for another. Why not write and ask the question?

Cambrian.—1. Evidently you have not properly focussed the image.—2. Possibly both lenses will fit the same flange, but we have not the instruments before us to test.—3. No doubt the picture may be improved by better printing. The printing is much at fault.

Colesweges.—The plan answers very well, but we prefer to dry the plates spontaneously. Good methylated spirit will answer very well. After use the spirit can be treated with the carbonate of potash, but this must be perfectly dry. We do not think the spirit will injure the dishes if the japan be of good quality.

Louise.—Doubtless, from what you say, the fault arises from your not timing the exposure properly. You either under- or over-expose the pictures. We do not know of anyone who will give you instruction. Better write to Messrs. Morgan and Kidd, and perhaps they may be able to assist you in the matter.

Argol.—The bee's-wax is about the best protection you can use. Its looking "smeary" is because you have not sufficiently polished it after it was applied. Try the encaustic paste, a formula for which will be found in the Almanac for the current year. The remark does apply to the citro-chloride. Methylated spirit is right. It requires very slight washing only.

J. Cowell.—Without knowing full details of the production of the prints it is next to impossible to surmise the cause for their fading so rapidly. It may proceed from the washing being insufficient. This part of the operation, as is frequently the case, may have been delegated to careless assistants; they sometimes shirk their work, and this may possibly be the cause. An acid mountant may also be the cause of the fading. The mounts also may possibly contain something deleterious, which can only be ascertained by making an analysis.

Received.—James Robb; J. Mahoney; J. Bowler. In our next.

Photographic Society of Great Britain.—The next monthly technical meeting of this Society will take place on Tuesday next, the 25th instant, at 5a, Pall Mall East, at 8 p.m.

Photographic Club.—The subject for discussion at the forthcoming meeting of this Club, at Anderton's Hotel, Fleet-street, on Wednesday next, the 26th inst., will be—*On Forgotten Processes.*

OUR ALMANAC.—We are requested by the Publisher to state, in reply to some communications received from former advertisers, that he will endeavour to make room for such advertisements as shall reach him by Monday next.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1282. Vol. XXXI.—NOVEMBER 28, 1884.

THE BICHROMATE DISEASE AND ITS PREVENTION.

There is no doubt that, since the question of the deleterious action the bichromate of potash has upon the skin of some carbon printers has been brought prominently before the medical profession by so eminent a member of it as Dr. Richardson, with whose observations we have from time to time kept our readers *au courant*, the subject has attracted much greater attention on the part of photographers than it has done hitherto.

Since the article on *The Bichromate Disease* appeared in our issue a fortnight ago, we have been asked by several correspondents who employ the salt only to a limited extent—as in the production of lantern slides by the carbon process, and occasionally a carbon print or two, or an opal picture by the "dusting-on" process—if there be, in our opinion, any actual danger of their contracting the disease which, from the published details, they say (and rightly, too, from what we have seen) must be of an exceedingly painful nature. One correspondent—a professional photographer—who employs both the carbon and dusting-on processes in his business, says:—"I would at once relinquish them if there really be any risk of such a disease as that described and illustrated in the last number of the *Asclepiad*, either to myself or to my assistant." He adds:—"I have used these processes for several years without either of us experiencing, as yet, any inconvenience whatever therefrom."

Now, from what has been published, and from what we have been able to ascertain from other sources, it appears that in some extreme cases the sufferer who has contracted the disease in its worst form has actually had to relinquish his profession altogether and seek another avocation. This, of course, is a very serious affair for one whose livelihood is dependent upon his labours, particularly if by taking a few simple precautions at the proper time the evil might be averted. On the other hand, we are assured that some persons have practised carbon printing continually for a great number of years without ever experiencing the slightest inconvenience; hence it is clear that the disease is not necessarily a result of the employment of the bichromate.

In order to avoid any unnecessary alarm—which the published accounts of the disease might have a tendency to create in the minds of those who may occasionally employ the salt by way of experiment, or in the minds of others who use it constantly in their daily avocations in larger quantities and under different conditions—we deem it advisable to offer a few remarks on the subject, and also to point out how its injurious action may be avoided; and that, too, with the least possible inconvenience in working.

In some processes in which the bichromate is used in photography it is necessary to pulverise the salt in order to get it into solution. In doing this the finer particles are apt to be diffused through the atmosphere, and eventually to be inhaled through the nostrils. This, as many of our readers are already aware, causes a violent irritation, often resulting in an unpleasant or even a painful fit of sneezing. In the manufactories where this dust always abounds more or less its inhalation leads to far more painful consequences; but the limited quantity ever likely to be inhaled in photographic operations will, probably, never entail anything like serious inconvenience. However, while the irritation lasts it is decidedly unpleasant, and it can easily be avoided. Dr. Richardson advises that a mask should be worn to prevent the inhalation of the dust; but this is by no means necessary in the case of the small amount that may be raised from the limited quantity of the salt usually pulverised for photographic purposes. Moreover, the formation of any dust at all may be avoided by a very simple expedient. All that is necessary is to very slightly moisten the crystals with water before commencing to pound them. A few drops of water sprinkled over several ounces of bichromate will effectually prevent the formation of any such dust as would fly about, and at the same time it will not render the powder perceptibly moist.

With regard to the use of cold solutions of the bichromate, MM. Chevalier and Bécourt state that provided there be no abrasion of the skin the hand may be immersed in it with impunity. As a matter of precaution, however, we strongly recommend that if the hands or the fingers be immersed in the solution, as they often are in sensitising carbon tissues, they should, immediately such operation is finished, be well washed in water made slightly alkaline, either with a few drops of ammonia or a crystal or two of common washing soda. This should be followed by plenty of warm water and soap, and copious rinsing under the tap. In washing the hands care should be taken that the wrists also be washed, so as to ensure the entire removal of any bichromate that may accidentally have got splashed upon them. By this simple precaution not only will all risk be avoided, but the yellow stain left on the skin by the bichromate will be effectually removed.

In dealing with the solutions generally, under which head would be included the development of carbon pictures, Dr. Richardson recommends the employment of an impermeable glove. When gloves are not used our advice is that the operator should always make it a practice, immediately after developing a batch of prints, to thoroughly wash the hands and wrists (and arms, too, if they are likely to have become contaminated) with warm water and soap—oil soap by preference, as it renders the skin more supple and less likely to chap in cold weather. The skin should be well scrubbed with a stiff nail brush, and the water used should be somewhat hotter than that employed for the development of the pictures. After the hot water a final rinse with cold will be an advantage.

As we mentioned in the previous article, india-rubber gloves are now being worn by several carbon printers who have previously suffered from the disease. From what we can learn the gloves are by no means so inconvenient to work in as many might suppose. Therefore, we strongly advise all who are constantly employed in carbon printing to obtain gloves immediately the first symptoms of the disease makes its appearance if they have not been in use previously, and not to wait until it has assumed formidable proportions before remedial measures are adopted. It may be well to mention again that the first symptoms of the disease—and they are said to be unmistakable—are a violent itching on the backs of the fingers and between them, and sometimes on the inner portions of the wrists, more particularly when the hands are warm. When this occurs no time should be lost in avoiding further contact with the solutions in any form, and the prevention lies in the wearing of india-rubber gloves.

In the foregoing remarks we have principally had in our mind the use of the bichromate, as employed daily in professional photography; but the question has been put by more than one of our correspondents, namely—"How is the bichromate likely to affect the amateur who only employs it occasionally?" To this we reply, somewhat emphatically—*Not at all.* So far as we can learn it always requires several months (often years) of continual working to develope the disease. However, if there happen to be an abrasion of the skin, and a strong solution of the salt comes into contact with it, a sore is at all times liable to be produced unless the bichromate be immediately washed out. A sore so produced is, as a matter of course, totally distinct from the disease itself.

In concluding this subject we strongly recommend all who have to deal with the bichromate of potash, whether in small or large quantities, to adopt every reasonable precaution to avoid any of its unpleasant effects, and to bear in mind the maxim that in all cases "prevention is better than cure."

TELESCOPES AND PHOTOGRAPHY.

We resume our consideration of the subject opened out in our last, when we left for further treatment in the present number the instrumental conditions governing the use of photography for astronomical purposes. We described the results hitherto obtained in solar photography, the immense excess of light in which class of work was the only difficulty, while with stellar work defect of light was the main obstacle.

It is obvious from our description of the painfully laborious method, by which only Mr. Common was able to execute his world-famous picture of the nebula in Orion, that a greater rapidity of execution would facilitate such tasks in every way, and render the results, if not more perfect—that were impossible—at anyrate more easy and certain of attainment. We should, then, not alone be able to shorten the time during which the observer's attention would be required, but far greater facilities would be given, in many ways, for increasing our store of knowledge of the stars.

For some little time past the attention of astronomers has been given to the possibilities of photography for star maps—perhaps more especially so since the interesting photographs of the great comet of 1882 taken by Dr. Gill at the Cape Observatory. Many stars of small magnitude were distinctly visible in these pictures, and it was soon perceived that an extension of the same mode of procedure would place within our reach a valuable record of the whole starry vault in which possible human fallibility could have no place.

The extent to which eye observation and the record of the pencil may err is well shown in the memoir by Professor Holden, which we quoted some time ago when alluding to Mr. Common's photograph. He had examined every drawing extant of the nebula in Orion, and had come to the conclusion that they afforded no information as to whether any change whatever had taken place in the nebula, or whether it had greatly altered since the first observation. With photographs no such doubt could exist, and thus the most interesting of all problems, the genesis of a star, could, if change were taking place, be noted from age to age by the unerring certainty of the camera.

It must be remembered that for such records to be strictly comparable they would need to be executed under precisely similar conditions in the recording agent, the film, and always by the same silver salt, although by taking a series of pictures with different exposures—a method which Mr. Lockyer terms "contouring"—it will, as he points out, enable us to employ any otherwise suitable silver salt.

To obtain such series readily a considerable increase in our present lens power would be highly desirable, and in the article to which we have called attention Mr. Lockyer suggests the lines upon which it would have to be built. Telescopes are, as our readers well know, of two kinds—reflecting and refracting. In the latter the rays are collected by a large object-glass and examined by the eyepiece; but in the former a mirror is used in lieu of the object-glass. The image given by each kind of instrument differs considerably: in the reflector a star appears as a dazzlingly bright spot or point from which irregular rays shoot out—most likely due, we imagine, to the structure of the crystalline lens of the eye rather than, as Mr. Common suggests, to the effect of a bright point upon a small portion of the retina; but in a refractor the image is of sensible diameter.

We have brought before our readers from time to time the progress of the great Lick telescope—a refractor—and the difficulties attendant upon the manufacture of the mere disc of glass alone before it is worked at all have been found so great that it is doubtful if a lens much exceeding three feet in diameter will ever be made. Then, again, with a large lens increase of size means increase of light absorption through the greater thickness of glass, liability to irregularity in the glass itself, the effect of which would be to blur the image, and finally increased difficulty in correcting the lens for colour imperfection, in which would result in defective definition.

In a reflector all these difficulties would be avoided, for the larger the mirror the greater would be the light and the better the definition and separating power. Again: Mr. Common points out, an object-glass requires a focus twice as long as is necessary with a reflector of the same diameter, and this means a light reduced fourfold—another element of slowness in photographing.

As regards the possible size of a reflector, mirrors three and four feet are already in existence. The power to increase their dimensions depends only upon the power to cast glass of the required size. Its optical character may be entirely disregarded, as its surface only is needed to be ground to shape, and it is then covered over with a thin coating of silver by one of the well-known precipitating processes. Unfortunately, at present, Mr. Lockyer says, there is only one place in the world—and that place not in our own country—where a very large piece of glass can be cast, and even there the possible piece would not much exceed the dimensions of existing glass mirrors. Experiments, however, are being made to utilise porcelain.

Mr. Lockyer has made the suggestion that a telescope of proportions far beyond anything hitherto made, or even imagined, should be constructed for photographic work entirely. When officially engaged in France, he gave data to the manufacturers sufficient for founding estimates upon, and he considers that for ten thousand pounds a reflecting telescope eight feet in diameter might be constructed. From the fact that, as regards eye instruments, it would be quite possible to conceive of a telescope, not greatly exceeding in size existing instruments, that would be too large for eye observation, while every increase in size in a reflector would actually increase its photographic power, the value of such an instrument will be easily seen.

Ten thousand pounds is an immense sum for a telescope, but Mr. Lockyer points out that little further cost would be entailed, and that the actual outlay for the purpose indicated would be far less than will be involved in refracting instruments now being constructed of less than thirty inches diameter. Each will require an observatory to work it in, which will cost, perhaps, forty thousand pounds, and seriously diminish its usefulness; while this telescope of the future could be more advantageously worked from a hut costing a hundred pounds. What a wonderful prospect for scientific photography is thus opened out!

We may conclude our survey by quoting Mr. Lockyer's descriptive anticipations of the powers, and value of such a wonderful instrument for scientific research:—"This eight-feet reflector I would make an instrument fitted only for such researches as those which Dr. Huggins and Mr. Common have shown us to be possible. I would then, by means of electro-magnets or what not—it is a perfectly simple thing to settle—get an arrangement by which a photographic plate could be sent up, capable of coming down again after a certain time with ten, twenty, or thirty different images impressed upon it if you wished. If it came down with one photograph as good as those which Mr. Common has enabled me to show * * * I for one should be perfectly content. * * * This dream—this beautiful dream—lacks all chances of realisation at the present time for want of glass—for want of the application of the arts to astronomical research."

PHOTOGRAPHY FOR NEWSPAPER CORRESPONDENTS.

A field in which photography is capable of development, if facilitated by the exercise of inventive genius in a particular direction, is that of an aid to the correspondents of illustrated newspapers. At present it is used to some extent, more especially in relation to architectural subjects and landscapes, also as an auxiliary power; but representations of stirring scenes in human life are usually done by hand by good artists, and at considerable expense. In such scenes the light may not always be suitable for photography, as in interiors or gas-illuminated subjects, but even in daylight hand-drawn sketches hold their own. A chief reason for this is that the saving of time in getting off news is nearly as great an object on a good illustrated weekly journal as it is upon a morning newspaper, and it is much quicker to dash off an outline sketch in pencil, slip it into an envelope, and start it at once, than it is to get with rapidity anything in the shape of a good positive in a form fit for transmission by post.

The chief impediments to the use of photography by the field correspondent are the delay and work involved in printing the positive, as well as the fact that all his materials for printing must pack into small compass, and be light enough in weight for a good stock to be carried on his person for a day without inconvenience.

Where but moderate expedition is necessary, and the correspondent is within the area of the international parcels post, as good a method as any for starting a positive photograph with expedition is to defer the complete washing of the negative from thiosulphate of soda until another day, to dry it quickly by the aid of alcohol, to print a transparency on another gelatine plate which can be expeditiously finished and dried in the same way, and then to start it by post. All this can be done, and has sometimes been done, with but little loss of time beyond the delay by parcels post. There would be difficulty and sometimes prohibition in sending glass from the continent by letter post; moreover, customs regulations interfere with that plan. As yet, England is not connected with the international parcels post system, and any postage parcel from the South of Europe to London is usually booked to Ostend or Calais only, on arrival at which place it has to be re-booked to reach England. The late Postmaster-General recently promised that as soon as possible his department would bring this country within the international parcels postage system It might be thought that it would be quicker to send small parcels direct to England by the regular express trains, but in some foreign countries the railway officials absolutely refuse to receive small parcels, the carriage of such being a government monopoly. By continental post a small parcel started from the South of Europe is four, five, or six days in reaching London.

From this it follows that some kind of paper or other flexible surface is necessary on which to print the positive, so that it may be sent by letter post, and risk of injury to it by breakage be avoided. The pictures being sometimes obtained at exceedingly heavy cost to the proprietors of the journal—as, for instance, in representing scenes of the war in Egypt—any risk of damage is a most serious matter. All these circumstances, then, point to the fact that flexible films, capable of development by the same liquids used for the negatives, may have a future before them for newspaper purposes. The present impediments are—that when the films are of gelatine they are so thick that they take a much longer time to dry than a recently-washed gelatino-bromide negative, and that the emulsion used is usually too rapid to give the best class of transparency. When a gelatine film is coated with collodion on one side in its manufacture it curls up when placed in the developing solution, because of the unequal expansion of the two surfaces, and this is troublesome. Most positives on gelatinised paper have a sunk-in look. What, then, is wanted is a sensitised film for transparencies which can be dried with rapidity after fixing, which does not curl at any part of the operations, which gives good contrasts, which can be printed by candle-light, which is little liable to tear or stretch when handled while wet by the fingers, and which can be developed by the same solutions as those used for negatives. Concentrated sulphite of soda and pyrogallol solution is good as regards small bulk and light weight, and when properly made and properly used gives exquisitely-clean negatives and transparencies. It will even develope paper pictures without leaving a stain.

Another point in quick newspaper work is that the camera shall be one which can speedily be fixed in position ready for use, every half-minute saved in time over this being a valuable point gained. The present tourists' cameras are capable of improvement in this respect. Among other modifications they require some arrangement for changing the lens instantaneously, without screwing and unscrewing; otherwise for quick work something on the principle of the gun camera must be used without a stand, although there are objections to the employment of such a weapon when it can be avoided.

In nothing more than the inauguration of new, and the work done by old, photographic societies can the impetus that modern photography has gained by its new methods of work be seen. For one photographer half-a-dozen years ago there must be at least a score of greater or less ability at the present time, and in consequence of this increase societies must naturally be formed for mutual interchange of ideas and instruction. Nowhere more than on the banks of the Mersey can we expect to find successful photographic work, and hence we hail with pleasure the establishment of a new society at Birkenhead—a busy centre, and a convenient meeting-place for the many residents upon the Cheshire shore of the estuary. With the veteran Mr. J. A. Forrest at its head, and a number of well-known names at the Council board, we believe we may safely predict a long and useful career to this latest-born society—"The Birkenhead Photographic Association"—and we cordially wish it every success.

A foreign contemporary describes a neat little photographic view-meter, the invention of M. Rossignol, devised, it is stated, to avoid the common trouble of finding upon setting up camera and tripod that the view, pretty though it appear to the eye, is not suitable for photographing. The apparatus is like a single opera-glass fitted with a rectangular aperture in lieu of an object-glass, while the sliding tube is fitted with a plano-convex at the view end and a plano-convex at the eye end. Upon looking through the instrument the view is perceived, and, owing to the construction of the lenses, upon a reduced scale; the aperture in front forms limiting lines capable of including more or less subject according to the distance the sliding tube is withdrawn. The instrument first requires to be set by adjusting the slide for each lens of the photographic outfit; that is to say, the camera and lens being set up for use, and the amount of view embraced noticed, the meter is adjusted to include precisely the same extent of subject, and a mark then made upon the tube. This is done for each lens, and, once arranged, a glance at the instrument will always tell what portion of the landscape would be photographed upon a plate the full size the camera will take, though, of course, marks might be made on the tube to correspond for each size of plate. It is obvious, too—though the fact is not noted—that the instrument would be useful in a converse way. Given a certain view to be included upon the plate, a glance at the meter would show the particular lens that would need to be employed.

"The clock of the future"—in all probability the near future—will include no more the time-honoured A.M. and P.M. Already what may be termed the "twenty-four o'clock" question is assuming considerable importance upon the railways in America. Journeys there sometimes, as we know, occupy days rather than hours and this interlapping and intermingling of *ante* and *post* become most confusing. In all likelihood, a day beginning at one o'clock and ending at twenty-four o'clock will be the usual mode of reckoning time, and when established it will save much inconvenience. The first important step in this direction in this country is to be taken at Greenwich. For many years there has been a timepiece there counting the hours in this manner; but from the first of January next this mode will be official. January, 1885, will begin immediately after midnight, and end at twenty-four o'clock.

At the last meeting of the Royal Microscopical Society Mr. Lewis Wright exhibited a most interesting adaptation of the optical lantern in the shape of a new lantern microscope. By means of his new arrangement, used with the oxyhydrogen light, he was able, with lenses down to half-inch aperture, to exhibit a variety of interesting microscopic objects which displayed the minutest markings with a perfection little short of that given by the microscope itself. The members present were highly pleased with the demonstration, which was admitted to surpass anything of a similar nature before attempted. There can be no doubt that, if it were needed, the arrangement would be quite sufficient for the photographing of microscopic objects, the whole secret of which lies in their due illumination.

The photographing of objects beneath the surface of the water has often been discussed, but in the most recent important attempt, in Scotland, it may be remembered a failure had to be chronicled—not through want of light, but owing to the presence of mud. For some time past experiments have been made in the clear water of the Lake of Geneva, and the latest report, by MM. Fol and Tarasin, of experiments carried out a couple of months ago is that one hundred and seventy metres—or, perhaps, a little more—is the depth to which light penetrates, the luminosity at that point being about equal to that of a clear, moonless night. It is, however, to be observed that assuming Professor Tyndall's theory of the colour of the ocean to be correct—the selective filtration of the waves of light by particles decreasing in size as the water deepens—it is evident that at the depth named, although luminosity ceased, rays of the violet end of the spectrum would still gain admission, and so photography be rendered possible, if need be, at still greater depths.

A correspondent writes to the *Athenæum* that it is not only in England that "the photographers of the shed" have had exceptional privileges accorded to them, as he was informed that a photographer at Bruges had met the same fate as the Fine Art Company. There is, however, another and important aspect under which the matter has to be viewed. The bulk of these copies are of more value to students than to any other class; but where is the value to students of the highly-retouched prints which MM. Braun send out as copies of the originals? And where is the chance of the student purchasing them at the price at which they are issued—fifteen francs each the correspondent in question believes them to be?

We would ask why does not Government undertake the photography of the pictures of our National Gallery? Photographic copies of every valuable picture the nation possesses should be available at all the public art galleries and libraries in the country. It is difficult to imagine a better mode of spreading a knowledge and a love for art among the people, and the cost would be by no means great. If there is not a sufficiently large staff at South Kensington it would be no difficult matter to find skilful English photographers who would be glad to undertake the work.

A great deal seems to be made of the difficulty of copying pictures through glass; but granted a good and sufficient light and clean glass and we do not see why any trouble need be made on that score. It is our purpose to make a few practical remarks upon this subject in our next.

The weather is a subject of perennial interest to the photographer, and the present year has been most remarkable for its peculiarities. In the columns of *Nature* for last week we find a very interesting tabulated account of the weather of the year, in which, for the first time that has come under our notice, we find a complete account of the rainfall for the year as far as the end of October. With the exception of the first quarter, when there was an excess of rainfall in all directions except over the midland and south-eastern counties of England, the whole year has been unprecedentedly dry. The rainfall has been below the average in every part of England, and in consequence the water reservoirs of the kingdom are in a very low state. In Manchester the night supply has been cut off, and in Bradford a water famine has been imminent. All this is very trying to photographers, who generally like to leave their prints washing all night. Still a good-sized cistern will overcome most difficulties, and it must be remembered that a couple of hours' washing with a machine that periodically empties itself is of more value than a dozen hours' mere turning of the tap on to a vessel full of prints.

The Times of the twenty-fourth instant has an article of an unusual nature—one interesting to all photographers, amateur and professional alike—a descriptive account of photographic printing in its present aspect, including an account of a new secret process. Touching briefly upon mechanical printing, and upon autotype and platinotype, it states that, practically, there has not been for twenty years past any improvement in the process by which the vast majority of photographs are produced, that of silver printing, and the writer describes a method he has seen in operation at Messrs. Marion's which is based upon that of Mr. Morgan, of Greenwich. The article goes on to state that, though Morgan's paper has come into extensive use, its cold, greenish hue has prevented it from securing the favour of a public educated to a liking for the rich purple and chocolate hues of ordinary photographs. The new process of Messrs. Marion, however (which it states is to be worked as a secret), is said by the writer to give tones which will be admired by all. The print, made by development, is purplish when developed, but requires gold toning to enable it to pass the ordeal of the fixing bath, and when finished, though not quite so good as the best silver printing, would require an expert to tell the difference. It concludes by saying that—"Having regard to all considerations, it may be expected that the albumenised paper will still hold its own for the finest work, and for work in summer when the light is bright and abundant; but the new paper will in all probability come largely into use for winter work, and it ought to be used by all portrait photographers for sending out 'proofs' at once of their portraits."

The balloonists claim to have scored at last in the attempts on the eighth instant by MM. Rénard and Krebs in their new balloon. M. Hervé Maignon states that, though the wind was blowing eight kilometres an hour, the balloon attained an absolute speed of twenty-three kilometres an hour; and he considers the problem of aërial navigation as practically solved. M. de Bruignac believes that they failed to fulfil the important condition of the approximation of the centres of traction and resistance. We shall see.

At the last meeting of the Photographic Society of Great Britain that careful experimentalist, Mr. L. Warnerke, gave his testimony in favour of the practical value of the carbonate of potash developer when used according to his formula, which resembles that adopted upon the continent by some who are clever at research. Its theoretical value is admitted, because it enables the operator to make a developer of fixed strength, instead of a solution which is liable to variation in consequence of the volatility of ammonia. Probably the discrepancies in the testimony of many who have tried the carbonates of potash and of soda may be due to impurities in the samples used, for these salts are liable to contain impurities which interfere with development, and it is not impossible that Mr. Warnerke's abolition of a bromide as a restrainer with these salts may be necessitated by foreign matters in his samples. The mode of manufacture of the carbonates of potash and soda renders them very liable to contain sulphates and chlorides, the latter being frequently present to the extent of between four and ten per cent. Potash salts are usually obtained from land and sea plants, sea water, felspar and other silicates, and the wool of sheep. They are so plentiful in the latter case that the sheep has the inestimable privilege of being an animal which supplies itself with a kind of natural soap, so that by the aid of a little water it can get up a good lather in perfect independence of advertising soap makers. Sulphate of potash, which is a retarding agent in development, is commonly present in carbonate of potash to the extent of thirteen or fourteen per cent., and in the potash of the Vosges it has actually been found to the extent of 38·84 per cent. by the analyses of Pesier. One of the purest varieties of carbonate of potash is made from cream of tartar—the acid tartrate of potassium found in grape juice. "Familiarity breeds contempt," so care is not always taken in photographic operations to work with pure chemicals and distilled water; yet that man alone who does so is entitled to speak with authority on the photographic influences of particular salts. The binoxalate of potash is easily obtained nearly pure; it should be further purified by recrystallisation, and then ignited in a silver or platinum crucible to yield the pure carbonate. The presence of sulphate of potassium as an impurity in any sample of carbonate of potash may be detected by adding a slight excess of diluted hydrochloric acid to it, then pouring in a little solution of chloride of barium; if sulphate of potash be present a turbidity is produced by the formation of sulphate of baryta. The presence of chloride of potassium is detected by the addition of a few drops of solution of nitrate of silver to the carbonate solution, which has previously been treated with sufficient nitric acid to give an acid reaction. The nitrate of silver then produces a white turbidity of chloride of silver in the nitrate of potash. Carbonate of potash is a deliquescent salt, and in purchasing it care must be taken not to buy in error the bicarbonate of potash, which is more commonly in demand in ordinary chemists' shops.

REFRACTING AND REFLECTING TELESCOPES.

The deep interest taken of late in connection with the subject treated in a leading article last week by us was well shown in a brisk and most interesting discussion which took place on the 14th instant, at a meeting of the Royal Astronomical Society, at Burlington House. The occasion was the reading of a paper by Professor Pritchard upon *A Photometric Comparison of Reflecting and Refracting Telescopes.* The observations made in connection with the recent eclipse of the moon led him to inquire closely into the cause of certain stars being noticed which were not in Dr. Struve's list. He discovered that the De la Rue thirteen-inch reflector only gave one, while the Grubb twelve and a-half inch refractor gave three, of these faint stars. These facts caused him to direct his attention to the relative capacities of the two classes of instruments in light-transmitting power, and, instead of finding upon investigation, as he anticipated, that the subject had been well worked out already, he discovered that comparisons hitherto made had been on such insecure bases that the results were simply conjectural.

He therefore arranged a plan for discovering the true relative value of reflectors and refractors in this respect, and he utilised for the purpose the two above-named telescopes, placing them, with his instructions, in the hands of two able assistants, Messrs. Plummer and Jenkins. Not to tire our readers with details, we may say that the results obtained were decidedly in favour of the refractors, in the proportion of 1·89 to 1 with the De la Rue reflector, and 1·5 to 1 when the latter was replaced by a Wish reflector, the latter being silver upon glass and the former speculum metal.

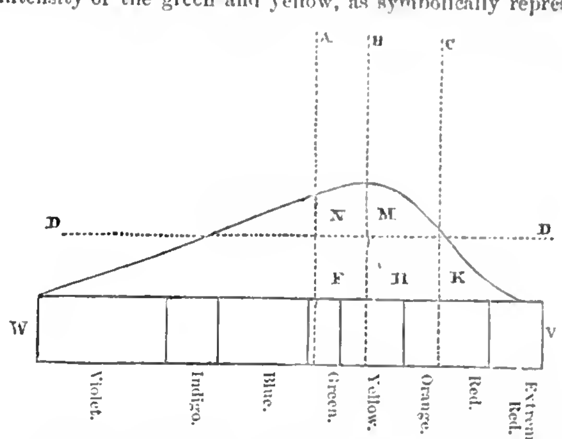
Before our readers accept these proportions as being conclusive and standard data as to the relative powers of the two classes of instruments, we would bring before them several points, including those brought into view in the discussion that followed the reading of the paper named. We have put before our readers Mr. Common's estimate of the relative capabilities of the two classes of instruments, and it must be borne in mind that in refractors increase in diameter brings increase of thickness in the glass, but no light-destroying defect in reflectors, so that the results of comparison between two twelve-inch telescopes would not hold good with larger instruments. Again: the observations recorded were eye observations, and it was pointed out by Lord Crawford that, for photographic purposes, there would be one reflection less than when the eye was employed; and Mr. De La Rue stated that speculum metal reflected more actinic rays than pure silver. Mr. Common put a question as to the positions of the wedge photometer when the comparisons were taken, and showed how the results could be made to vary according to the position of the wedge, whether in the focus or in the expanding cone of rays after passing the focus. The mirrors used were thirty-three and three years' old respectively, and it was argued that this fact would interfere with the results. Mr. De La Rue stated that his reflector was as good as new, and the Wish reflector equal to what it was when it left the maker. Silver, he said, did not tarnish when chemically deposited. Mr. Ranyard, however, said that his experience was contrary to this; for, though he kept his mirror closely covered up, he found it to deteriorate in a very few months. It will be thus seen that, though a very exactly arranged attempt has been made to compare reflectors and refractors, we are yet far from seeing an agreement come to on the subject among astronomers.

PRINCIPLES OF ILLUMINATION FOR DEVELOPING.

The great theoretical error of the past, which has for years led to the use of so much worse a light in the developing-room than is now proved to be practically necessary, seems to me to have been due to the overlooking of the fact that a reduced intensity of the yellow of the spectrum will give much more light to affect the nerves of vision than will the full-power red of the same spectrum from the same luminous source.

Fraunhöfer was the first to publish good measurements of the luminous intensity to the eye of the different parts of the spectrum. Let W V, in the accompanying diagram, represent the solar spectrum, and the curved line represent the luminous intensity of its different parts; its maximum intensity is denoted where the dotted line B crosses the curve above the yellow, a little on the blue side of the D sodium lines. Yellow glasses commonly transmit nearly all the rays between the blue-green and the extra red, and too often a portion of the blue. At all events they usually let through the light represented by N, M, F, H, K, and when they were selected with a little care they answered for the wet-plate process. When gelatine-bromide plates, with their great sensitiveness, came into use this light was found to fog them during development, so red glasses were adopted to cut off all the rays between A and C. An approximately safe light was obtained, but at the heavy cost of reducing the intensity of the light to that represented by the portion of the curve above the space K, and hence the injury to eyesight which so many photographers have found to be the practical result.

The right and alternative plan would have been to have lowered the intensity of the green and yellow, as symbolically represented



by the dotted line D D, cutting off the luminous intensity N M, and leaving for use F H K, for the benefit of the eyes. This is exactly what is done by substituting translucent lantern screens for transparent glass, combined with a source of light of low intensity, and explains why it is that all the new lights which have recently become so popular are produced by the aid of translucent instead of transparent screens. Indeed, with a thick paper giving much translucency even some feeble blue rays will pass without doing perceptible harm when the original source of light is not too strong, as exemplified in the case of "true canary medium," which is a bad screen as regards its colour, but owes its good character to its thickness.

The line D D serves to illustrate my meaning; but, as a matter of fact, a translucent white screen will not change the top of the curve into exactly a straight line. It will flatten the top of the curve, and, if the screen be of paper, linen, or other cellulose fabric, will cut off the extreme portion of the red, as I discovered by spectroscopic examination. The rest of the red it transmits liberally. Cellulose fabrics are very opaque to the luminous rays coming from a poker at a dull red heat. There is little luminosity in the extreme red rays; still, as they are comparatively safe for photography, it would theoretically, if not practically, be as well to save them by using a translucent screen containing no cellulose.

Fraunhöfer gives the following figures to represent the luminosity of the spectrum at the various chief solar lines:—Light at red extremity, 0·0; at B, 3·2; at C, 9·4; at D, 64·0. Maximum at dotted line B in my diagram, 100·0; at E, 48·0; at F, 17·0; at G, 3·1; at H, 0·56; violet extremity, 0·0. These figures of his can but be approximate, but they are near enough for the purpose of guiding experimentalists in improving the light of the developing-room. Helmholtz has proved that with care in arranging the appliances, and by placing the observer in darkness, the violet end of the spectrum can be seen far beyond the point at which it is ordinarily visible, and more of the red end of the spectrum can be seen by some persons than by others; hence all diagrams like that given herewith are not theoretically perfect, though amply good enough to serve as practical guides. Lord Rayleigh has discovered that in a spectrum taken from the light of a blue sky the different colours are not of the same relative intensity as when taken from a cloudy sky; there is more red in proportion to the green in the light from the sky when the latter is obscured by cloud. He finds that if lights from sky and cloud are of equal intensity at the line C in the red the first will be somewhere about twice as bright as the other at E in the green.

By means of alkaline albumen films stained with fluorescine great power can be exercised in regulating the kind of rays admitted into the developing-room; for, by gradually increasing the proportion of fluorescine in the solution used to coat the glass plates, the more refrangible rays are gradually cut off giving the power of cutting short the spectrum anywhere the operator chooses between A and C in the diagram. I, however, think it would be a great mistake to go farther than to cut off the bluish-green; for, if the light be then not safe enough for the purpose, the amount of general illumination should be reduced by interposing translucent colourless screens, or otherwise. If the fluorescine film be made abnormally intense in colour, it is a reddish-brown, transmitting only the red and a little orange. I prefer to obtain this effect, should it be required, by using a fluorescine film to cut off the spectrum to A only, then to superimpose a film of carmine. In fact, with separate albumenised films on glass, of fluorescine and carmine, the lower end of the spectrum may be cut short wherever desired, and the transmitted colours are pure and brilliant. Carmine is just like ruby glass in its optical properties for photography. When the film is not intense it is of a pinkish-red colour, like the ornamental articles of glass stained with suboxide of copper; when the film is more intense it is like the ruby glass in ordinary photographic use. Both let a little blue through when strained by an intense light like that direct from the sun.

A curious and little-known effect is produced when the rays of the spectrum as far as the dotted line A are admitted into the developing-room, for the green rays then slightly increase the yellow appearance of the light. In fact, if all the true yellow and a portion of the red were cut off, the room would apparently be illuminated with pure yellow light, so subject is the human eye to all kinds of illusions as to colour. Lord Rayleigh discovered this compound yellow. Mixtures of blue and yellow look green, as every mixer of colours knows; the fact is so familiar that it causes no surprise. Lord Rayleigh did not see why a mixture of pure red and green should not produce yellow, and, by using the pure red and green of the spectrum in proper proportions, he produced a yellow which fairly well matched the true colour. He made two varieties of special apparatus to do this; but the effect may be obtained in a simple way by filling a glass trough with a solution of litmus to cut off the yellow and orange rays, then adding solution of chromate of potash to cut off the blue and bluish-green. Only red and green rays then find their way through, and when the strength or thickness of the solution is so arranged that neither red nor green predominate the transmitted light appears to be yellow, although it contains no real yellow at all. He does not think it more unnatural to get a compound yellow in this way than to get a compound green by the ordinary method, and is of opinion that the bias given by constant experience is at the root of the apparent strangeness of the fact. Colour has a wonder world of its own. What is the explanation of the circumstance that a dark yellow is not generally recognised as such, but thought of and called by a new name—brown? Sir John Herschel first put this question, but where is tho answer? A dark blue is blue still.

The vertical lines separating the colour spaces in my diagram are but approximate, for no two men looking at a spectrum would select the same points as midway between each two colours, and numerous experiments in this direction, taking averages of the results, would, no doubt, reveal curious variations in the vision of different persons, not altogether ascribable to colour blindness. Robert Hunt amused himself sometimes by asking observers to note the central point between two colours, by indicating the spot with the point of a needle. Newton and Fraunhöfer each divided the length of the spectrum into 360 parts, and gave the following as the length of the space occupied by each colour:—

1. Red	45	—	56
2. Orange	27	—	27
3. Yellow	40	—	27
4. Green	60	—	46
5. Blue	60	—	48
6. Indigo	48	—	47
7. Violet	80	—	109
Total length	360		360

A common scientific error in experiments intended to relate to developing-room illumination is that of photographing coloured fabrics, under the impression that the effect they produce on the plate is a measure of their value as screens for the window of the operating-room. When this is actually the case in practice, in relation to two fabrics much alike to the eye, the result is a pure accident. The light reflected from coloured fabrics differs from that which they transmit, as readily revealed by the spectroscope. For instance: different coloured ribands reflect different amounts of unchanged white light which never enter the fabric at all. On the same principle it is a mistake to varnish the interiors of those developing-room lanterns in which reflected instead of transmitted light is used in photography. This may be proved by making a solution of a brilliant coal tar dye in albumen, coating a small glass plate with it, and, when the film is dry, allowing sunlight to fall on it so as to be reflected from the albumenised side to the ceiling. Two images will be formed on the ceiling—the one of them bright white from light reflected from the exterior surface of the albumen, and the other coloured by rays which penetrate the film and are then reflected from the back of the glass, through the film again, to the ceiling. It is not necessary even to varnish the film to obtain this effect. The inside of the Starnes's lamps should be as rough and unpolished as possible, necessitating a stronger initial light to obtain the same amount of illumination on the plate under development.

The light transmitted by fabrics also differs from the light they reflect, because of the influence of translucency, as well as because of the optical action of the colours themselves. Who can tell the colours of aniline dyes from the hues reflected by their crystals? Again: taking the common ruby glass of the photographer, samples of it are sometimes found exceptionally heavily charged with suboxide of copper, giving it a purple tint by reflected light when examined at a particular angle. The fact that such samples specially reflect some blue light is no proof that they transmit the same quantity of blue; in fact, these particular samples are the safest, because they keep out more blue than samples in other respects of the same make. Mr. Woodbury made a thick film of coloured gelatine which reflected green rays and transmitted red.

The principles laid down in this article are far-reaching. If they be true—and I think that time and experience will prove their accuracy—the theories of the past about the necessity for red light in the developing-room are false, and photographers have been blinding their eyes for years because of the erroneous ideas in their heads. These principles not alone condemn real glass utterly, but they go further, for they in a milder form condemn orange light also. They furthermore enforce that red or orange light is not the best for the manufacture of gelatine plates, over which a safe light is more necessary than for the short process of development. This point can be put to the test of experiment. It will probably be found that if the intensity of a light behind a translucent full-yellow screen of fluorescine is properly regulated, and two plates be placed respectively at such a distance from it and from the best red light as to give the same amount of fogging for the same time of exposure, the yellow light will be very much the brightest to the eye at its own fogging distance as compared with the visual intensity of the red light at its own fogging distance.

W. H. Harrison.

TRANSATLANTIC JOTTINGS.

The question of amateur photographers and the possible injury they may work to the profession is being discussed with considerable vigour on the other side of the Atlantic, and the editor of *Anthony's Bulletin* devotes some considerable space to a temperately-worded article upon the varions aspects under which the subject may be seen. He is evidently at one with us in the view we expressed some time ago that amateurs were a help rather than a hindrance to the professional photographer; but, at the same time, he points out that the conditions vary considerably between the east and the west of the States. We cannot put one view he presents better than by quoting from the journal itself, noting that the controversy has arisen through the stand taken by the gentleman whose name is mentioned:—

"Amateurs in the true sense of the word take up the art from a pure love of it, and practice without a consideration of reward. Such amateurs Mr. Melander, like all other wise and liberal-minded men, welcomes with his whole heart as valuable workers in the great photographic field. Unfortunately in the west, and especially in Chicago, there appears to be an army of so-called amateurs who from curiosity, love, the desire of gain, or some other motive have taken up the art, and who as soon as they can make a negative at once begin to canvass for *business*, proposing to make their newly-acquired art a means for increasing their income. Everyone understands, who knows anything of the universal rules governing the standing of amateurs in any branch of the arts, sciences, or of sports, knows that the moment one receives money for a performance, product, work of art, or it matters not what, that moment he ceases to be an amateur and becomes a professional."

These words are as apt as they are true; but, in our opinion, they add little weight to the argument against amateurs. Successful portraiture requires more skill, knowledge, and practice than landscape work, and there is too much vanity in human nature to allow the work of the average amateur to make any serious difference in the income of the professional photographer. It is well, however, to bear in mind the distinction between "amateur" and "professional," which is broadly stated in the above quotation.

The vast strides made by photography of late years, and the complete change that has taken place in dark-room modes, could not be better exemplified than it is in an article in the *Photographic Times*

(New York) under the title of *Ambrotypes*, which, as many of our readers will know, is the common designation in America for the collodion positive. We involuntarily referred to the cover of the journal to ascertain that the date was correct, and that we had not by accident picked up an old copy. But, no! the date was right, and there for perusal was a complete account of how to make a collodion positive, from the putting together of bath and developer to the final completion of the picture with black varnish or velvet! To old workers in photography this would seem a very useless article, but a brief consideration will show that in all probability the proportion of photographers who know nothing of wet-plate work is nowadays greatly in excess of those who are familiar with it, and that it may be useful to teach them the mode of working a process which gives really beautiful results. We do not think there is much likelihood of their taking it up, seeing that the apparatus of the day is quite unfitted for wet plates. Still, the resuscitation of the memory of an old process is interesting, and to the old hand will recal many an incident of the past. "Ah! those *were* the times!" said an old photographer to us; "no re-sits—money down!"

A suggestion is made by a writer in the same journal that "photographers would do their patrons a great favour if they would have the figures for the year printed upon the mounts in addition to name, &c. Photographs are, as a general rule, carefully preserved, and after a few years it is impossible for most people to remember just how long ago a particular photograph was taken. * * If photographers will adopt this suggestion the public will appreciate it, and everybody will wonder why it has not been done before." We can tell this gentleman why it has not been done before. It is because "it is impossible for most people to remember just how long ago a particular photograph was taken;" and when the portrait is one of a lady who once was young, and would be still, no effort of memory will enable her to date it more than two years ago. The photographer who carried out the method suggested would lose many sitters.

Professor Hough has been making experiments as to the relative rapidity of wet and dry plates. He first thought that twenty or thirty times represented the rate, but afterwards modified his notions. The conclusion he then arrived at was that they were one hundred and twenty-five times quicker, and the ground of his conclusion was, according to the President of the Chicago Photographic Association, that a picture of a landscape could be taken in the one-hundred-and-twenty-fifth of a second, while a wet plate took one second. At the same meeting where these remarks were made, Mr. Greene accounted for fog by supposing that the light which went in a straight line through a lens created the fog. When a lens was stopped down the straight rays were cut off, and only the oblique rays went through; hence the picture was sharper. These theories apparently did not gain any support, which we can scarcely say surprises us.

There is a distinctive peculiarity in American advertisements which almost enables them to be detected in a moment. When we read in a list of testimonials a letter from Mrs. ——, stating that "I value my *Photographic Times* next to my Bible," it strikes us as almost profane.

An interesting communication, by Mr. Carbutt, upon reducing the intensity of negatives, &c., is to be found in the *Photographic Times*, and in it he strongly recommends Mr. E. Howard Farmer's method with ferridcyanide of potassium and hypo.

The Photographic Section of the American Institute had an interesting conversational discussion upon founding a photographic library of reference works. The list of works suggested was rather "mixed," some of them being almost antiquated, and others only to be linked to photography by a great stretch of imagination. One of the members seemed to have noticed this, and he gravely "wished to add mention of the English Blue Book as being of great value to a library!"

We have on a previous occasion made mention of the war of tariffs which is being fought in some of the large cities of the United States, and we read that the President of the Illinois Photographers' Association recently stated that little as yet had been accomplished in the direction of fixing a "price-plank."

American photographers are more tranmelled by postal restrictions than we are in this country. "Book Post" is all that is needed here, but in America postal packages are divided into several classes; and this has led to a committee being formed to endeavour to secure a reversal of recent decisions which classified photographs as fourth class, instead of third class, as formerly. The late announcement is to the effect that "first-class postage must be paid on photographs which have been worked in *ink*, classing them as drawings." Vexatious restrictions such as these must seriously interfere with the business nature of large establishments as are are to be found in the States.

LANTERN SLIDES ON COMMERCIAL PLATES.

Part I.

In few, if any, shapes does photography play a more pleasing, interesting, or imposing part than when it takes the shape of a lantern picture on a good-sized screen. Scientific photography shows itself most valuable when it is used to throw on a screen enormously-magnified images of microscopic and often invisible objects, or objects visible only under strong powers of a good microscope. Possibly, observations on certain spectra can be made more easily, searchingly, and accurately in this manner than in any other. I am not, therefore, shooting over my mark when I say that in the optical lantern there is a power into the infinity of which man has hardly as yet more than dipped his finger; nor do I propose to dip deeply into the subject on this occasion. My remarks shall be confined to the methods of producing from ordinary photographic negatives "slides" which will give enlargements on the screen of landscape, portrait, *genre*, or marine subjects; in fact, of any subjects that can be photographed in the ordinary acceptation of the word.

Certainly one of the weak points of our art at present, as compared with the higher art of painting, is the smallness of our work. That a small work may be artistic I do not seek to deny, but a small picture in order to pass muster with the critics must be of a pitch of technical perfection most difficult to arrive at in painting; and, while I admit that technical perfection is more easily arrived at in small work by photography, I maintain that in most of our small work we lose some of the finest points that mark the work of the painter. We become "patchy" and lose breadth and vigour in our small work. That the lantern reproduces our small work in its true and original proportions of light and shade is certain, but it reproduces on such a scale that, whatever faults may be found with our work, "patchiness" is not likely to enter into the accusations against us. I know one thing as a certainty: so long as my smaller negatives can be copied as slides without losing any necessary parts of my composition which may happen to be near the edges of the negatives—so long, in fact, as my negatives can be properly squared or rounded—I have a much higher opinion of my own taste when I see my pictures as transparencies on a fifteen- or twenty-feet screen. Perfect sharpness of outline and detail is not, in my opinion, an artistic necessity—quite the reverse; and yet for some reason a small print out of focus is to me an offence, while the same picture slightly out of focus on a large screen is to me a "thing of beauty and a joy," so long as I see it. I leave it to more learned men than I am to give our readers the reason for this. It was my observation of these facts that caused me to turn my attention to lantern slide making in the first instance.

In the second place, I found very soon after I began to turn my attention to lantern slides (and that is not a year ago) that negatives absolutely or all but unprintable in silver, carbon, or platinotype yielded first-rate slides for the lantern. This discovery was the means of rescuing from the oblivion of garret and cellar many a negative that had cost me much trouble, but had to be thrown aside on account of technical imperfections. I find now that I can produce, either in the camera or by contact, a very fair slide from any negative that is not utterly ruined by thinness from over-exposure or any other cause. I also found that with perfect ease I could copy any part of a negative, so that where, for instance, I have a nice group of cattle in the centre of a large negative, I simply make a slide of the part I want, leaving out all the rest of what may perhaps be a worthless negative. This last view of the question I strongly insist upon. I have very many negatives almost perfect in one part and worthless in all the rest. And, lastly, when I have in view the illustration of some particular object or set of objects, I go in perfect happiness with a pocket camera and make small negatives in almost any weather, knowing that I shall be able to make slides from the negatives at a later period.

As an instance of this I may say that not long ago, being at Ayr, I wished to get some reminiscences of our poet Burns. There was a pretty high wind all the time, but I simply took rapid plates and "shuttered" all the views I wanted. Many of my negatives, being hard, are worthless for silver printing, but capital for slides. I do not, however, mean to assert that a bad negative makes the best slide. All I say is that a hard negative makes a very good slide. In my opinion, the perfect slide can most easily be made from a good negative rather on the hard than on the soft side; and this I apply to both contact printing and camera copying. I see that my preliminary remarks are already longer than I intended; but, as one "may as well be hanged for a sheep as for a lamb," I shall make two chapters of my subject.

There are many other points of advantage that may be claimed for slide-producing. It is not only eminently satisfactory when done but it is most interesting in process, and slide-making is the best amusement for winter that the enthusiastic amateur can find. A person, otherwise idle, can in a day produce dozens of slides by contact, or, like me, he can gloat over the production of two or three. If he copy in the camera at this season he will not produce more than two or three in a day. Contact printing can easily be done at night; but I do not intend to go into that subject, because I do not attempt such work after dark.

If ultimate success after a long series of failures give a man the right to speak with decision on any subject, I think I may safely claim that right. I dare not say how many scores of little plates I wasted before I got a slide that satisfied me. I could make slides that would "pass in a crowd"—if it were a very large franchise demonstration crowd—but I could not for a very long time make a slide that would for a moment compare with slides I had seen, not only in the market but in the collections of amateurs. In fact, I never was as nearly "licked" in anything photographic as I was in the production of good slides. I had stained skies, or general incipient fog, or, failing these, I had my shadows "bunged up;" in short, there was always something wrong. How I got over my troubles it is my object now to inform my readers.

In the first place, I have to explain that I could not make my own emulsions either of gelatine or collodion, having been expressly forbidden by my over-zealous doctor not to remain long in my operating-room. I am a tender plant, it would appear; so I had to buy my gelatine plates and my collodion emulsion, and I have to apologise once for all for having to mention commercial names, but unless I do so I shall certainly not be understood.

My first trials were with wet collodion, and in a short time I got to make sufficiently good work copying in the camera from large negatives. I made both bath and developer strongly acid with nitric acid, and used but little bromide in my collodion. Though I secured by these means fine, clear positives, I objected first to the building up of metallic silver in the shadows; and, second, to the coldness of tone, which I could not overcome with either gold or acid platinum chloride. Nor am I very fond of the wet process, but even had I succeeded with it to my complete satisfaction I should have still tried to gain the same end with some dry process. That fine slides can be made by the wet process is made certain by the fact of Mr. Gale's successes in the lantern slide line. Last year he had some grand slides by the wet process; this year he has carried off the medal for slides at Pall Mall, and I suppose he still uses the wet process. But his experience and mine seem to differ. I prefer the "stain" produced in the development of an emulsion to the building up of silver on a wet plate. I call it a "stain," because that is the appearance the reduced silver presents to the naked eye in an emulsion positive.

I now pass on to my experiments with gelatine plates. I began with some very slow bromide emulsion made by myself and in good working order. In the camera with long exposures I got results that did not satisfy me at all. I never got a thoroughly-clear sky—not even when the negative sky was blocked out—and when developing I never could tell when to stop. It is highly important in all processes of slide-making to know exactly when to stop development. Sometimes I got the whole slide blocked up, and sometimes after fixing I found only a ghost of an image. This was the case both under pyro. and ferrous oxalate development. Nor was the colour ever good with these developers, and gelatino-bromide negatives are not easy to tone. Then I tried ferrous oxalate with a citrate on some very slow bromide plates kindly given to me by Mr. G. Smith, but I had still almost the same troubles—unpleasant tone, uncertainty when to stop development, &c. Still this addition of citrate to the developer was a step in advance, as I appeared to get greater clearness in the high lights of my slides.

My first approach to success was when I took to Mr. A. Cowan's gelatino-chloride plates, and developed them with his own developer. I succeeded best with Mr. Cowan's No. 3 (or "extra-warm tone") developer. As I have already in these columns given my experience with Mr. Cowan's chloride process I need not repeat what I said before, further than in a general way. The great secret of success with any process is to expose long enough and not too long—a very wise remark on my part! But I mean that the plate must be exposed to such an extent that not the slightest forcing of development is required; in fact, the shorter the development for a lantern slide on a Cowan's plate the better, supposing always that the red colour disappears from the plate before fixing. I found that a plate fixed before the red colour left it was exceedingly easy to tone to almost any extent, but I did not find the slides when finished by any means so satisfactory as those which had *not* left the developer while still red. A plate that gains sufficient *density* while still red or reddish is almost certain to be over-exposed and want "pluck." I like plenty of half-tone in my slides, but the worst slide of all is one that is *all* half-tone, and wanting in both shadows and high lights. Therefore, the plates must not be over-exposed. As to my method and time of exposing I shall treat hereafter.

Having used a good many dozens of Mr. Cowan's plates without entirely succeeding—for which, no doubt, I alone am to blame—I tried Mr. Edwards's gelatino-chloride plates. As with Mr. Cowan's so with Mr. Edwards's: I got very near complete success; in fact, with certain kinds of negatives I consider I did attain success. Some of my slides on gelatino-chloride plates were shown in the Society's lantern in Pall Mall, and were considered, as I was told, good specimens. Many of these were copied in the camera, and others printed by contact, but it was impossible to tell "which were which." Mr. Edwards's developer is different from Mr. Cowan's, and is a little more easily made. I need not here give his formula, as he sends instructions with each box of plates. It is, however, necessary to note that the solutions should be made with distilled water, otherwise a deposit will certainly take place and frustrate the work. I think that, on the whole, I have succeeded better with Mr. Edwards's gelatino-chloride plates for lantern slides, but I prefer Mr. Cowan's for making large transparencies for window or table decorations. My experiences in the latter line are to be found in the columns of this Journal in the earlier part of the present year.

I have not a grain of doubt that very fine slides may be made with these chloride plates. But I doubt if they afford facilities for accommodation to various qualities of negatives to the same extent as either wet or dry collodion. To those who are trying, or proposing to try, gelatino-chloride plates my advice is this:—Expose so that the development is speedy but not precipitate. Develope the positive rather stronger in colour and force than you wish it to be when finished. After fixing and well washing—do not "scamp" washing because your plates are small—never omit a good dose of acid and alum; sulphuric acid is best. Expose a hard negative to a bright light, and a soft one behind ground glass. My exposures for contact printing are made beneath a thick dome of obscured glass in the roof—my room was meant for a billiard room—and my exposures with gelatino-chloride plates average about ninety seconds. In the camera I have to expose on an average negative from half-an-hour up to two hours at this abominably dull season. Referring to a remark a few lines above, I am aware that it is often recommended to expose a hard negative to a dull light for a longer time. This does not at all tally with my experience. More anon about collodion emulsion and apparatus.

Andrew Pringle.

ISOCHROMATIC PLATES.

[A communication to the Glasgow and West of Scotland Amateur Photographic Association.]

Since the introduction of gelatine as a medium for holding the sensitive silver compounds the photographic plate has made rapid strides towards perfection; yet we must admit that much remains to be done before the perfect plate is an accomplished fact. Perhaps the most prominent defect in plates as now used is their inability to reproduce different colours in the same relative intensity as they present to the eye. Let us see, then, the cause of this, and the means by which better results may be obtained.

You all know what a spectrum is, and have all seen it in the rainbow, or in a more homely form as thrown upon the wall by the prisms of a chandelier. When we examine such a spectrum we find it to consist of a band of coloured light, graduating from red at one end, through orange, yellow, green, blue, and indigo, to violet at the other; these colours blended together form the white light by which we take our photographs. Now, if we expose a plate to this spectrum and develope it we find that only some of the colours have effected reduction of the sensitive salt. Let these spaces on the board represent the various colours, and the height of this curve the intensity of their action on the plate; then pure bromide of silver will be represented by this curve, chloride by this, and iodide by this. Bromide has by far the greatest range, and when a small amount of iodide is present with it there is a slight decrease in the blue region. Such plates would, therefore, be evidently best for general landscape work, and we may be pretty sure that most commercial bromide plates do contain a trace of iodide.

It is evident that most of the work is done by the rays towards the violet end of the spectrum (a great deal is done by rays beyond the violet which are invisible to the eye), and that green has comparatively little effect. We can thus see why, in landscape work, we lose so much of the detail in shadows and foliage, the light which presents such detail to the eye being rich in green and red, but deficient in blue and violet. Could we obtain plates sensitive to green we should get negatives giving a much more natural gradation.

Leaving out of the question the actual reproduction of colour—which is as yet a far-off possibility—let us see what can be done to secure in light and shade a better rendering of the *value* of colour. The meaning of this term "value" is that bright colours should give light tones, and dark colours deep tones. We know that if we photograph blue and red on an ordinary plate they show in the print as white and black respectively, while yellow and green both appear dark; but if we can make plates sensitive to the so-called "non-actinic" colours we will then obtain prints showing a more natural gradation.

The method used to obtain such plates is the addition of some substance to the film capable of absorbing and converting into chemical energy those rays which are inactive on an ordinary plate. These substances are dyes, mostly of the aniline series, and a few natural vegetable colouring matters. They are themselves sensitive to light, as manifested by a bleaching action under its influence. The rays which effect this bleaching are those towards the red end of the spectrum—that is, the very rays which we wish to capture and divert to our plate. The immediate cause of the bleaching is oxidation of the dye, but how this effects the silver salt is a matter of dispute.

Captain Abney holds that the dye in absorbing oxygen acts as a developer, similarly to pyrogallic acid in the alkaline developer, this slight reduction forming a nucleus for a further deposit of silver during development of the plate. This theory seems to be borne out by the fact that the dye is only a colour sensitiser in presence of a chemical sensitiser—that is, a body capable of absorbing the bromine, &c., set free during exposure. Gelatine is such a sensitiser; also silver nitrate in the case of collodion plates.

Dr. Vogel's theory is that the energy absorbed in bleaching the dye is transmitted to the silver haloid, upsetting its equilibrium and rendering it capable of development. This theory seems to be proved by the fact that a dyed collodion film exposed to the spectrum will, if coated with collodio-bromide emulsion and developed without further exposure, give an image of those parts of the spectrum to which the dye is sensitive. It is very evident, however, that the invisible photographic image is still in want of a satisfactory explanation.

A large number of dyes have been found more or less effective, and I might give you a long list bearing the delightfully-simple and explicit names peculiar to the aniline and kindred series, but it will be sufficient to mention those which have been put to practical use. Amongst vegetable colouring matters, chlorophyll extracted from green leaves is a sensitiser for red, and turmeric extract for red, yellow, and green. Most of the dyes which have been tried have slowed the plates, and have been most effectual on collodio-bromide; but Dr. Vogel has recently discovered a new substance which is most effective with gelatino-bromide, and which actually increases the sensitiveness of the plate. It is, however, such a recent discovery that I can learn little about it. He has named it "azaline."

Next to azaline eosine seems to be most useful, and plates prepared with it are now disposed of commercially. Dr. Vogel has by means of eosine prepared collodion plates eight times as sensitive to yellow as to blue; but with gelatine his results have been less satisfactory, the plates being only twice as sensitive to yellow as to blue. This is a long way short of what is required, for in nature yellow is about twenty times as luminous as blue to the eye. Therefore, in using these plates for copying oil-paintings, it is found necessary to photograph them through yellow glass in order to restrain the excessive action of the more actinic colours. The above results are obtained on bromide plates, which are most affected by these colour sensitisers. Many substances which have a marked effect on bromide are inactive on chloride and iodide.

We are likely to hear a good deal about eosine, and it may interest you to know a little about what it is. Though commonly known as an analine dye it is not really so, but is a potassium compound of tetra-bromo (or iodo) fluorescein, which, in its turn, is derived from resorcin--a substance allied to pyrogallol, and, like it, a powerful developer. Pyrogallol, hydrokinone, and pyrocatetchin all yield bodies similar to fluorescin, and these produce dyes like eosine; therefore, when we buy eosine it is rather doubtful what precise substance we get. This may explain why some experimenters have met with less success than others.

True eosine exists in two forms—the iodeosine or blue shade, and bromeosine or yellow shade. It gives with silver nitrate a precipitate soluble in ammonia, which is sensitive to light. A few drops of the ammonia solution added to an emulsion is found the most effective way of preparing the colour-sensitive plates. Ordinary plates, however, may be treated with a solution of three parts of eosine in 100 parts of water containing ten per cent. of ammonia, and then dried. Here is such a plate, which you see is a faint rose colour; and here is a yellow plate stained with turmeric. I now pass round a colour scale with negatives on two such plates and on an ordinary plate. The latter shows the blue dense, and the yellow almost clear, glass. The turmeric plate shows the green denser, but on the eosine plate the difference is very striking. The yellow is nearly as dense as the blue, while both green and yellow show a notable gain in density.

It is not necessary to have a highly-coloured film, as the merest trace is sufficient. Dr. Eder prepared a stained emulsion, from which he separated the bromide by means of Plener's centrifugal machine. This he washed till the water came away colourless and re-emulsified in fresh gelatine, and the resulting plates were as colour-sensitive as the original emulsion. The washed bromide was faintly tinged, and Dr. Eder conjectures that an insoluble compound is formed between the bromide and the gelatine immediately surrounding the grains, which, being stained, is sufficient for the purpose in view.

I daresay most of you have now had enough of this subject. Still, it is one to which our attention will be often attracted during the coming season; and I trust that, when isochromatic plates become practically obtainable for landscape work, our Association will be one of the first to give them a fair trial. W. Goodwin.

ON THINGS IN GENERAL.

The cat is fairly let out of the bag about the Trafalgar-square monstrosity. The disfigurement of the finest site in Europe is not a workman's dining-room nor a place of worship. It is simply the private workshop of a foreign tradesman allowed to be set up on ground belonging to the British people to facilitate the manufacture he is engaged in, and enable it to be done at the cheapest rate. No rent, I suppose, is paid, and my readers will already have learnt that the national treasures of art have been licensed free to this foreign photographer to be taken off the walls, to have the glasses removed, and be carried about from place to place, so that he might do in the manner most convenient for his trade what has been denied to any British subject. The monopoly granted him is further enhanced in value by the authorities hastening in advance, before the request is made, to deny the like facilities to any mere Englishman. As the matter now stands in print it is nothing but an impudent slur upon our countrymen; and I hope the firm originally interested, even if their head-quarters be in the provinces, possesses sufficient influence to have the "job" brought before Parliament.

I have been interested in reading the articles on *Modern Dark-Room Improvements*, and have been able to glean some useful hints therefrom, but I should rather hesitate before adopting all. That dark room must be interesting; but to find in one room, even so well lighted as described—light enough to cure the owner of the need for the use of spectacles—and if ventilated to perfection, the operations of plate drying, negative drying, gas burners boiling, evaporating pan at work, varnishing and collodionising—all going on at the same time, and a couple of water taps only in the place, suggest that the writer, besides being able to produce photographs and pictures so well as I know he does, must also have the bump of order and system developed in the highest degree to prevent unpleasant *contretemps* occurring.

Among the new patents I see one by Mr. Vanderwyde for the production of vignettes direct in the camera by means of a screen placed either between lens and sitter, or lens and plate. His specification states that this has not been done before, except in the way of producing dead black ground, while his patent is to enable tinted grounds to be produced. Whatever the value of the translucent screen within the camera may be is not for me to say—it does not look feasible upon paper—but I can state that the idea of a vignetting screen outside the camera is very old. I distinctly remember it twenty-five years ago, and one of the most expert photographers then living used it regularly in his business, and, I believe, made an extra charge for pictures produced by its aid. It is, therefore, obvious that the patent is invalid on this ground alone unless a disclaimer be entered, and if it were I opine there would be little of value left to protect. Still, if the publication of the patent subserve no other purpose than that of drawing attention to a capital mode of vignetting which must have additional value, now that gelatine plates enable such perfect films to be produced, Mr. Vanderwyde will deserve the thanks of the photographic community.

I always like to read Mr. A. F. Genlain's articles, as he is a clever and enthusiastic photographer and an artist of skill. He will, therefore, the more readily allow me to point out an error in his last article on *A Little Philosophy*. "Let us deflect two beams of light—one yellow and one blue—on a white strip of paper and we shall certainly obtain a green strip as the result." The word "not" should be inserted after certainly. Mr. Genlain was thinking of the effect produced on his pallette when selective absorption would cause the mixture to appear green. When reflection only is called into play, blue and yellow lights will not commingle into green.

What a horrible thing to read, as I did a week or two ago in these pages, about the production of dimples by artificial means. Is it true, I wonder? What a dreadful plight the young lady would be in if, in lieu of a dimple, she found herself disfigured for life with a huge wen, or such a destruction or disorganisation of surrounding tissue as would lead to the colour entirely leaving the place, and thus the use of face powder be rendered necessary for the rest of her life! I cannot say I should think she would have cause to complain. Eyebrows made to order—not painted, but real hair—have come under my own cognisance, so that I can bear witness to the fact of the adoption of that expedient. A photographer is accustomed to see a great amount of human vanity, and hence is not surprised at any such exhibition as this. But, after all, I need not say "human" vanity, for vanity as great exists among the lower animals, as any close observer of nature knows well.

The idea of the dust of Alexander stopping a bunghole is familiar to us as an emblem of the base use to which things noble may be put, and it was forcibly brought to my mind the other day when reading of one of the uses which albumenised paper had been made to subserve—the wrapping of packets of butter. A pound of butter in a sheet of albumenised paper! The thought is too terrible to contemplate. And *such* paper as is now sold! What next? We only want to see a first-class portrait lens attached to a peepshow, a camera as a blacking box; but hold! already have we come to this latter pitch of humility: nothing is so likely to happen as the improbable. Free Lance.

THE SCENERY OF VICTORIA AND NEW SOUTH WALES.

In The British Journal of Photography for 31st August, 1883, was an article, by Mr. A. Pringle, styled a *Tour Round the World*. This I read with great interest, as I also did those which followed; and, for the benefit of such other photographers, amateur or professional, who may feel disposed to take a holiday trip in the same fashion, I thought that a short sequel might advantageously be written.

It is a pity, so far as Melbourne (and also the colony of which it is the metropolis, viz., Victoria) is concerned, that Mr. Pringle was unable to prolong his stay for a week or two, and by this means see something of the surrounding country; for, judging from his remarks, he missed some of the most striking points, though it must be admitted that in every direction, save one, in which the new arrival looks the country is flat and without the least pretension to the picturesque.

The only place of interest outside the city which Mr. Pringle mentions is Fern-tree Gully. This is certainly a pretty place, the difficulty of getting there being the one thing against it, although during the last two or three months an agitation has been got up for the purpose of trying to induce the Government to make a branch line of railway to the Gully. But this spot is only the opening scene to what, with the Blue Mountains of New South Wales—of which I shall speak shortly—is, without doubt, the grandest scenery in Australia, and which is quite different in character from the New Zealand scenery. In fact, Fern-tree Gully is considered by most of the Melbourne tourists to be old-fashioned, and other places, with more magnificent views and more easily reached, now command the attention of sightseers generally.

The most celebrated of these is the country lying between Melbourne and Wood's Point—the latter, a mining locality, in the centre of a very mountainous district. Starting from Melbourne by train, and proceeding about twenty-five miles through some picturesque suburbs and an undulating country beyond, Lilydale is reached. Here the tourist must take the coach, or, if he be fond of a few miles of stiff walking, may "tramp," *viâ* Healesville and Fernshawe, to Marysville. At Marysville, the Stevenson Falls are the show of the district. At all these places are country houses of accommodation, at which the living is good and the charges moderate. The landlords of the inns—or, as they are called, "hotels" (in Australia every place at which beer or spirits are sold is dubbed by its proprietor "hotel")—or any of the residents of the neighbourhood willingly point out subjects of interest to the traveller who is hungering and thirsting after them.

Among the scenes on this road may be mentioned the justly-celebrated "Black Spur." The scenery here is in its character unsurpassed by any in the colony—from the smallest fern tree gulleys to extensive forests of the desert growth. We can boast of some of the notorious "big trees of Victoria," which can hold their own against their world-famed brothers in California. The whole country is overflowing with grandeur. Some of the trees mentioned above are forty feet in circumference and fully four hundred feet in height. To give some idea of the timber hereabouts, it may be mentioned that one fallen tree near Healesville measured 480 feet. Another giant of the forest which had fallen across a stream running into the Watts River, and thus forming a ready-made bridge, was 435 feet from its base to the other end. The original length of the tree could not be ascertained, as its top had been consumed by a bush fire; but even at this distance from the roots it still boasted a *diameter* of three feet. It is, therefore, probable that the height of the tree when standing was about 500 feet. Sunbury, twenty-three miles from Melbourne, contains some charming "bits," situate on Jackson's creek. The landscapist may leave Melbourne by the train at midday and return the same evening with his three double-backs full of pictures, all obtained within two miles of the local railway station.

If the tourist wish to go further afield, no place will repay him more for the trouble he takes to reach it than the seaside township of Lorne, or, as it was called until recently, "Loutit Bay." The train is taken through Geelong to Winchelsea, whence Lorne is reached by coach in about seven hours from Melbourne over a rather rough road, but at the same time nothing to frighten the traveller. Here are good hotels, with all modern comforts, electric bells, gas, and other joys of civilisation, including a photographer, who reaps a fair harvest in the holiday season, the town—or rather village—being crowded. But the show of the place, so far as the picturesque is concerned, is the scene on the Erskine River, adjacent to the town. The "Erskine Fall" is one which is worth travelling almost any distance to see. The river drops over a shelf, and then, diversified by a series of breaks, reaches the basin of the stream below amid a perfect bower of ferns and other plants, the whole forming as picturesque a study for the camera as can well be imagined, its peculiar wild and romantic solemnity defying language to describe it. The only regret of the photographer who has any art feeling is that he cannot convey to others through the medium of the sensitive plate (that is, with the present power and knowledge which we possess) any but the very slightest idea of the beauty of the scene which is before him.

Another fall on this river is named the "Phantom," from the fact that, in spite of its existence having been reported by an old resident in the district, all attempts to find it again proved unavailing until three or four years ago. In addition to these there are minor points of interest all worthy of the photographer's attention, the scenery all over the district being of the wildest mountain character, and the vegetation most prolific. Daylesford—about eighty miles from Melbourne, and reached by railway—also offers ground for the tourist, who may add to rough country scenery the extra attraction of a few views of gold-mining machinery, &c.

The Australian Alps, though somewhat difficult to reach—that is to say, the road is a long and somewhat roundabout one, although good enough—amply compensate the traveller for the fatigue of the rail and coach journey. Here mountain succeeds mountain like lumps of sugar in a basin, the whole country being of the wildest nature; and, to those who look upon Australia as a land of cloudless skies all the year round, it may seem strange when they are told that it is no uncommon thing for teams of horses and waggons to be stuck for days in the snow whilst crossing these ranges.

In the northern and western districts of the colony there are also plenty of good views to be obtained. As regards the sister colony of New South Wales, the landscapist has but to sight Port Jackson (the celebrated harbour of Sydney) and he will begin immediately to wonder whether his stock of plates is sufficient to secure all the beauties he sees around him at a single glance. However, he need not feel distressed at this, as the principal makes of gelatine plates are to be obtained in both Sydney and Melbourne at London prices.

Judging from his letters, Mr. Pringle has not visited New South Wales at all. This is to be regretted, for pressed for time as he must have been he would have found a fortnight in New South Wales well spent, and the journey from Melbourne to Sydney, although taking two or three days by water, formerly occupied only twenty-four hours by rail; but since he was here the time has been reduced to eighteen hours.

As has been before mentioned, the beautiful scenery of Port Jackson and the Paramatta River will attract the first attention; then there are the Blue Mountains and the Hawkesbury River.

The Blue Mountains' scenery is as wonderful as any to be seen on the Australian continent. The mountains are reached by rail from Sydney, and to the foot of them the distance is about forty miles from the city. The ascent is made on a zigzag, and by this means an elevation of 613 feet is gained in a distance of three miles. This is sometimes called the "Little Zigzag," to distinguish it from the one by which we descend the mountains on the other side. They extend between fifty and sixty miles, and every three or four miles there is a station or platform. Within a mile or two of each of these stopping-places is situated some pretty or grand spot, the sight of which will well repay the tourist for his work in reaching it. Waterfalls—both grand and picturesque—mighty chasms and fearful precipices, rocks, and mountains meet the traveller at every turn.

The Wentworth Falls, situated at the head of an immense valley encircled for miles with lofty hills thickly covered with timber, form the first grand sight met with on the mountains. The fall of the main cataract is roughly estimated at 1,000 feet, and, as it has only a very small stream to feed it (not a Niagara by any means), the water, as a rule, breaks into spray long before it reaches the foot of the glen. About a hundred yards above this is situate a smaller fall, which is named the "Weeping Rock." It is a rock forming the bed of the stream, and stretches out, overhanging somewhat in the form of a fan, the water falling in a number of small streamlets like an artificial fountain. These falls are only two miles from the railway station, and are reached by a good country road.

About four miles further on the line is the town of Kootoomba, where there is another large fall and some smaller ones, as well as various other points, and a view of the same extensive valley which we have at the Wentworth Falls. Next we pass Blackheath Platform, which is only a mile and a-half from Govett's Leap, one of the greatest natural wonders of the world. The rent or depression is said by many (how true the statement may be must be left for each witness to judge for himself) to be the deepest chasm with perpendicular cliffs in the known world. It is almost surrounded with these cliffs. The sublimity and majestic grandeur of this scene is not realised at once. The trees in the valley below, although 100 or 200 feet high, are not recognisable in their individuality. The scenery is full of grandeur, and, to add to its beauty, two streams are precipitated into the abyss. They are changed into mist long before they reach the bottom. The depth of the principal, or Govett's Fall, to where the water first strikes the rock is 520 feet, and to the basin at the foot of the rocks immediately below, 600 feet. Standing at the basin, the cliffs forming an end to what is known as the "Horseshoe Bend" on each side rise to a height of 700 feet. The depth to the bottom of the valley, at the junction of the three falls, is 2,000 feet; and the precipices of a smaller nature round about in some cases exceed 1,000 feet.

The next station is Mount Victoria, seventy-seven miles from Sydney, and 3,422 feet above the sea level. Here are good hotels, and abundance of the same sort of scenery as that previously described. About eleven miles further on we pass through the Clarence Tunnel. The rails here are 3,658 feet above the sea level, which is the greatest altitude reached by the railway. So rough was the country at this part that the surveyors who laid out the line had to be lowered down the cliffs by ropes, and the contractor was obliged to commence the work of construction in a similar manner. The tunnel is 539 yards long; and at a further distance of two miles the descent of the mountains is commenced in a somewhat similar manner to that in which we ascended them, but on a much grander scale.

The Great Zigzag is a series of inclines made along the side of the mountain, several tunnels and viaducts being passed. The gradient for the whole distance is one in forty-two, and the distance is five miles, the line in some places traversing the brink of a precipice. The writer knows a lady who, on descending the Zigzag for the first time, fainted on looking out of the carriage window. These five miles of railway are said to have cost half-a-million sterling to construct, the whole of the lines being on the English gauge of four feet eight and a-half inches.

About a mile beyond the foot of the Zigzag is the thriving town of Lithgow, which is supported by its coal and iron mines and ironworks. At Lithgow the Blue Mountains scenery ends. The train pursues its way into the interior through the town of Bathurst, and so on towards the River Darling, to a point on which the line is in course of construction. The line is already open to a distance of over 400 miles from Sydney.

The scenery on the Hawkesbury River has been compared by many to that on the Rhine; some have, indeed, said that it excels the Rhine. Anthony Trollope has written of it in very glowing terms, and says that it surpasses both the Rhine and Mississippi. It is easy of access from Sydney. Conveyances leave in the afternoon for the mouth of the river, and next evening the tourist is landed in the city again, having had a comfortable lodging at the hotel, ascended the river to the town of Windsor, and returned by rail. The whole trip costs £2 5s—not an extravagant sum, as it includes all hotel expenses, &c.

There are various other places of interest: the Southern or Illdwarra district, and the famous Fish River Caves, which bid for the premier position against the celebrated caves of California. They are reached by conveyance from Mount Victoria.

Of course, it is impossible in a short article of this sort to give a fully-detailed account of the various places of interest in both colonies; but I think I have made it tolerably clear that the continent of Australia should not be overlooked by any traveller—be he photographer or otherwise—who wishes to make a tour "round the world."

I may mention that in the event of other photographers visiting Melbourne, any of the members of the Amateur Photographic Association of Victoria will be happy to assist them in whatever way they can, as far as obtaining views and learning the run of the country is concerned. The address of the Association is Royal Society's Hall, Melbourne; and any communication sent to the above address will be at once attended to by J. H. Harvey,

Hon. Secretary.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 15,192.—"Ornamental Frames." W. Russell.—*Dated October* 21, 1884.

No. 15,198.—"Stands for Photographic Cameras." J. Ashford.—*Dated November* 19, 1884.

No. 15,202.—"Holder for Manipulating a Photographic Plate;" complete specification. W. G. Honey.—*Dated November* 19, 1884.

No. 15,307.—"Apparatus for Illuminating Sitters and Subjects to be Photographed." H. N. Steffner.—*Dated November* 20, 1884.

No. 15,440.—"Magic Lanterns." C. Gray and H. Kemp.—*Dated November* 24, 1884.

PATENTS SEALED.

No. 612.—"An Improved Folding Box for Parcel Post." William Blake.—*Dated January* 4, 1884.

No. 10,226.—"Improved Apparatus for Dissolving and Changing Pictures in the Magic Lantern." B. J. Edwards.—*Dated July* 16, 1884.

Changing Optical Lantern Slides with the Feet.

William Henry Duncan, Coalbrookdale, Shropshire, Engineer.

My invention has for its object changing the views, working the gas cock, and turning the limes of dissolving-view lanterns by pedals moved by the feet of the operator, so as to leave the hands and eyes free to use a book or a written lecture.

In carrying out my invention I employ two or more pedals, which are so connected to the lime cylinders, the gas cock, and to the arrangement carrying the sets of pictures that the light can be raised and lowered and the pictures fed into the lantern by pressing down the foot pedals. In my dissolving-view apparatus the views or slides to be exhibited are carried by four or more movable racks, two generally being placed on each side of the lantern. These racks are moved along guides, which keep them in the same planes as the openings in the sides of the lantern tubes intended to receive the views. One pair of the set of racks is moved forward at a time. The distance of this travel is equal to the distance from one view to another in the rack. After the rack movement has brought a picture in position opposite to a groove, fixed in line with the opening in the side of the lantern tube, a rod brought against the edge of the picture pushes it out of the rack into the groove, and at subsequent movements of the pedals other pictures are pushed out of the rack and follow each other in the conducting groove which guides them into the lantern.

After the lantern has shown the pictures on the screen the continued passing of other pictures into the groove causes those which have been exhibited to be pushed into the receiving rack on the opposite side. This rack has the same forward movement as the other, and brings an empty division in proper position to receive the slides at the time required, so that racks filled with pictures are placed on one side of the lantern. Each picture is in rotation passed through the optical systems, and after being shown on the screen is passed into a rack on the opposite side. In this manner the lanterns are served with picture slides. The lime cylinders are turned, and also raised slightly, so as to present a fresh surface continually to the flame of the combined gases at each change of the picture.

The working of the gas cock, whereby the pictures are dissolved, is done at the proper moments by the action of the apparatus, and the whole of the movements required to produce these results are given by pedals worked by the feet, or by levers worked by the knees or hands of the operator; but by preference by pedals worked by the feet, either direct or by electricity. For moving the picture racks I employ levers which act on ratchet wheels keyed on shafts fitted with toothed pinions, which latter work in toothed racks placed below the pictures. The pitch of these toothed racks is the same as the distance from picture to picture in the carrying racks, so that the set of pictures is moved forward this distance each time the catcher wheel is turned forward one tooth. By these means the pictures are moved forward through the exact space required, and at the right moments, by the action of the foot pedals. For turning the limes I use a ratchet wheel, fixed on a shaft, projecting outwards from the back of the lantern. This wheel is turned by a lever in connection with a foot pedal. For working the gas cock I use levers and a rod, which carry the motion of the pedal up the back of the lantern to the cock and turn it at the moments required. The picture pushing-rod is operated by levers and rods in connection with the pedal in the forward direction, and is drawn backward by a spring. The arrangements I have described may be used with three lanterns placed one over the other, but by preference I use them in connection with two lanterns only. The order of the various motions is as follows:—Left pedal, on commencing to descend, turns down gases from the bottom lantern and turns gases on to the middle lantern, draws back the catcher, and also lowers the ratchet lever of lime-turning arrangement during the first half of travel. Bottom lantern being now dark the next half of downward travel changes its picture. First part of pedal's return stroke draws back the picture pushing-rod, remaining part acts on catcher-wheel, moves the set of pictures forward ready for the next change; also lifts the rod for turning dissolving-cock into proper position for next dissolving with the other rod at the next change, and also turns the lime. To prevent mistake by the operator not pressing down the pedals alternately a locking device is applied, which consists of a weighted lever oscillating between the two pedals and worked by declines on the bottom portion of the lever.

What I claim is:—First, the apparatus for changing the picture slides of a dissolving-view or magic lantern by pedals moved by the feet, or by levers moved by the knees or hands of the operator; second, the apparatus for raising and lowering the light by pedals; third, the locking device for the pedals.

[Certain drawings accompanied the complete specification which it is unnecessary here to reproduce.]

Improvements in Portable Photographic Cameras.

Frederick William Hart, 8 and 9, Kingsland Green, London, Manufacturer of Scientific Apparatus.

I first construct the front framework of the camera in square or other rectangular form, such framework having a revolving flanged disc of the greatest diameter the framework will permit. Such disc has an opening through it half its width below the centre to near the circumference, the width being of such dimension as will permit the lens tube to be centrally placed and moved freely along the opening to near the circumference. On this revolving disc I place a slide diametrically over the opening, and of such length and width as will well cover the opening when the centre of the slide is brought over the opening near the circumference; on this slide the lens is to be mounted. I fix the disc and slide in any desired position by means of screws or cam clamps with my improved folding disc heads to such screws or cam clamps.

The construction:—On the shank is a disc of metal, and across the diameter is hinged a half disc of like thickness, which when raised enables the screws, cams, or racks and pinions to be actuated. When folded down the whole does not project from the body of the camera more than one-eighth of an inch, thus permitting close packing, whereas the screw heads at present in use project half- to three-quarters of an inch, thus preventing compact packing. The back framework and the flexible extending body is constructed as usual, with the exception that I employ my folding disc heads to all clamping screws and pinion heads. The advantage in using the said disc heads will now be seen in my main improvements to obtain extended range for lenses of long focus. I shut the body, as above described, up quite close, together with one or more dark slides or a magazine plate-holder included, and form around them a casing, embracing the top, front, bottom, and back, three of these rectangles being hinged and the fourth angle secured by lock, bolts or hooks. This, my improved base-board, when unfolded is made rigid by triangular bolts of metal—steel or bronze preferred—sliding in groves in opposition to the hinges, means being provided by the enclosing plate for taking up wear so as to ensure continuance of the utmost rigidity. The camera-body frames slide to and fro on this base-board, being kept parallel by side guides in the ordinary manner. On the top face of the base-board I employ two short lengths of rack, when weight is of moment, say one-sixth of the length of the base-board, the solid base of which is V or half-V on the sides, with corresponding counterparts for them to slide in the base-board. The end of each portion of rack has a spring detent pin to fix them at any part of the base-board corresponding to the focus of the lens in use at the time. Where weight is not an object the metal rack may be fixed the entire length and cut at the joints for folding.

By these recited improvements I obtain greater range for focussing than hitherto—economy of space, rigidity, and a square body throughout—thus making the camera available for lenses of short focus, including an angle of 90° to 100° of subject on the plate, as well as narrow-angle lenses of long focus for extreme distant objects. As an illustration of improvements effected: the latest tourists' cameras exhibited (say half-plate) have a range of focussing power of twelve to sixteen inches: whereas, with my recited improvements as set forth in this specification, I obtain twenty-four to twenty-six inches of focussing power, giving thereby greater facility for the production of artistic photographs from nature, also for copying.

The inventor claims:—1st. The employment of the slides for carrying the nuts.—2nd. The locking by adjustable triangular bolts on the opposite side to the hinges.—3rd. The employment of the side of the base-board on which the bolts are as the top working surface.—4th. The base-board forming a casing entirely round the camera body, with the addition of dark slides or magazine plate-holder, if desired, by which he obtains the maximum of length without the introduction of weak-extending slides as hitherto used.—5th. The cam wedge and stirrip combined, with or without screw action for clamping the parts.—6th. The folding disc head to screws, cams, and pinion spindles or axes, by the use of which much less space is occupied in the packing of photographic cameras.

[Certain drawings accompanied the complete specification, which it is unnecessary here to give.]

Exhibition.

PHOTOGRAPHIC SOCIETY OF IRELAND.

[Second Notice.]

Regarding the exhibits of portraits, Messrs. Lafayette show well to the front with three frames of large direct pictures, a few of which appear rather theatrical or over-studied in the pose, but all showing great manipulative skill and finish. The same firm have also hung several frames containing numerous cabinet-sized portraits, which are the best collection of small work in the room.

Messrs. Chancellor and Son, also of Dublin, exhibit numerous works of great merit, amongst which we have no difficulty in selecting *Il Penseroso* (No. 213) as the best, and worthy of study by all interested in this class of work; and *Fancy Ball Costumes* (No. 492), by the same firm, are exceedingly excellent.

Messrs. Robinson and Sons, of Dublin, besides the enlargement (No. 82) already noted, show several groups with their respective enlargements in carbon, but their small frame of three heads on opal, *The Sisters* (No. 454), seems to be the most superior opal plate in the room. Indeed, in the matter of this class of work, we consider there is great room for improvement, as several of the finest at first sight—notably Nos. 253 and 31—have been so much retouched with brush work as to remove them from this class of photographs pure and simple.

Mr. H. S. Mendelssohn has forwarded a charming collection of groups, which, by their unconventionality of pose and artistic treatment, are amongst the very best work in the room, and we have no hesitation in selecting Nos. 20 and 97 as being gems of their kind.

In *genre* pictures we must not omit to draw attention to *The Seven Ages of Man* (No. 136), already exhibited, and which secures a great deal of real admiration both for the results obtained and for the patience and skill which have been exercised in completing such an ambitious task. We are at a loss, however, to understand how the picture illustrating one of the ages in no way shows "the beard of formal cut," which the poet states to be one of its peculiarities.

Close to the above hangs one of the smallest of its class in the room, by C. Wyrall, and entitled *Peg in the Ring* (No. 124). It is a charming picture, having no appearance of being a made-up subject, but simply an instantaneous photograph of some boys at top-pegging. If this be so Mr. Wyrall is to be congratulated at having hit his subjects when so artistically posed. A similar picture (604) in the small room is also worthy of attention.

Mother's Love (No. 117), by J. Hubbard, whose death we regret to hear of since his pictures were hung, is a truly realistic picture of admirable composition. The same lamented artist is also represented by Nos. 12, 110, 255, 455, and 525, which are mostly all of the same character. A pretty frame of fishing boats (No. 131), by Mr. F. M. Sutcliffe, attracts and pleases; but we question the good taste of the title under the second print.

Mr. A. G. Tagliaferro exhibits a large number of interiors, all of excellent quality except for some converging lines; but still we think the medal for the best interior must go to him, or to *A Mansion in the Olden Time* (No. 494), by Mr. E. Brightman. The *Interiors* (No. 316) exhibited by the Platinotype Company are marvels of delicacy, although not quite such difficult subjects. Indeed, every praise must be accorded to the exhibits of the Platinotype Company, who, in Nos. 299 and 363, show some splendid heads, a large portion of the credit of course being due to the artist, Mr. Valentine Blanchard, from whose negative they are taken; but we cannot fail to admire the peculiar excellence that is the speciality of their process, which there is ample scope for studying in the large collection of exhibits shown either by the Company or those who are working this method of printing.

Mr. Herbert B. Berkeley, who is so intimately connected with the Platinotype Company, exhibits in his own name one of the gems of the room—a small landscape with cattle, entitled *Noon* (No. 528)—which might be overlooked, as it is not particularly well placed. Nos. 383, 430, 644, and 645 by the same gentleman are also well worthy of notice, and we have much pleasure in drawing attention to them.

The Exhibition is greatly indebted to the Autotype Company, who have hung a very large number of frames, each one of which deserves special praise. Their *Copies of Oil Paintings* (No. 193), *Dieu le Veult* (No. 197), *Come Unto These Yellow Sands* (No. 181), and *Israel in Egypt*—this latter hung too high for convenient inspection—are all marvels of good work, as are their large *Portrait of Cardinal Newman* (No. 182), *A Frame of Fans* (No. 16), and *Derwentwater* (No. 112), noticed in our last number. Mr. W. Maitland's *Sorrow on the Sea* (No. 210) and numerous others, not omitting some studies of heads in red chalk and copies of Turner's *Liber Studiorum* (Nos. 562 and 563) all show by their varied excellence that the work of the Autotype Company is as diversified in its style and character as the originals to be reproduced. For alone placing before the general public and art students true *facsimiles* of the drawings and studies from the celebrated art collections of the world the Company should receive all credit, and, we trust, more substantial reward; for, if these copies were more generally to be found in our local art schools all could learn and profit by them, and their influence become more widespread than is possible while the originals remain locked up in the Louvre, the Vatican, or in Dresden—treasures of art only visited by relatively the favoured few.

We append the list of medal awards:—

Large landscape.	227.	*Grasmere.*	Silver medal.	J. A. Greene.
,, ,,	76.	*Pas de Roland.*	Bronze ,,	Geo. Mansfield.
Small ,,	186.	*Alpine Views.*	Silver ,,	Professor Donkin.
,, ,,	528.	*Noontide.*	Bronze ,,	Herbert B. Berkeley, Platinotype.
Instantaneous.	14.	*Yachts.*	Silver ,,	G. West and Son.
,,	446.	*Shields Harbour.*	Bronze ,,	T. M. Auty.
Interior.	494.	*Olden Mansion.*	Silver ,,	E. Brightman.
,,	541.	*Church of St. John of Jerusalem, Malta.*	Bronze ,,	A. G. Tagliaferro.
Large portraits.	213.	*It Penseroso.*	Silver ,,	J. Chancellor.
,,	203.	*Large Portraits*	Bronze ,,	J. Lafayette.
Small portraits.	239.	*Cabinet Portraits.*	Silver ,,	J. Lafayette.
,,	271.	*Cabinet Portraits.*	Bronze ,,	J. Robinson and Sons.
Opals.	454.	*The Three Sisters.*	Bronze ,,	J. Robinson and Sons.
Genre picture.	450.	*Reading to Granny.*	Silver ,,	W. Gillard, Platinotype.
,,	128.	*Peg in the Ring.*	Bronze ,,	C. Wyrall.
Enlargement.	210.	*Sorrow on the Sea.*	Silver ,,	Autotype Company.
,,	82.	*Portrait.*	Bronze ,,	J. Robinson and Sons.
Transparencies.	715.	..	Bronze ,,	P. H. Fincham.
Mechanical print.	—	"*Ein Autodafé.*"	Bronze ,,	Rud. Schuster.
Animals.	108.	..	Bronze ,,	J. J. Dixon.
Microphotographs.	731.	..	Bronze ,,	Dr. R. A. Hayes.
Apparatus.	—	Improved Camera.	Bronze ,,	J. V. Robinson, Dublin.

All the above medals were awarded by the ballot votes of the members of the Photographic Society of Ireland.

Special bronze medals were awarded to Mr. E. Skeen, Ceylon, for a collection of tropical views; Mr. Geo. Renwick, for *Frost Studies* (No. 152); and Mr. H. S. Mendelssohn, for a group (No. 97).

The special prize, given by the Amateur Photographic Society for the best untouched picture by an amateur, has been awarded to Mr. George Mansfield, a member of the Photographic Society of Ireland, for *A View at Sauveterre* (No. 71).

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
December 1....	West Riding of Yorkshire	Godwin-street, Bradford.
,, 2....	Sheffield	Freemasons' Hall, Surrey-street.
,, 2....	Halifax..........................	*Courier* Office, Regent-street.
,, 2....	Bolton Club......................	The Studio, Chancery-lane.
,, 2....	Glossop Dale	Glossop Coffee Palace, High-street.
,, 3....	Benevolent	181, Aldersgate-street.
,, 3....	Edinburgh	Hall, 5, St. Andrew-square.
,, 3....	North Staffordshire	Town Hall, Hanley.
,, 3....	Photographic Club	Anderton's Hotel, Fleet-street.
,, 4....	London and Provincial	Masons' Hall, Basinghall-street.
,, 4....	South London (Annual Meeting)	Society of Arts, John-st., Adelphi.
,, 4....	Bolton	The Baths.
,, 4....	Leeds............................	Philosophical Hall.
,, 4....	Glasgow	Institution Rooms, Buchanan-st.
,, 4....	Dundee	Lamb's Hotel, Reform-street.
,, 4....	Coventry (Annual Meeting)	Coventry Dispensary.
,, 4....	Yorkshire College..............	College, Cookridge-street Leeds.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

At the monthly technical meeting of this Society, held on the 23rd inst., the chair was occupied by Mr. T. Sebastian Davis.

Mr. Francis Cobb showed a plate covered with fog, which was the result he obtained when using the soda developer.

The Chairman had found that with plates of his own making he could not develope with soda as the only alkali; but upon the addition of a small quantity of ammonia the image came out well.

Mr. Edwin Cocking handed round a plate developed with a mixture of soda potash and sulphite, without ammonia or restrainer. He considered the formula a very good one.

Mr. L. Warnerke found that, when using potash instead of ammonia, the restraining effect of bromide was very great.

Mr. A. Cowan agreed with this remark, and added that $\frac{1}{32}$ of a grain of bromide to the ounce of developer was too much to use when employing potash as the alkali.

Mr. Cobb remarked that when using potash, and not finding it to act with sufficient energy he had added soda to the mixture, the film had slipped from the plate.

In answer to inquiries,

Mr. Warnerke said that he was quite satisfied with the potash developer. There was less loosening of the film and less green fog than with soda. He used no restrainer unless he wanted extreme density, as in copying engravings, and then he added a few drops of a ten-per-cent. solution of bromide to the developer. The formula he employed was as follows:—

Carbonate of potash	45	grains.
Sulphite of soda	12	,,
Water	1,000	,,
Pyro.	12	grains.
Sulphite of soda	24	,,
Citric acid	2	,,
Water	1,000	,,

Mix equal parts for use.

The CHAIRMAN inquired whether any further experiments had been made with the new developer, hydroxylamine.

Mr. ARNOLD SPILLER said that since the last meeting he had found it to be advantageous to add a small proportion of alcohol to the developer. This addition lessened the liability to those little pits or spots which were formed in soft gelatine when developing with hydroxylamine; as not only was the gelatine less soluble when alcohol was present, but the gas evolved (nitrous oxide) was more soluble in an alcoholic solution than in a merely watery one.

A question was then read as to the best method of preparing hydroxylamine.

Mr. SPILLER replied that he employed the plan with nitric ether and tin. With regard to frilling when using the hydroxylamine developer, different makes of plates acted very differently; of three kinds that he had tried one frilled and two did not.

Mr. W. M. ASHMAN suggested that Mr. Spiller should give complete details of the mode of preparation of hydroxylamine in the Society's journal, and this Mr. Spiller undertook to do.

Upon being asked what advantage he found the new developer to possess over those previously in use,

Mr. SPILLER said that the image came up quite free from any stain or deposit, and that there was the same latitude in exposure as with pyro. The solution, moreover, did not change, but remained unoxidised.

The CHAIRMAN thought these advantages were very great, and that it was a thing happening very rarely that a new developing agent was discovered.

Mr. HOPKINS then showed a camera back with dark slide, similar to the one which had been shown at the late Exhibition of the Society, with this difference—that the focussing glass did not now require to be removed from the camera, but the putting in of the light-proof back shutter acted upon levers which drew the screen behind the plate to be exposed.

Mr. J. R. GOTZ showed a series of lenses by Suter, of Basle. The characteristics of them were—that the A series had, he believed, a larger aperture than any other aplanatic doublet lenses had been made with, and consequently were very rapid. The B series were somewhat slower and covered a larger field, and the C, or wide angle, included a still wider angle. They were all fitted with stops and screws according to the Society's standards, and were so arranged that several lenses would fit the same flange.

Mr. W. BEDFORD thought it would also be desirable that the equivalent focus of each lens should be indicated on the mount.

Mr. WARNERKE considered this suggestion a very important one. With regard to the choice of lenses of the A or B series: he would like to know, if they were both stopped down to the same rapidity, which lens possessed the flatter field and gave the better picture.

Mr. GOTZ believed that the B lens would have the flatter field.

The CHAIRMAN, in proposing a vote of thanks to Mr. Gotz, said that it was satisfactory to find the Society's standards adopted by lens makers.

The next technical meeting was announced for the 23rd of December, when the Chairman proposed to bring a lantern fitted with Sugg's large burner, and throw an image with it upon the screen, to illustrate the usefulness of such a convenient arrangement as the application of ordinary gas to lantern purposes.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AT the meeting of this Society, held on the 20th inst., the chair was occupied by Mr. F. W. Hart.

Mr. C. H. TRINKS was introduced to the meeting by Mr. Henderson as a gentleman who had had considerable experience in photo-engraving processes, and he (Mr. Trinks) observed that the method which he ha principally followed, and which had given him the best results, was that of Mr. Fox Talbot. There was a curious action upon a sensitive surface, on which he would like to hear the views of the members. If a sensitive surface were left between the leaves of a printed book there would be found to be an impression of the letters upon it. How was that explained?

Mr. A. L. HENDERSON said that it might arise from either of two causes. The paper might act as a phosphorescent surface or the ink as a protecting one to the plate, the paper where not inked allowing the air with what impurities it might contain to have access to the sensitive surface.

The CHAIRMAN and other members thought the latter explanation more probably correct than the phosphorescence one.

A discussion then took place as to the best means of preventing the action upon gelatino-bromide, which had been stated to ensue from the nature of the material in which plates were packed, and it was suggested that the grooving of plate-boxes should be soaked in melted paraffine.

Mr. A. COWAN had kept plates in boxes with pine grooving for a period of more than two years without any injury arising therefrom.

Mr. HENDERSON thought that, as thymol had no injurious effect upon emulsion, the vapour from turpentine might be expected to be similarly innocuous. He had found, however, that when a large quantity of thymol was added to emulsion there was a mottling upon the surface of the plate.

Mr. W. E. DEBENHAM suggested that this mottling might be due to the alcohol in which the thymol had been dissolved. Mottling was characteristic of emulsion containing a large proportion of alcohol.

Mr. A. MACKIE had formerly used camphor in emulsion to preserve it. There appeared to be some chemical action, as the smell of the camphor was changed.

Mr. HENDERSON had found camphor to produce fog.

MR. MACKIE had not observed this.

A MEMBER inquired whether alcohol or any other ingredients used in forming a gelatino-citro-chloride emulsion could be traced as the cause of the gelatine being coagulated—a thing he had been troubled with.

Mr. DEBENHAM said that citrate of potash would do it if not added in the proper manner.

The CHAIRMAN remarked that bichloride of mercury was an exceedingly powerful antiseptic, so small a proportion as one in a hundred thousand being sufficient to preserve a solution. It was possible that such a minute trace would not be injurious in an emulsion.

Mr. TRINKS had found wood spirit to succeed well as an antiseptic.

Messrs. G. A. Davenport and Godefroi V. J. Porrin were elected members of the Association.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

THE first general meeting of the session was held in the Religious Institution Rooms, 177, Buchanan-street, on Thursday, the 13th inst.

The chair was occupied by Councillor ROBERTSON, who in a few remarks congratulated the meeting on such a large attendance.

The minutes of the last meeting were read by Mr. George Bell, interim Secretary, and approved of.

The first business on the list was to appoint a Secretary in room of Mr. J. Craig Annan, who has retired. Mr. GOODALL proposed Mr. Lennox, which was seconded by Mr. BELL, and unanimously agreed to.

Owing to Mr. J. Y. McLellan's departure to Russia a vacancy was made in the Council, and on the motion of Mr. BELL, seconded by Mr. Wm. LANG, Jun., Mr. Patrick Falconer was appointed to fill the vacancy.

Mr. LANG kindly offered to present members of the Association with a view of Cadzow Forest, taken at the last outdoor meeting. The offer was accepted, and a cordial vote of thanks was given to Mr. Lang for his kind offer.

Mr. FALCONER proposed that there be a discussion at the next meeting on the best medium for the dark room, which was agreed to.

The question-box contained nothing of interest.

The CHAIRMAN then called on the Treasurer, Mr. Geo. Bell, to read his annual report, which is as follows:—

TREASURER'S REPORT—SESSION 1883-84.

DR.	£	s.	d.	CR.	£	s.	d.
To Balance from last year	£15	15	3	By Secretary's Expenses	£5	2	0½
,, Members Subscriptions	22	15	0	,, Printing Account	5	14	0
,, *Conversazione* per Statement	17	15	6	,, Rent of Rooms	9	1	6
				,, Geo. Mason & Co.'s Account	2	5	0
				,, *Conversazione* Expenses	22	0	3
				,, Mr. McCall for Lantern Exhibition	1	1	0
				,, Davidson's (Gilder's) Acct.	0	13	0
				,, Treasurer's Expenses	0	6	0
				,, Mr. Paterson's Collecting Account	1	5	6
				,, Carriage of Goods	0	6	10
				,, *Citizen* Advertisement Account	0	6	6
					£48	2	4½
				,, Balance in Treasurer's hands	8	3	4½
	£56	5	9		£56	5	9

Glasgow, 13th November, 1884.

We have examined the foregoing entries of charges and discharges and found them duly vouched and correct, the balance in Treasurer's hands being £8 3s. 4½d.

(Signed), ANDREW MACTEAR, JOHN PARKER, } AUDITORS.

A vote of thanks to the Chairman brought the meeting to a close.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.

THE ordinary meeting of the above Society was held in the College of Physical Science, Newcastle, on Tuesday, the 18th instant.,—Mr. J. B. Payne in the chair. The minutes of the previous meeting having been confirmed,

The CHAIRMAN said he thought they might congratulate themselves on the result of the exhibition they had held during the past week. The number of exhibitors might have been larger, but the quality of the work he considered very good. He then presented the medal, given by Mr. Borrow for the best set of three pictures taken by a member at the outdoor meetings, to Mr. J. P. Gibson, of Hexham, and the prize (a very handsome album partially filled with views), given by Mr. J. P. Gibson for the best set of two pictures taken by a member who had not previously received a medal or deploma, to Mr. Edgar Goold.

Votes of thanks were duly passed to the judges (Mr. Laws responding) and to the hanging committee.

The presentation picture for the year was announced by the scrutineers to be one by Mr. Edgar Goold, *Bywell*, No. 18 in catalogue, this picture having received the largest number of votes.

Mr. LAWS announced that Mr. Garland had promised a second medal for the transparency competition.

Mr. J. PIKE read an extract from the *Photographic Times*, which he thought might be of use to some of the members, viz.:—"Negatives showing a turbidness on parts of the plates, after removal from the alum bath, may be cleared by treating them with sulphide (?) of soda solution or weak sulphurous acid. The turbidness is caused by a separation of sulphur in the alum bath, the sulphur being retained in the film." He (Mr. Pike) said he had frequently been troubled with such a deposit on the negative, but it was always removable with a pledget of cotton wool.

The CHAIRMAN said that he had been informed recently that benzole, containing a small proportion of resin, had the effect of removing green fog.

Doubts were expressed as to the part played by the resin in this matter.

Mr. PAE remarked that he had found benzole by itself answer the purpose. He also suggested the use of benzole for reducing the density of negatives, locally or otherwise.

A question was found in the box:—"With some plates the leather (hinge) of the dark slide gives an *opaque* marking, and with others a *transparent* one; how can this be accounted for?"

Several members had experienced trouble with their dark slides, the plates of some makers being apparently more easily affected than others.

Mr. DODDS remarked that a trace of ammonia in the leather might account for the opaque marking.

The CHAIRMAN said that he had found common writing ink painted over the leather a complete cure.

Mr. PIKE had recently been working with argentic-bromide paper, and, as a consequence of manipulating large sizes of paper in a very small room, had been troubled with an occasional marking or stain of a very disagreeable colour, with metallic lustre. He had always discarded a print when marked in this way, but had found that the marking was removed by a solution of hydrochloric acid—one part of acid to twenty-five parts of water. He suggested the use of this acid in preference to sulphuric as a clearing solution.

Professor HERSCHEL said that he had also found hydrochloric acid a much superior clearing agent to the acid recommended by the makers.

Mr. JOSEPH GRAY, of Newcastle, showed some transparencies taken on chloride plates of his own make. They were developed with the ordinary pyro. and ammonia developer, and were of a very pleasing tone. He said that any of the various developers in use—sulphite of soda, washing soda, &c., &c.—were applicable, and gave a variety of tones. The transparencies shown were favourably criticised.

Mr. PIKE called attention to the very fine character of the image, and said that the emulsion had apparently been carefully filtered. Some commercial chloride plates looked as if this operation had been omitted.

A paper on and demonstration of the platinotype process was promised by Mr. H. G. Templeton, of Gateshead, for the December meeting.

NORTH STAFFORDSHIRE AMATEUR PHOTOGRAPHIC SOCIETY.

THE annual meeting of the above Society was held at the Mechanics Institute, Hanley, on Wednesday, the 19th instant,—Mr. Charles Alfieri, President, occupying the chair.

Captain West-Jones, Major Harrison, aud Mr. T. G. Keeling were elected members.

It was resolved to permanently lease a suitable laboratory in the Potteries for the Society's use.

As only photographs 8 × 6 had been sent in from two sources for selection as presentation prints, the Secretary was instructed to endeavour to procure some of a larger size for the same purpose.

It was also resolved that albums and note-books on the models of the Postal Photographic Society should be circulated among the members of the Society, who, in many instances, live some miles apart.

The financial report of the Treasurer showed a very satisfactory balance of funds in hand. The annual report of the Council was read and unanimously adopted:—

ANNUAL REPORT.

The Council, in presenting the annual report of the North Staffordshire Amateur Photographic Society, for the year 1884, congratulate the members on having passed another year of the Society's existence—a year which, although not so productive of results in outdoor work as might have been expected from the exceptionally fine summer with which we have been favoured, has still not been barren of results so far as photography is concerned.

We keep apace with the times, even our veterans having for once and for all laid aside collodion, with its baths and dippers. The artistic platinotype, and, to a large extent, the argentic-bromide paper process find favour among us, while carbon has still some votaries, the users of albumenised paper being in a minority.

Taking, first, the monthly meetings, we have not, as a rule, been favoured by the attendance of so many of our members as we would desire; but, as they live farther apart than is the case with societies in less subdivided districts, we cannot expect a large attendance when the weather proves unfavourable. Some of our meetings have been very well attended, and we are glad to see that our members are interested in any paper or demonstration announced, and arrive in force on those occasions.

The following papers have been read, and demonstrations given:—*On Enlarging upon Argentic-Bromide Paper*, by Mr. Charles Alfieri. *Lantern Slide Making upon Gelatine Plates*, by Mr. Charles Alfieri. *Artistic Composition and Pictorial Effect*, by Mr. Charles Alfieri. *Platinotype Process*, by Mr. W. B. Allison. *Printing by Artificial Light and Transparencies on Collodio-Bromide*, by Mr. W. B. Allison. *The Carbon Process*, by Mr. W. B. Allison.

The following articles of apparatus have been exhibited:—Kirkby's instantaneous shutter, and "Eclipse" shutter, from Mr. J. J. Atkinson.—Reynolds and Branson's "Phœnix" shutter, by Mr. M. Burgess.—Camera, lenses, and stands, from Mr. C. E. Elliott, London, all of which were much admired by members.—Three instantaneous shutters, and a dark slide for four plates, made by members.—A changing box for twelve plates, with camera, made by an amateur gentleman.

Outdoor meetings, as usual, were advertised monthly. Only two came off—one to Barlaston, the other into Derbyshire, and even these were but poorly attended. The gentlemen, however, who went had the satisfaction of bringing home several gems of pictorial beauty. We have been unfortunate in the weather on two occasions when excursions were arranged, and in the other instances several of our members were simultaneously absent from home. Thus, a combination of unlucky circumstances has prevented us as a Society from taking advantage of our late beautiful summer. Still, we must hope for better fortune next season.

Our Association, as originally started, was composed of photographers both amateur and professional. However, for various reasons it was, at the June meeting, after mature consideration, resolved that in future only those gentlemen or ladies who practice photography as amateurs be admitted into membership. The subsequent election as members of many well-known gentlemen of county notoriety and local influence has given to the Society a good social status; so that as the amateur practice of our art becomes more and more extended we shall doubtless have the pleasure of enumerating on our list the names of many ladies as well as gentlemen.

The meeting was then adjourned.

BIRKENHEAD PHOTOGRAPHIC ASSOCIATION.

THE preliminary meeting of the above Society was held on Thursday, the 20th instant, at Berry's Grand Restaurant, Argyle-street, Birkenhead,—Mr. John H. Day in the chair.

The undermentioned gentlemen were elected to conduct the business of the Association for the ensuing session:—*President:* Mr. J. A. Forrest.—*Vice-President:* Mr. H. N. Atkins.—*Treasurer:* Mr. J. Maurice Jones.—*Council:* Messrs. A. W. Beer, A. W. Cornish, R. W. Hill, T. Cragg James, E. Newall, and P. H. Phillips.—*Hon. Secretary:* John H. Day, 19, Milton-road, Birkenhead.

Thanks are due to Mr. Richard Hartley and Mr. C. Berry—the former of whom placed his studio in Market-street, and the latter a room in his establishment in Argyle-street, at the disposal of the members for the purpose of holding their monthly meetings, &c.

The competitive element having proved a beneficial stimulus to the production of good work in kindred societies periodical competitions were decided upon, the result of which it was proposed should be duly reported in the newspapers. It was also determined, should the funds of the Society permit, to present each subscriber annually with an enlargement, if possible, from some selected negative, the production of a member of the Association.

Arrangements are in progress for a miscellaneous concert, to conclude with a lantern exhibition, to be held on Thursday evening, the 18th of December, in connection with the above Society, on which occasion a number of original and interesting photographic pictures, the work of amateurs and others, will be thrown upon the screen.

Correspondence.

PHILADELPHIA CORRESPONDENCE.

[FROM OUR SPECIAL CORRESPONDENT.]

THE Science Congress and the Electrical Exhibition have been held in this city, and no lecture or paper upon photography has been given at either. The Science Congress was attended by many members of the British Association, who came on by special train from Montreal for that purpose. The great assistance that photography renders to modern scientific research should have been recognised at least, if no more.

The Electrical Exhibition has been a great success in every way. The exhibition building, which is situated on the west side of the city, has been crowded every night; but whether half or quarter of the people who flocked there cared anything for electrical science is a question. It was the thing to go, and thousands went. I suppose there was very little there that you did not see in the London exhibition, and there were many exhibits which had but a remote relation to electricity. For instance: there was an artificial hatching machine, where chickens were being produced by the score, which was continually surrounded by an admiring crowd; but the only thing I could see about it connected with electricity was an instrument for registering the temperature, called the "telethermometer." This instrument was shown in other parts of the building in connection with refrigerators and store closets for fruit, meat, &c. The expansion or contraction of the mercury acts upon an arm with a pencil at one end, the point of which touches upon a sheet of paper, which is being unrolled from a roller at a stated speed. The paper is ruled horizontally for the hours and vertically for the temperature, so that the variations of temperature are registered, and also the time of the variations. This same instrument is made to give an alarm on board ship upon the approach to icebergs. When nearing icebergs the temperature of the water for a considerable distance is much lower than the normal temperature of the ocean. When the mercury in the telethermometer falls below a certain point (when hung over the side of the ship) a bell is rung by electricity in the captain's cabin or any other part of the ship to which the wire may be taken.

The exhibits connected with photography were few. Mr. W. Curtis Taylor, of 1328, Chesnut-street, had an electric light studio for taking portraits and made a large number of portraits nightly. Mr. Taylor claims to be the first photographer in this city who has used the electric light for portraiture, and shows one taken nearly fifteen years ago; but it has not been done commercially. Mr. Curtis Taylor is the only remaining partner of the well-known firm of Taylor, Wenderoth, and Brown, whose studio was situated at 914, Chesnut-street for so many years, and whose reputation was world wide. Mr. Wenderoth was well known to English readers as a most indefatigable experimentalist. He died early this year, but he had been out of the firm for some years working at his easel as an artist. Mr. Brown also left the firm, and is still working at his easel as a miniature painter, having a studio in Chesnut-street. Mr. Taylor has but lately opened his new studio at No. 1328, and has secured the sole right to photograph in the exhibition building. His studio was most simple. He says his idea was to produce a light as near as possible like his skylight in Chesnut-street. He was very much confined in space, and only exposures were made at the exhibition building, the development, printing, &c., being done in Chesnut-street. The studio was lighted by two Brush lights of 2000 candle power each, about nine feet from the floor, one being placed directly over the head of the sitter, the other about eight feet in front of it, in a direct line with it. Thus the source of light was all at the top, but below the lights and above the head of the sitter was a screen of semi-transparent paper. It is called here "onion-skin paper," and is a kind of tissue paper. This was made translucent by a coating of silicate of soda. This screen sloped towards the side of the studio but did not touch, thus leaving the side to be illuminated by the direct light from the lamp, which, being reflected, gave the side light. Mr. Taylor was very successful, the modelling in many of his negatives being exceedingly soft and delicate; but all had a very unpleasant stare in the eyes, which had to be modified in touching the prints. Vanderweyde, of London, and Kurtz, of New York, had fine exhibits of their electric light portraiture, and Mr. T. H. McCollin, of Arch-street, Philadelphia, had a fine show of enlargements made by the same light, these last being platinum prints.

The leader in the Journal upon the use of sulphite of soda has attracted considerable attention. All the journals here have reproduced it (as they do almost everthing, for there is very little of original matter in American photographic journals as a rule). It has explained the great discrepancy in the experience of many good workers who have advocated or condemned its use in the development of dry plates. I think on this side it has been used more universally and in larger quantities than in England. Take Carbutt's last formula, for instance, which stands thus:—

No. 1.

Water	10 ounces.
Citric acid	60 grains.
Crystallised sulphite of soda	2 ounces.
Pyrogallic acid	1 ounce.
Water to make up	16 ounces.

No. 2.

Water	10 ounces.
Citric acid	60 grains.
Crystallised sulphite of soda	2 ounces.
Carbonate of potash	4 ,,
Water to make up	16 ,,

His directions are for portraits on his special plates to take three-quarters to one drachm of No. 1, and from half to three-quarters of No. 2 to each ounce of water used in developing. You will note the very large proportion of sulphite of soda in this formula. It becomes a very serious item in the success or failure of those using this formula, and there should be no uncertainty as to its condition when used. In my own experience with this salt I have been most unfortunate and abandoned its use many years ago; and, in spite of the many new developers, all of which are claimed to be improvements, still develope with ammonia pyro., the formula of which I published in England some years back. All the American plates I have used here have succeeded better in my hands with ammonia than with the formulæ published by the makers of them. It may be that having had considerably more experience with the ammonia developer than any other it is only natural that I should succeed better with it. I have seen many fine negatives developed according to Carbutt's formula and other formulæ, but I have yet to see in them qualities I could not get with ammonia.

My next communication will be from the sunny south, having accepted an appointment as chief of the photographic staff of the Centennial Photographic Company at the World's Industrial and Cotton Centennial Exposition, New Orleans. This exposition is going to be one of the biggest things ever seen in this country of big things. The photographic exhibit is in the hands of a committee appointed at the Cincinnatti Convention, the chairman of which is Mr. E. L. Wilson, editor and proprietor of the *Philadelphia Photographer*, and the director-general and board of management of the exposition have made him chief and superintendent of the photographic department—a position of much responsibility and of more honour than profit. Should any English photographers wish to exhibit they could make arrangements to send together, prepaid, through Messrs. Atkinson, or other stock house, directed to Mr. Edward L. Wilson, Exposition Buildings, New Orleans, La., U.S.A. I have his authority for saying they will be received and placed to the best advantage. The space for the photographic exhibit is on the gallery of the main building—a position where light and space is everything that can be desired; and I should like to see some of the best English photographs placed in competition with those of their American cousins.

Philadelphia, U.S.A., October 9, 1884.

HYDROKINONE.

To the Editors.

Gentlemen,—Experimenting again today I have obtained as good, if not even better, results by a more simple formula than that given in my letter of last week, namely:—

Saturated solution of carbonate of potass	1 ounce.
Solution of hydrokinone (of a solution of 8 grains to the ounce of water).	2 drachms,
Water, as required	3 to 5 ounces.

Pour this on the plate and leave it on for one or two minutes. *Then*, pouring it off the plate into the developing glass, add—

Saturated solution of oxalic acid	10 minims.

Re-apply to the negative, when the image will almost directly begin to appear, and continue slowly to strengthen, resulting in a good, clean negative.

Now for a remark. Mixing the oxalic acid with the other chemicals before pouring them over the plate appears to stop the development, but on adding twenty minims of *liquor potassæ* (B. P., sp. gr. 1058) the plate then comes out as stated before. Why is this? Is development due to a process of reaction?

In this latter case the plate sometimes becomes spotty and iridescent when viewed by reflected light, but this does not show by transmitted light, except the spots on the unexposed edge that has lain on the flange of the dark slide. However, if the oxalic acid be used as directed above there is no such appearance at any time.—I am, yours, &c.,

Greenhithe, Kent, November 21, 1884. W. T. F. M. Ingall.

NORTHAMPTON MUSEUM PHOTOGRAPHIC EXHIBITION, 1884-5.

To the Editors.

Gentlemen,—May I call the attention of those of your readers who intend exhibiting at our forthcoming exhibition to the fact that the last day fixed for receiving exhibits is December 1st.

To prevent the possibility of any pictures being shut out cases should be sent in at once.—I am, yours, &c., R. Manfield, *Hon. Sec.*

Northampton, November 25, 1884.

LANTERN EVENINGS AT THE PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

To the Editors.

Gentlemen,—As the letters of Mr. G. Smith and Mr. W. Brooks in your last issue are bound to be seriously considered by the Council of the Photographic Society of Great Britain, I would suggest at the same time—or at anyrate between now and next season—that the whole question of lantern exhibitions should be gone into. The Society, to justify its title, should certainly be representative in all its transactions, and take care that what it essays to do should at least be as well performed as the average of undertakings of a similar nature.

On the evenings I looked in to see the transparencies shown it was pretty freely remarked that there was considerable room for improvement as regards uniformity of mounting the slides, and especially in the description of them or method of announcing the titles.

I have not the pleasure of knowing the gentleman who undertook the latter duty, and who probably is a most useful member of the Society; but one could not expect him to be able to describe subjects which he probably saw for the first time when placed on the screen. Some little previous arrangement would be an improvement, and the names of the slides should be called out in a voice that will reach to the far end of the room. Where money is received for admissions, for the credit of the Society it is necessary to give as much *entertainment* as possible.—I am, yours, &c.,

London, November 21, 1884. One of the Public.

THE RECENT ROYAL ARMS CASE.

To the Editors.

Gentlemen,—A few weeks ago I suggested by letter to you a subscription among the profession to reimburse Mr. William Turner his expenses in the law suit against Messrs. A. and G. Taylor. Has anything been done in the matter? If not, are you prepared to be treasurer of the fund?

The desire to recoup Mr. Turner is general, but it is absolutely necessary to appoint some responsible person to receive subscriptions. In the event of you having an objection to undertake this office, rather than the affair should drop through I will undertake to receive moneys and acknowledge the same (with your permission) in the Journal.

I suggest 2s. to 5s. as the amount to subscribe.—I am, yours, &c.,

12, *Clapham-road, S.W., November* 26, 1884. Geo. J. Tear.

[We should prefer to stand neutral in this matter, but publish Mr. Tear's letter in order that any intending subscribers to the proposed fund may know where to forward their contribution.—Eds.]

Notes and Queries.

A. B. says:—"What is the reason that, although the lens of the eye throws an inverted image on the retinal screen, we see objects right end uppermost and not upside down?"

"I have been much interested in your remarks upon the extraordinary conduct of the National Gallery officials. I should like to know with regard to the points raised why it is necessary to take paintings down and to remove glasses for photographing?—J. Thompson."——Our correspondent's question would require too lengthy a reply for these columns, but we may say that the subject will shortly be treated by us in a leading article. Meanwhile we may inform him that it is entirely a question of light and convenience. Neither one removal nor the other need be looked upon as an essential necessity, though in practice they may become necessary.

J. A. T. wishes to know how to make paper translucent by other methods than waxing.——In reply: Coat unsized white paper with a mixture of equal parts of Canada balsam and oil of turpentine, then hang up to dry. If more transparency be desired, take the dried paper and repeat the treatment. Another plan is to treat the paper with a mixture of equal parts of nut oil and oil of turpentine, then to rub the surface immediately with wheaten flour; next hang up for twenty-four hours to dry. The first method gives the whitest tracing paper, the latter the more flexible. After being washed with ox-gall and dried these papers may be written upon with ink.

"I HAVE bought a second-hand pair of hand-scales, but though they are quite new-looking, well made, free from rust, and, apparently, in perfect order (except that the little ornamental rod which should project above the middle of the beam was filed off by me, as it was bent), I cannot get them to weigh accurately. They don't seem to work well. Can you suggest the cause, or remedy?—INQUIRER."——Yes. The cause is the loss of the "ornament" you describe, which is not an ornament at all in the strict sense of the word. Its absence interferes with the equilibrium of the balance, altering the position of the centre of gravity, and so the scale is liable to topple over and not to recover itself properly. The scale will not work well until this pointer is replaced.

"WITH regard to the making of chloride of gold, as dwelt uponby you last week, I should be glad if you would tell me do you think there is much economy in a photographer making his own chloride?—R. TWISS."——In reply: A very simple calculation would have enabled you to discover for yourself as to there being any economy or not. If you purchase a fifteen-grain tube of chloride of gold you will usually find upon it a guarantee that the tube contains seven and a-half grains of metallic gold. In other words, you pay for gold made up as chloride at the rate of (say as an average) two shillings for every seven and a-half grains of metallic gold. There being four hundred and eighty grains in an ounce troy, it is evident that for an ounce of gold converted into chloride we pay

$$\frac{480}{7\frac{1}{2}} = 64 \times 2/\text{-} = £68\text{s. } 0\text{d.}$$

If from that we subtract £4 5s. 0d. (the actual value of the ounce of gold), we find a loss of £1 3s. 0d. per £4 5s. 0d., or about twenty-seven per cent.

"MY Bunsen burner does not act properly. I light it, see it goes all right, and watch it for a minute or two; but almost always when I leave it for a while the light goes out, or, rather, runs down and burns inside with a useless, smoky, disagreeable-smelling flame. Can I do anything to it, or shall I have to obtain a fresh one?—W. HITCHIN."——In reply: There is no need to purchase another, though it is possible you may not have the best form of burner. The running down of the flame is caused by an excess of air supply, a means of regulating which is to be found attached in the best form of Bunsen. Notice whether at the base of the instrument there be not a metal ring perforated with holes fitted to it. If there be, you have only to turn it slightly till the outer holes are not precisely opposite those in the base, and by this means you will check the egress of air to any extent you wish. Should there be no loose ring you need only slightly plug up the holes which you will find pierced in the base. We have performed this satisfactorily by breaking a wooden match into two pieces and placing them in two opposite apertures.

INQUIRER is perplexed by the conflicting testimony of skilled photographers as to the utility of sulphite of soda in the developer.——Much of these varied opinions would disappear if pure recrystallised sulphite of soda were bought in the first instance, and care then taken to give it the right degree of acidity before adding the pyrogallol to make the stock solution. A sample of sulphite of soda which looks dead white and chalky, and not in clear, bright crystals, is bad. When the salt is good, very little acid need be added to it to give it sufficient reaction before the addition of the pyrogallol; but there should be sufficient acid to give a decided reaction with litmus paper. Sulphurous acid is good for the purpose; but citric acid will do when the sulphite of soda is pure, because so little acid is then required. If much have to be added to neutralise an improper degree of alkalinity, sufficient nitrate of soda will be formed to act sensibly as a retarding agent. The method of applying the developer to the plate may have an influence. If the acid pyrogallol be applied first, and the other ingredients subsequently, the plate receives a preliminary wash of weak free acid, which probably promotes the formation of a clear negative. At all events, we have found the plan to work admirably.

Exchange Column.

*** We are compelled to leave over several Exchanges till next week.

Wanted, a biunial lantern in exchange for a 54-inch Victor bicycle; write for particulars and photograph.—Address, J. K. TOWNSEND, Kimberley, Nottingham.

I will exchange a whole-plate bellows-body camera and lens, Ross's wide-angle doublet with drop shutter, circular diaphragms, sun shade, and whole-plate plate box, all complete and in good condition, for a tricycle in good order.—Address, JAMES ROBB, 209, Dalmarnock-road, Glasgow.

I will exchange a half-plate camera and lens, with three double backs, by Lancaster, whole-plate view lens, by Grubb, and a three-wick enlarging lantern, by Hughes, all in perfect condition, for a whole-plate camera, of modern construction and by a good maker, with two or more double backs.—Address, J. MAHONEY, St. Michael's street, Malton.

I will exchange a Lancaster's improved *méritoire* camera and lens, quarter-plate, with four double backs, complete in case; also gem camera and four lenses, to take twelve on quarter-plate, all in first-class condition, for good half-plate wide-angle lens, balustrade, posing chair, or anything useful in photography. — Address, J. BOWLER, Jun., Oxford-street, Oakengates, Salop.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPHS REGISTERED.—

William Arthur Skill, 58, Bailgate, Lincoln.—*Photograph of S.S. W. Tower, Earl's Barton Church, Northant.*

ASBESTOS.—We believe the light is not yet fully in th market. When it is due notice will appear.

PYROTECHNIC.—We are sorry we have not the gentlemen's present address, or would gladly forward a letter for you.

BEGINNER.—There must be some mistake; the price of ferrous oxalate is not as many pence as you name shillings.

RAVEN.—Perhaps the best lens for your purpose would be the No. 4, or for very wide angle No. 3 of the same type as the slower one you now have.

W. F.—We shall probably have something to say on the subject in a week or two. At present, especially situated as you are, we would advise you to adhere to the old method.

W. W. EVERS.—1. We cannot refer you to any particular number of the Journal, but if you will state more definitely what you require we will do our best to help you.—2. Bigelow's *Album*—an American publication—is, we believe, out of print.

FIDUS.—The best mountant for the purpose is a thin—say ten to fifteen grains to the ounce—solution of gelatine applied warm to both glass and print, the squeegee being used in the ordinary manner.

W. G.—We cannot at present devote an article to the subject, but may refer you to past volumes of the *Almanac* and to the forthcoming one for such information as can be given without personal instruction. The pencils may be obtained from any dealer in photographic material.

NOVICE.—If you apply to any dealer in lanterns and lantern appliances you will be able to obtain such a work as you require. To ask us to give in this column "particulars as to the making and use of oxygen and hydrogen gas, and any suggestion as to the best form of apparatus jets," is too much.

C. W.—A good solution for the purpose consists of a mixture of nitrate of copper and nitrate of silver. The metal should be heated before application, and the solution re-applied until the desired colour is gained. Bichloride of platinum will also answer. You failed probably in not using heat.

E. W. R.—1. Increase the proportion of soap dissolved; the application in the dry state is no use.—2. Pretty hot, but not hot enough to injure the prints; merely warming is no use.—3. The weaker the toning bath the slower but more regular the action. The weaker the fixing the slower the action and the less the effect in lowering the tone.

GAS LIGHT.—It is more a matter of taste and convenience combined. If, after all that has been written in the past few months on the subject, you cannot make your own selection, we can only say that we still adhere to a ruby, or "ruby on orange" glass of not too pronounced a shade, while there are many who prefer Mr. W. E. Debenham's combination of green and yellow. The choice rests with yourself.

J. M.—1. The mixture should be kept at boiling temperature for a few minutes.—2. The proportions of silver to be converted and of carbonate of ammonia employed for the purpose should bear the same relation to one another as the combining equivalents of the respective salts, bearing in mind that the ammonium salt requires a double atom of the silver salt. Thus, 96 grains of $(NH_4)_2\ CO_3$ if it be pure well combine with 340 grains of $Ag\ NO_3$.—3. We do not know that there is any special "formulæ;" the silicate of potash should be diluted to a convenient strength.—4. You do not state what class of lens—whether portrait or landscape. The larger the stop employed with a single landscape lens the smaller the field it will cover sharply. Thus, your whole-plate lens may be made practically to work more rapidly for quarter-plate than for full size, but it will not bear the use of too large an aperture without entire loss of definition. If you work it with a stop not exceeding one-tenth of the focal length you will not find any cause for complaint.

RECEIVED.—Sands and Hunter; A. Rivot and Co.; J. L. Robinson; &c. In our next.

PHOTOGRAPHIC CLUB.—At the forthcoming meeting of this Club, at Anderton's Hotel, Fleet-street, on Wednesday next, December 3rd, the subject for discussion will be—*On Outdoor Photography.* There will also be an exhibition of photographs taken by the members during the past summer. Annual dinner on December 10th, 1884.

MARION'S ALPHA PRINTING PAPER.—We understand that a demonstration of the working of Marion's alpha printing paper will be given at Soho-square next week. This paper is introduced as a substitute for albumenised paper, and offers the advantage of rapid printing—one and a-half to four seconds in daylight and thirty seconds in gaslight.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.—The annual meeting of the above Society will take place on Thursday next, the 4th December, at eight o'clock, at the House of the Society of Arts. Several important matters in connection with the welfare of the Society will be discussed, and the election of officers for the ensuing year will take place. Intending competitors for the artistic competition are reminded that their pictures must be delivered between the 1st and 4th December.

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1283. Vol. XXXI.—DECEMBER 5, 1884.

COLLODION EMULSION FOR TRANSPARENCIES.

Since we wrote on this subject a fortnight ago we have received several communications suggesting that we have not supplied a sufficiently definite method of working to enable any operator, hitherto inexperienced in dry collodion work, to take up the process we recommend. It had not been in our mind at the time we wrote to descant upon the general subject of collodion emulsion, but rather to confine our remarks, as we did, to the question of tone. We had for the moment lost sight of the fact that a very large number of amateurs of the present day have taken to photography since the days when collodion emulsion ceased to be a pretty regular topic in these columns, and are, therefore, perhaps, wholly ignorant of the details of the process. We may, consequently, be allowed to glance back briefly to the subject, which a few years ago was tolerably well threshed out in all its phases.

One correspondent refers us back to a formula given by Mr. G. F. Williams in 1879, of which we have spoken favourably on more than one occasion. With this he complains he has not succeeded to his satisfaction for transparency work—a complaint we can quite easily understand. The fact is that that formula was intended for rapid negative work, for which purpose it is perhaps as good a one as can be found; but, unfortunately, the requirements of rapid negative and of transparency work are not the same, and the conditions in the two cases are scarcely compatible. Besides this, it will be gathered from our article a fortnight since that an unwashed emulsion is preferable to a washed one for the purpose, if for no other reason than that it admits more readily of the use of an organifier. If the latter be added directly to the emulsion—as is necessary in the case of a washed emulsion—the organifier exerts an influence far from beneficial upon the constituents of the emulsion itself, chiefly on the pyroxyline, with the consequence that the longer the preparation is kept the more inferior is the quality of the film produced from it.

To this we may add the circumstance that, unless the conditions be of the most favourable, and the utmost care be exercised, the character of the film produced by a washed emulsion is not for transparency purposes equal to an unwashed one. It is not that there is any granularity or texture which makes itself apparent, nor is there any difficulty in making clean pictures; but the operation of washing the emulsion seems to take something out of it which deprives it of its power of giving depth, transparency, and colour in the shadows. If an emulsion be divided into parts before washing—the one used as recommended in our last article, the other "washed" and organified with the same solution as that employed with the first half—it will be found that a great difference exists in the quality of the images given by the two. The washed emulsion, though perfectly suitable for negative work, will be found to give a less "juicy" image (to use a term that has been applied for the purpose of conveying the same meaning) than the other, though probably in other respects there will be little difference between them.

Therefore we recommend decidedly, for transparency purposes, an unwashed emulsion. The preparation of the plates may be a more troublesome operation than it is with the washed preparation, which only entails the trouble of coating and drying, but the extra trouble will be fully compensated for by the greater beauty of the results. At the same time we do not mean to infer that washed emulsion is unfit for the purpose; quite the contrary. The fine examples of lantern transparencies by Mr. William Brooks, so familiar to visitors to the South London and Parent Societies, are, we believe, all produced from washed emulsion, and we have in our possession at the present time some emulsion prepared by Mr. Brooks quite two or three years ago, which yields results that it would be difficult to beat by any process. Still, however well the washed emulsion may work, we think the unwashed will work equally well with less trouble.

Another question which exercises the minds of one or two of our correspondents is as to the advisability of using a thick or a thin layer of emulsion—an opaque or a transparent film, as one puts it. This question may be considered, however, apart from the question of mere opacity, for that quality may arise from want of transparency in the layer of bromide or from the piling up of a great thickness of transparent material. Besides this, much depends upon the capability of the film to give density under development. Some of the thinnest and most transparent films in dry plates (and, for that matter, in wet plates also) have been found to be capable of yielding the densest of negatives Look back, for instance, at the old "Hill Norris" plates, and, later again, Major Russell's ordinary "tannin" plates. These, though extremely thin and transparent, yielded negatives in which the highest lights could be made absolutely opaque. On the other hand, it is possible to make an emulsion which shall give films presenting a very dense and opaque appearance before exposure, which possess in all the qualities that combine to make "body" and which yet give but the merest *shadow* of an image on development.

Thus, though transparency and "juiciness" in the shadows are the objects to be aimed at in transparency production, these qualities are dependent on other conditions than the mere thickening or thinning of the film; and we propose, in response to several requests, to give in the course of two or three articles working instructions by which anyone may successfully work the collodion emulsion process and obtain results which, if they do not surpass albumen plates in quality, will come very near them, and, at the same time, leave them far behind in the matter of convenience.

PERMANENCE OF THE GOLD-TONED COLLODION IMAGE.

It will be remembered that, a few weeks back, we devoted an article to the subject of the fading of the collodion image. In that article we alluded to the chances there were of the fading of collodion transfer pictures, more particularly when they were made by the method then described, and by which on one occasion we actually saw them produced. This method, at the time, we were assured was the one universally practised in some establishments. The reason assigned for this plan being followed was that of a great saving of time, and, also, what was of equal importance, namely, that better tones were more easily secured.

As a further example of the fading of the collodion image reference was made to the evanescent character of the once beautiful photo-crayon portraits—a style of picture introduced by the late Mr. Oliver Sarony some fifteen years or so back. So extremely fugitive did some of these pictures prove that we have heard in one case at least of an exposure of a few days only in an outside show-case being sufficient to cause their total destruction. These pictures, it need scarcely be mentioned, were toned with mercury. From this, and many other examples of their fading we could mention, it must not be assumed that *all* pictures toned with mercury will, of necessity, fade, or that all photo-crayon portraits must necessarily be fugitive; for such is not the case, as we have stated on several previous occasions.

Since writing the article to which allusion has just been made we have had an opportunity of seeing a series of half-a-dozen or so of these "photo-crayons," which were made at the time this style of enlargement was first introduced, and we must say that they are beyond question as perfect and free from all signs of deterioration as they could have been the day they were produced. The pictures are rich in tone, bold, and vigorous; and as they were in the frames —although one knew the fact—it was difficult to conceive that the image was on glass, and that the picture was not a veritable crayon drawing on paper. The gentleman who gave us the opportunity of seeing these specimens assured us that during the two years following the introduction of this particular style of enlargement he produced between one and two hundred of these pictures, and he had not been able to trace a single instance of fading or deterioration.

Now, as many are aware, the idea has got abroad that one of the principal reasons why the photo-crayon portrait had such a brief run in public favour was its alleged fugitiveness. Therefore we, very naturally, were anxious to learn the method by which these particular examples were produced. When this was ascertained we could at once see why they had stood this long test of time, and also that pictures made as these were should be theoretically amongst the most permanent photographs it is possible to produce. As the subject may be of interest to our readers we shall, with our friend's permission, here describe the method employed in their production.

The collodion used was one giving a good body, and contained about one grain per ounce more bromide than is usually employed in ordinary collodion for the wet process. The silver bath was of the usual strength of thirty grains to the ounce. It was rendered slightly acid with nitric acid, but no more of this was added than was necessary to yield absolutely clear glass in the lights. The plate was allowed to remain in the sensitising bath for a much longer period than was customary in the wet collodion process, in order to ensure the more perfect conversion of the bromide. On removal from the bath the film had a dense and creamy appearance. After draining somewhat closely the plate was then ready for the camera, and a very full exposure indeed was always given. The image was then developed with a solution of pyrogallic acid, restrained both with acetic and citric acids, and just sufficient alcohol added to cause it to flow easily over the film.

As a very full exposure was always given the image flashed out quickly after the developer was applied, the half-tones and high lights following the appearance of the shadows in rapid succession. Hence the whole of the detail was brought out before the image had time to acquire any actual density. The plate was then well washed under the tap, afterwards fixed in a very dilute solution of cyanide of potassium, and again very thoroughly washed. When the image was examined at this stage it possessed to the uninitiated, we are told, a very unpromising appearance. By transmitted light it was thin and feeble. By reflected light, when backed with a piece of white paper, the lights appeared somewhat over-exposed, and the shadows seemed little better than a buried brown mass, lacking much in detail.

The picture was now toned. This was a very simple operation, and only occupied a minute or two. A solution of chloride of gold—about two grains to the ounce of water—was poured over the plate, and after being on for a few seconds was drained off and again poured on, the effect produced by each application being carefully watched from the back of the plate. As soon as the gold had penetrated the deepest shadows, known by a change in their colour, the plate was once more thoroughly washed and then allowed to dry. It was afterwards varnished with an ordinary hard negative varnish.

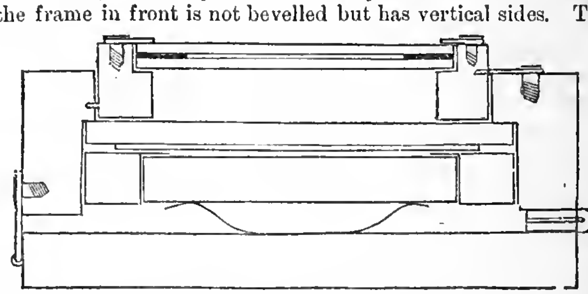
From the description of how these pictures were produced it will be seen that they should be—as undoubtedly they are, and time has proved it—as permanent as any photograph that it is possible to produce. The image is composed of metallic silver and gold—the latter metal, one of the most permanent known, predominating. The image is then hermetically sealed between the glass plate and an impervious varnish, which effectually protects it from all chances of atmospheric influence.

It will be noticed that at no stage of the operations is that alleged cause of the fugitiveness of most photographs—the hyposulphite of soda—employed at all; hence no sulphuretting action can possibly be produced. Nor is there, if the plate be washed with moderate care, any deleterious material whatever left in the film which might eventually act upon the image and lead to its destruction.

VIGNETTING.

In dealing recently [*ante* page 625] with the various methods of producing vignette effects, we proposed upon another occasion to describe a method of vignetting which we had seen practised with success, and which was especially contrived for carbon printing where, in small work at all events, a tinted margin is generally printed in, and for producing vignettes with tinted margins; in fact, for those cases in which a second printing is required that has to be in register with the first printing. This undertaking we proceed to fulfil.

The printing-frame itself is of the kind having a plate glass upon which the negative lies. It is somewhat larger than the negative itself, so as to allow for the adjustment of the latter to the opening in the vignetting form, as this form, unlike that described in our former article, is not capable of such adjustment. The inner edge of the frame in front is not bevelled but has vertical sides. These



vertical sides form a rim into which a second or vignetting-frame is dropped, secured at one end by two pins running into holes cut parallel with the glass of the printing-frame, and at the other end by a small brass button attached to the printing-frame and fitting into a groove cut in the vignetting-frame.

This upper or vignetting-frame is made of deal, and is about half-an-inch in thickness when used for small vignettes, such as the heads ordinarily printed of *carte* size. When intended for large heads or for cabinet portraits the frame is thicker—the additional thickness giving the gradation over a larger surface, which is required in such cases. On the upper surface of this frame a rabbet is cut as deep as two thicknesses of ordinary glass. Into this rabbet is dropped the vignetting form, which consists of two glasses enclosed in a sheet of opaque paper, with an opening cut on the same principle as the openings in the vignetting cards described in our former article—that is, with reference to a set of openings of definite sizes, each denoted by a certain number and letter. The glasses containing the cut paper are held together by paper binding round the edges, and the whole "form" is kept in place in the vignetting-frame by very small brass buttons.

For large heads, or when for any reason it is desired to make the vignetting very gradual, the effect is produced—in addition to the distance from the negative which the wooden frame gives—by using several thicknesses of translucent paper in place of the one thickness of opaque material, and cutting the openings in this translucent paper of sizes each a little larger than the next one. There is then, however, generally a thickness of opaque paper with the largest opening of all to preserve the whiteness of the margin. We have, however, as a variation, seen very pretty effects produced by using translucent paper only, the print in this case being strong in that part which constitutes what would otherwise be the whole picture, and the background and accessories looking as if faintly sketched in.

For printing tinted margins a set of "forms" is used, each consisting of an opaque paper enclosed, as the vignetting forms were, between two glasses, and numbered to correspond with them. Thus, if No. 18 W—signifying a vignetting form with an opening of two and a-quarter inches in length and of wide proportion—had been used in printing the vignette, a form with similar number would be employed when printing down the margin.

In order to secure the registration of the paper, or carbon tissue if that be in use, so that the margin and centre shall be printed in proper place with respect to each other, a light inner frame is employed This frame fits into the back of the pressure-frame, and its internal dimensions are only a little larger than those of the paper intended to be printed upon. This frame is put in after the negative and rests upon it. To this inner frame are hinged the flaps covered with cloth or felt, which press the paper into contact with the negative. The paper being placed close along one side and against the top of the inner frame, its position or registry is the same when the margin is being printed as when printing the picture itself in the centre. The hinged flaps are pressed against the paper by springs on a bar hinged to one side of the printing-frame itself, and fastened by a hook in the usual manner to the other side.

For carbon printing, in order to secure a white safe edge, a sheet of opaque paper is pasted over the front of the inner back frame and an opening of the requisite size cut in it. This is not required when using albumen paper, but in the establishment where we saw the whole arrangement at work it is preferred in both cases. The registration in this case is against slips of card attached to the paper mask instead of to the woodwork of the inner frame itself.

Vignetting is a device which may either add to or detract from the beauty of a photograph; and we believe that a serious consideration of the means to produce the best result and a systematic method of working cannot fail to be of advantage.

DIFFICULTIES IN COPYING OIL PAINTINGS.

The case of the Trafalgar-square monstrosity, which has recently excited so much acrid comment among photographers, has brought into strong prominence the troubles which surround the difficult task of copying oil paintings. Some of them are imaginary, but there remains a sufficiently large residuum to cause the successful production of a good copy to entail the expenditure of a considerable amount of trouble guided by skill, knowledge, and judgment. Let us follow in imagination a picture brought to the photographer's studio.

In the first case it will be encumbered with a heavy frame, which, if the picture be of large dimensions, will render the placing of the picture in a suitable position for photographing a matter of extreme difficulty; hence the removal of the canvas from the frame becomes most desirable, and may be undertaken without risk. If the picture be of moderate dimensions it may possibly have a protective sheet of glass in the manner now becoming so general. At one time engravings and pictures in water-colour and crayon, &c., were only so treated. Oil paintings were supposed not to require a glass, but modern experience proves that their surface is not a sufficient protection. The tendency of the observations made upon the Trafalgar-square case have all suggested the impossibility of photographing the oil painting without taking the glass out, but though we do not go so far as to say that such removal is no assistance, we do say that it is not necessary, and, further, that as good pictures may be obtained when the glass remains in front of the painting as when it is removed.

Two objections are urged against the presence of glass in front of an object to be copied: first, a doubled image through reflection from the two surfaces of the glass; and, secondly, the reflection of external objects. As a matter of fact this first-named reflection, with glass of ordinary thickness and near to the surface of the picture, and the camera not too close to the object, is entirely inappreciable, even in pictures of strong and sudden contrasts. We have before us a set of photographs from a number of crayon studies by Landseer, which were taken by a professional photographer, who makes no speciality of the work, for the purpose of being engraved in the *Art Journal;* yet, although he informs us they were copied through the glass, we fail upon the closest scrutiny to discover the slightest trace of the presence of any medium between picture and lens.

If such be the case with a picture where dark shadows and pure whites appear in the closest proximity, far less danger is to be apprehended when an oil painting is before the lens. Reflections from external objects, however, will stand upon another footing entirely, and will be far more likely to become impressed in the case of an oil painting than an engraving, sketch, or drawing in black and white, which, owing to the absence of varnish and the pure colours obtained through the avoidance of a resinous medium, are photographed so quickly that weakly-illuminated objects which the glass might reflect have not time to impress themselves. With the majority of oil paintings the exposure is so very long that objects so faintly illuminated as to be barely, if at all, visible upon ocular inspection will, if reflected by the glass that protects the picture, become photographed to the exclusion of faint details in the painting itself.

This, however, need not cause the condemnation of the glass, for though, as we have said, further trouble may be entailed thereby, it must be obvious that means may be adopted to obviate ill effects; and they are well worthy of being employed in such a case—for instance, as photographing the national pictures. The means are simple. They merely consist either in placing the picture in such a position that it only reflects neutral objects; or if, as would be the more likely state of things in the average studio, a suitable spot could not be found in placing dark screens in front of the painting, between it and the lens.

There are usually sufficient objects in a studio to enable this to be done—a curtain, movable background, black cloth, covered reflecting screen, or other means; but if there should not be, something would have to be found, for the simple reason—we are now coming to a fresh point—that if no glass existed to reflect objects an equal necessity would arise for screens. The picture itself would then reflect them, the only difference in the two reflections being that with glass the objects would be distinctly reflected, but with the varnished or glossy surface of the pictures the reflection would not only be indistinct, but would further spread to a greater degree on account of the surface being uneven and not, practically, plane like a piece of glass, patent plate being generally employed for the purpose.

Reflections may arise from many unthought-of causes. We have seen an apparently inexplicable stain on a plate traced to the reflection from the polished mahogany front of a camera of a portion of the picture itself that has been of an unusually bright character. Further: we have known instances where the face of the photographer, or even his shirt front, cuff, or pocket-handkerchief, as he stood cap in hand, have been reflected.

The simplest method of knowing what objects are out of the sphere of reflection is to stand in front of the lens and closely scrutinise the picture that is being copied, observing whether any glare appears to come from its surface. If there should be any such appearance it will come from some object that must be removed or covered. An imaginary line drawn from the outside of the picture through a point the width of the picture, right and left, from the lens will include all possible reflections; this the photographer can readily calculate himself. When the work is important, and many copies are made, dark cotton velvet curtains would be most convenient; they need not be large if placed in front of the camera with a narrow aperture for the lens, and they would not be costly.

We will return to the subject in our next issue, and treat of further practical difficulties that arise.

In a private letter received from our friend Mr. Frederick York, who is now in the States, we learn that he has already covered five thousand miles in his American wanderings, and has now reached Washington, where he will be engaged for some weeks in photographing what is noteworthy in the city and district. Every accommodation has been afforded to Mr. York in the photographic department at the Treasury, so that we may hope and expect to see some good things when he returns home. He has up to the present time 370 plates to develope. With the New Year he changes his quarters to New Orleans, where he will "do" the great southern exhibition.

SPEAKING on lantern matters, Mr. York says :—"The information published last year in your Journal respecting lantern slides here was misleading. I find that half-a-dollar is the price for plain photo.-slides, or forty-five dollars per hundred, and that regular piracy is not practised here. Things are sometimes copied to order to save delay in sending to England for other copies. There is a first-class manufacturer at Philadelphia who does a large trade, and his prices are about the same as ours in England. The only difference is that he has a sliding scale—8s. a dozen if twelve of a subject be taken, 12s. if six, and 15s. singly ; and his price varies with different subjects—*Yosemite Valley*, *Yellowstone Park*, &c., are more expensive than copies from engravings. I went all over his place, and he was very communicative."

MR. YORK was present at a recent optical lantern exhibition of the New York Society of Photographic Amateurs, and said that he had secured three hundred negatives of American scenery and other subjects of interest during his stay in that country.

A NEW association has just been started in Versailles, under the name of the Photographic Society of Versailles. Its president is M. Eugène Lefèbre, its secretary M. Druy, and its honorary president M. Davanne, President of the Council of Administration of the Photographic Society of France. The Versailles society will publish a journal, and its members intend, among other things, to do the useful work of photographing in general and in detail that grand monument of the pride and ambition of some of the French emperors, the palace at Versailles, also its park and museum.

AT a recent meeting of the Society of Photographic Amateurs of New York, Mr. Partridge described an easy way to convert an ordinary student-lamp into a lamp for developing purposes. He surrounded the light portion of the chimney with on ordinary ruby globe, obtained at small cost, and screened the bottom of the burner with a paste-board tube having a slit cut in to fit over the bent arm of the lamp. The chimney above the globe was protected by an ordinary ferrotype plate bent in the form of a tube, and on the top of the ferrotype tube were laid wires crosswise, on which rested a common small tin cake or biscuit-pan, which prevented the light from escaping upwards.

THE Franklin Institute of America contemplates the establishment of a School of Photography this winter.

IN Belgium there is but one photographic association, but it is in three sections—one at Brussels, one at Ghent, and the third at Liége. By this union of forces a better journal is brought out than could be done by three separate societies, each fighting on its own account. Mr. O. Campo is the new president of the Brussels section, Mr. G. De Vylder of the Ghent section, and Mr. L. De Koninck of the Liége section. The new secretary to the Brussels section is Mr. Lannoy. Mr. O. Campo, the president, is an Italian gentleman, who has long resided in Brussels, and has spent some portion of his life in India. At the first winter meeting of the Brussels section, Mr. L. Rommelaere pointed out the advantages which would result if a display of Belgian photographs were to be made, under the auspices of the Belgian Photographic Association, at the International Exhibition in Antwerp, in May next. It was resolved to consult the sections on the point, and the replies received will determine whether the Association will grant a subsidy to further the object.

THOSE who communicate with foreign journals should write proper names clearly. The *Bulletin* of the Belgian Photographic Association contains a letter from the Secretary to the Dublin Photographic Exhibition, signed "M. Greenwood Pins," also a letter from Mr. W. F. Donkin, of "Packham." Once upon a time a Parisian photographer who could not speak English interviewed an eminent man of science at his home in London. The photographer, on his return home, induced a Parisian journal to print that he had had the honour of consulting in London that "venerable" chemist "Croker Williams." Who from this French description would recognise a former editor of this Journal, Mr. William Crookes?

THE *Bulletin* of the Belgian Photographic Association is a journal of remarkably good quality, setting a good example to a portion of the other continental photographic periodicals. Its contents are intelligently selected, it is well illustrated, printed, and covered, and for years has every month printed a frontispiece illustrating the results of various methods of photo-printing for book illustration. Of late years it has confined itself to frontispieces by permanent processes. Those by Goupil et Cie., of Paris, are remarkably good

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LIME water—that is, solution of lime in water—has been said to be the best of the many chemicals recommended for adding to solution of chloride of gold for the purpose of neutralising it for making a toning bath; but, whatever alkali or alkaline earth be added, it should always be remembered that the normal condition of pure chloride of gold is to be acid. If, therefore, the stock solution be rendered neutral to test paper, the gold in solution is not that salt of gold formerly known as "terchloride"—now more commonly termed "acid chloride"—but one possessing different qualities. It will, when so neutralised, become darker in colour, approaching a brownish-orange rather than yellow, and, what is of more importance in practice, it will not keep. It gradually decomposes and throws down metallic gold upon the sides of the bottle in which it is contained.

STILL, it is very desirable to neutralise before mixing with the acetate or other salt, as then a more definite formula can be arrived at. When unknown quantities of acid are present there cannot be uniformity in the composition of the toning bath. If lime water be used for this purpose we recommend that cold water be used in making it. Hot water dissolves less lime than cold, and it is stated that the quantity of lime dissolved is lessened by the presence of carbonate of lime. These are useful points to note; for, at the best, there is so small a quantity of lime held in solution that the amount of lime water necessary to be stored would be inconveniently great unless it were saturated.

WE should think there is scarcely a compound known which is put to so many uses as collodion. The latest we have heard of is for solidifying creosote for applying to decayed teeth, ten parts added to fifteen of the latter substance being said to combine into a plastic solid.

ANY photographer who may have had his stock of collodion rendered useless through the introduction of gelatine plates may find a pretty use for it during the winter season by converting it into balloons. We hasten to say not for outside use; we have no intention of endeavouring to rival our esteemed correspondent Mr. Shadbolt—toy balloons for ascending indoors, we mean. Collodion is superior to all other substances for this purpose, and with care and a little dexterity a small quantity of collodion will furnish a good-sized balloon. We have seen them from six inches to twenty-four inches in diameter. The mode of manufacture, which is simple, is as follows :—An ordinary glass flask—the shorter its neck the better—is carefully cleaned, rinsed out with distilled water, and perfectly dried. A quantity of collodion is then poured in and the flask turned round in all directions until it is evenly coated, when the residue can be poured out, taking care to have the inside of the neck also covered with the collodion. The flask is then placed neck downwards in a warm place till thoroughly dry; it will be well to give it two full days so as to ensure the absence of all moisture. All that remains is to withdraw this coating of collodion without breaking it—a rather delicate operation, but one that can be performed by not being over hasty and carefully humouring the film. When it is quite withdrawn it can be easily filled with gas from a gas bracket, and will then, from the lightness of the material, ascend in any room. The larger sizes are made in glass carboys, and form very effective objects.

THOSE of our readers who do not care to go to this trouble, and yet would like to have some means of an unusual kind for amusing their juvenile sitters, should make a solution for soap-bubbles, which can be inflated by hydrogen if preferred. With a properly-made solution it is quite easy to produce bubbles close upon a foot in diameter, which can without bursting be rolled along the floor, played with like a shuttlecock—using the arm as a bat; or they can be placed upon a table to be admired, and many a happy, natural pose obtained when every other means have been employed. A solution of oleic acid is better than soap with glycerine and water.

It is stated that if gum arabic be dissolved in water thrown down by strong spirit a precipitate will be obtained of great keeping powers which can readily be dissolved in water. Should this method prove to be practicable it ought to be useful, for, as is well known, gum arabic requires a long time for solution when the pieces as imported are employed; while if powdered gum be used, not to speak of the extra cost, some skill is needed to avoid the whole becoming a sticky mess difficult of solution.

When gum arabic is dissolved in the ordinary way hot water is generally employed to facilitate solution; but it is a mistake to do so, as the solution quickly turns sour. When the water is kept hot during the time the gum is becoming dissolved, no heat being used at any stage of the process, it will be found that the mucilage so formed will keep good for weeks.

Another method of preserving solution of gum has been suggested by Rother, who states that about two ounces of glycerine added to a pound of it will entirely prevent decomposition. This method is not likely to be of such use to photographers as that of Max Regensberg, which, if his recommendation be of proved success, would be a real boon. He says that four or five drops of silicate of soda for every ounce of paste, glue, or mucilage will prevent decomposition. The news seems almost too good to be true. We shall, however, give the plan a trial, when, if it possess any value, our readers will be apprised of the fact.

At a meeting of the Physical Society an interesting note was read by Mr. T. Glazebrook, M.A., F.R.S., upon the polarisation of light. He found that a film of moisture upon a plane of glass altered the angle at which the light became polarised. He also stated that blowing upon a clean plate of glass with moist air or with dry air altered the angle of the emergent polarised light, the former causing a deviation in a direction exactly contrary to that from the latter.

He also exhibited a spectro-photometer the exact details of which had been previously given by him to the Cambridge Philosophical Society. This or some similar instrument approaches what is needed to settle dark-room controversy, and put results upon a scientific basis. Given a ready means of measuring the intensity of light for each ray, it would be easy so to dull the intensities of any sets of rays as to make them uniform, and then test the chemical action. If such a result could be in practice worked out the results would be of great and lasting value.

THE CAMERA AS A METEOROLOGICAL INSTRUMENT.

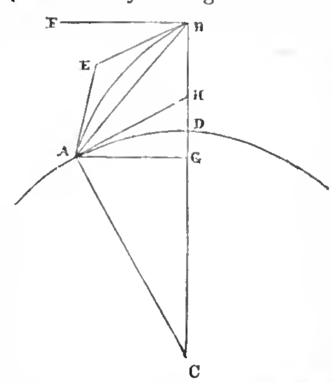
Meteorology is rapidly advancing towards the position of an exact science, and its future progress depends chiefly on the number of careful observations—not at a few isolated stations only, but at every available spot upon the earth's surface. Already a large number of private individuals have equipped themselves with the usual meteorological instruments, and are keeping accurate accounts of the temperature, pressure, and moisture of the atmosphere. Nor is it necessary here to enlarge upon the importance to the photographer of an accurate knowledge of such atmospheric conditions as these, nor upon the great influence which weather exerts on almost every detail of photographic manipulation.

But there is another condition of the atmosphere which, up to the present time, appears to have received but little attention from meteorologists, although it is of the greatest importance to the landscape photographer. It is a fact well known to those who have had much experience in target-shooting that *refraction* plays a most troublesome part in displacing the apparent position of the target, which sometimes appears elevated far above its actual place, and at other times depressed to an equal extent. Thus, the would-be marksman is at a continual loss to estimate the true elevation, and the slightest atmospheric change disturbs his most careful calculations.

In photography refraction plays an equally important part, and more especially when distant ranges of hills figure in the landscape. The actual height of a range of hills, when focussed upon the ground glass, will be found to vary considerably according to the value of the refractive index of the atmosphere.

The usual method of estimating the value of terrestrial refraction is by measuring contemporaneously the elevation of the top of a mountain above a point in the plain at its base, and the depression of that point below the top of the mountain. The distance between these two stations is the chord of the horizontal angle, and this horizontal angle, increased by the difference between the apparent elevation and the apparent depression, is equal to twice the angle of refraction. Generally speaking, the refraction is found to be about the fourteenth part of the horizontal angle.

It is usual to illustrate this by the following geometrical construction:—Let C be the earth's centre, and A an observer, with A H as his horizon; if B be some distant hill top, and the arc A B the path of a ray coming to the observer at A Now the height of D B



is so small compared with the radius of the earth C D that the angles A E B, A C B may be regarded as supplementary to one another. A C B is called the "horizontal angle." B A H is the real height of B, and E A H its apparent height. Again: the real depression of A below B is F B A, and its apparent depression is F B E. The angle F B A is equal to the sum of the angles B A H, A C B; that is, the true elevation is equal to the true depression and the horizontal angle. But the true elevation is equal to the apparent elevation diminished by the refraction, and the true depression is equal to the apparent depression increased by the refraction. Hence, twice the refraction is equal to the horizontal angle increased by the difference between the apparent elevation and the apparent depression. This process involves considerable trouble, and is not suitable for daily comparison of the relative value of the refractive power of the atmosphere.

During the past month I have taken daily observations in the following manner:—A camera, fitted with a Ross's rapid symmetrical lens of eleven inches focus, was adjusted in an upper room of my house in such a way that the landscape upon the ground glass included a garden wall in close proximity, and a range of hills (the South Downs) about 500 feet high, at a distance of a mile. Upon the ground glass I ruled carefully a number of horizontal lines, at intervals of an eighth of an inch. These lines were numbered consecutively, and the spaces between them filled up by finer lines sufficiently close together to enable the eye to discriminate distances of about ·0125 inch. I had thus a scale whereby the smallest variation in the altitude of objects focussed upon the ground glass could be accurately measured. The observations consisted simply in reading off the actual height of the line of hills upon the ground glass. It is important that the position of the camera should remain absolutely unaltered from day to day, otherwise the observations will, of course, be rendered quite worthless.

In order to check the results a photograph was taken in various states of the atmosphere, and the actual distance of the summit of the hill range from the foot of the wall in the foreground was measured with a pair of fine compass points. The following table shows some cf the figures actually obtained, with rough notes as to the general condition of the weather:—

Oct. 25.		Top line of hills reached		7.25.	Weather dull, glass falling.
,, 26.	11 a.m.	,,	,,	8.0.	Clear, no sun, after storm.
	1 p.m.	,,	,,	7.75.	Bright sunshine.
,, 27.	9 a.m.	,,	,,	7.65.	Clear, cold, sun, glass rising.
	3 p.m.	,,	,,	7.75.	,, ,, ,, ,,
,, 28.	9 a.m.	,,	,,	7.9.	Clear, warmer, no sun, rising.
	3 p.m.	,,	,,	7.6.	Dull, rain, glass falling.
,, 30.	9 a.m.	,,	,,	7.6.	Fine, clear, warm.
	4 p.m.	,,	,,	8.0.	Dull, but glass very high.
,, 31.	9 a.m.	,,	,,	8.0.	Very fine and clear, glass high
	1 p.m.	,,	,,	8.0.	,, ,, ,,
	4 p.m.	,,	,,	8.0.	,, ,, ,,
Nov. 1.	9 a.m.	,,	,,	7.5.	Fine, but slight mist.
	2 p.m.	,,	,,	8.0.	Dull, but high barometer.
,, 2.	10 a.m.	,,	,,	8.0.	Fine, clear, glass rising.
	2 p.m.	,,	,,	8.0.	,, ,, ,,
,, 3.	9 a.m.	,,	,,	8.0.	,, ,, ,,
	2 p.m.	,,	,,	8.0.	,, ,, ,,

Nov. 4.	4 a.m.	Top line of hills reached		8.0.	Fine, clear, glass rising.
	2 p.m.	,,	,,	8.2.	,, ,, ,,
,, 5.	9 a.m.	,,	,,	7.99.	Rain threatening.
	1 p.m.	,,	,,	7.80.	,, ,,
,, 6.	9 a.m.	,,	,,	7.90.	Fine, clear, after rain.
	2 p.m.	,,	,,	8.20.	,, ,, ,,
,, 7.	9 a.m.	,,	,,	8.20.	Fine, very cold, glass high.
	2 p.m.	,,	,,	8.20.	,, ,, ,,
,, 8.	9 a.m.	,,	,,	8.80.	Very fine, cold, glass very high
	2 p.m.	,,	,,	8.80.	,, ,, ,,
,, 9.	10½ a.m.	,,	,,	8.4.	Not so fine, glass high.
,, 10.	2 p.m.	,,	,,	8.2.	Dull, misty.
,, 11.	8 a.m.	,,	,,	8.0.	Glass falling.
,, 12.	8 a.m.	,,	,,	8.0.	,,
,, 13.					Too foggy for observation.
,, 14.	2 p.m.	,,	,,	7.99.	Fine, cold, glass falling.
,, 15.	2 p.m.	,,	,,	7.90.	,, ,, ,,
,, 20.	3 p.m.	,,	,,	7.90.	,, ,, ,,
,, 30.	3 p.m.	,,	,,	7.0.	Dull, wet, glass falling.

Thus it will be seen that the refractive power of the atmosphere generally increases with the height of the barometer, and diminishes with the height of the thermometer. The total difference in the actual height of the hills on the ground glass during the period of the above observations was nearly ·2 inch—an amount easily appreciable by the eye on a quarter-plate landscape. Unfortunately, during the whole of the above-mentioned time the weather was remarkably fine, cold, and dry, with an unusually high barometer. If the weather had been more variable greater differences would have been found. A series of such observations taken the whole year round would, no doubt, give valuable information respecting the several conditions upon which refraction depends.

J. Vincent Elsden, B.Sc. (Lond.), F.C.S.

COLOUR OF GELATINO-BROMIDE TRANSPARENCIES.

Gelatino-bromide, for the special work of transparency making, is perhaps as little in favour as any article so universally in use for negatives could possibly be, even for enlarging from. Its handiness has hardly compensated for its flatness and too great tendency to fog, unless used with extreme care. It has to give place largely to carbon and to other processes more or less, whilst for the lantern and decorative purposes only an operator here and there thinks of using it. Nor is the cause of this disfavour hard to seek. The very sensitiveness that is so valuable for the negative is a stumbling-block where extreme clearness of the lights and force in the shadows is desiderated.

This state of things will, however, I venture to prophecy, even in spite of the admonition not to do it "unless you know," be greatly altered should the soda developer come as generally into use as it deserves. This agent puts at once into our hands the power of making from the same gelatine plate standing ready in the stock of every dark room either the softly-gradated negative for which it was intended or the most brilliant and forcible transparency it is possible to see, by simply substituting for the pyro. ammonia developer one of soda and pyro.

A few weeks ago, in this Journal (it was November 14), the Rev. H. Victor Macdona gave a formula that answers perfectly well, namely, one ounce of washing soda and eight grains of bromide of potassium to half-a-pint of water. One grain of dry pyro. to each ounce is named, but this I look upon as entirely a variable quantity. As might be expected, the same principle holds good as when ammonia is being used; the more pyro. the more density, and the restrainer being already mixed with the alkali the power of the print is completely under control. By the addition of more pyro., or diluting the already-mixed developer with the stock soda solution, the operator can do just what he thinks well.

So far, then, there is nothing new in what I have said, and it is only advanced as an introduction to what follows on a simple means of *determining the colour* of the transparency. I think it will be pretty generally admitted that the tone or, strictly speaking, *the hue* of a gelatino-bromide transparency is anything but agreeable as it comes from the developing dish. Here are the means of altering it:—Supposing the transparency forcible and good, the operator may make it what colour he wishes—within moderate limits, of course—but with a much wider average of choice than is usually supposed. The *character of the clearing bath determines the colour.* To make sure of our ground, let us just rehearse the operations. The developing print is watched till the requisite force is slowly built up—much more slowly than with ordinary negative development—and pretty frequent racking is necessary to prevent crapy marks, though there seems no tendency to bubbles sticking to the film, as with ammonia. When developed and fixed the plate is washed, and then plunged into a bath of acid alum to remove the discoloration, which is rather greater than with ammonia.

Of course we all know that a number of acids are in general use in the formation of this clearing bath; but I am not aware that hitherto these acids have been formulated into a means of leaving the image with a series of special and definite colours. I say "definite" colour, because one would suppose that exposure and a variety of causes went to produce the tint, and that, in fact, it was more or less accidental; whereas it seems determinable in a manner reminding one of the definiteness of the rigid tints awaiting one's choice in pigment printing. It may be expected that interesting results await experiments with acids other than those named here, such as sulphuric and formic; but I content myself with naming those tried, and the tints obtainable in each case, premising that in most instances a considerable number of plates were experimented with, and that there was no variation whatever, no one of any batch running into the colour of any other batch or anything tending towards it.

1. *Warm Red.*—This is obtained by a bath of iron with tartaric acid:—

Alum	1 ounce.
Tartaric acid	1 ,,
Sulphate of iron	3 ounces.
Water	20 ,,

Rather more water may be used. There is just a danger of the salts crystallising on the film, though no harm is so done. Further dilution does not appear to affect the tint. The film is extremely non-actinic.

2. *Photographic Brown*—called thus for want of a better and more definite name.—It is describable as something similar to a good-toned brown albumenised print, or like a warm brown carbon print—very unlike the range of colours usually associated with developed pictures on glass. The formula is as before, with the omission of the iron.

3. *Yellow Green.*—This also is so called for want of any really definite term. As all artists well know, there is no talking of colour in set rigid terms; but this is wonderfully suggestive of the peculiar hue of sun-lighted foliage in the spring and early summer, running from whitish yellows through various degrees of yellow greens down to brown greens or green browns in the shade. I hope to try the effect of this on lantern slides from suitable landscape subjects. At present my experiments have been made on nothing less than whole plates:—

Saturated alum solution	1 pint.
Muriatic acid (commercial)	1 ounce.

4. *Greenish Black* was the result from the commonly-used alum and citric solution.

5. *Warm Sepia* was obtained as follows:—

Saturated solution of alum	1 pint.
Glacial acetic acid	1 ounce.

6. *Black*, slightly inclining towards warmth, but very neutral compared with the others. From Edwards's clearing solution (citric alum and iron).

7. *Cool Brown*, produced thus:—

Oxalic acid	1 ounce.
Saturated solution of alum	1 pint.

I may add that the particular brand of plates used happened to be Marion's ordinary "Britannia," though it is not probable that the results would be materially altered with other makes.

Benjamin Wyles.

GAS BAGS *VERSUS* BOTTLES.—LANTERN SLIDES.

I read with very great interest, some few weeks since, the article by Mr. Samuel Highley on *Bottles* versus *Gas Bags.* All who know Mr. Highley are aware that he is no mean authority on these matters. Being a user of the lime light I for one should be very glad to be able to do away with the gas-bags with advantage, but I fail to see how it is to be done. In the first place, good bags are indeed very expensive, and I never like to trust to common bags. I have seen several bags which were not any better than if they had been made of American cloth. If one be willing to pay a good price, good durable bags *can* be obtained. There is one advantage with bags—you can see how much gas you really have; but in a room that is packed they do take up more space than the bottles I admit, and with the latter there is no fear of any harm by being pressed or run against, which has to be guarded against when using bags.

In using bags, if there be one thing that I am more particular in than another it is to see that I have plenty of room for the bags to clear themselves as they fall, and I always insist that I have a clear half-yard from the nearest person. If I find a boy who I think inclined to be troublesome, I remove him some little distance away; but, as a rule, I never have any trouble with an audience, as they begin to know that it is not wise to play any tricks after the accounts that have appeared in the daily papers about accidents therefrom. If at any time an obstacle were put in my way, so that I could not work under my own conditions, I would not on any consideration light up until they were complied with.

Now, as for accidents occurring through weights tumbling off the bags, there need be no danger on that score; I always strap my weights on securely, so that it is not possible for them to shift as the boards go down. With bottles there are no weights to look after, but, under present conditions, the flow of the gases must be regulated at the main cocks on the bottles and not at the burners' When the operator has only one burner to attend to it is easy enough; but when he has to work a double or a triple lantern it is almost out of the question; for if the gases are regulated to keep two or more burners at their best—when, perhaps, two of them have to be turned out—the pressure will be found too great for the tubes, and something must give way. Therefore, with all their troubles and faults, bags are the best until a governor which is automatic can be adapted to the bottles, so that the cocks of the bottles can be turned full on and the lights regulated at the top of the burners themselves. Then everything will go on smoothly enough; but until such conditions can be obtained I fail to see how perfect safety from explosions can be guaranteed. I am in hopes that it will be accomplished some time.

I am alluding to the use entirely of mixed jets. No one will doubt the safety of bottles when full and both at the same pressure; the suspicion is when they are getting low and at different pressures. I am sure everyone will admit that it would not be wise to attempt to work mixed jets with a very great variation of pressure between the two bottles.

When proper regulators or governors, however perfect, are adopted I do not think they will even then drive out the use of bags, for a very important reason, namely, the cost of the gas and filling of the bottles. I think the lowest price for oxygen in bottles is about eightpence per foot. Now, when the cost is compared with the cost of gas made by myself, if much be used it means an everlasting tax. Then, again, there is the hydrogen, which has to be compressed; this is still another additional cost, and the employment of bottles would be found far more expensive than if bags were used. If this were the only obstacle to the use of bottles it might be overlooked on the score of convenience *at times*—when working near home within cab- or cart-driving distance.

There is another fact which must not be lost sight of, and that is the additional cost of railway charges. Supposing one has to go some two or three hundred miles into the country for (say) a five- or six-nights' run; in getting bottles up and down the cost would be enormous, especially if all railways charge the same as the line near which I live. Empty bottles would not come back as return empty boxes, or if they did there is no telling when they would turn up, and how many "paid-ons" there would be on the way bill; and if these were taken by passenger train there would be one farthing per pound for every thirty or forty miles, which must all be taken into consideration.

When a regulator or governor for the bottle is a fact, then manufacturers must put their wits to work to invent a simple compressor, so that the lanternist could fill his own bottles and reduce the cost. I for one should strongly object to pay eightpence per foot for all the gas I used when I could make it for nearly eighty per cent. less, according to the market rate for chlorate of potash, &c. Although I have enumerated all these drawbacks, I should be very glad to have all the gas ready to take into the lecture hall instead of having to make it when I got there; nevertheless I treat gas-making as a very simple matter, for I can fill my large bag in half-an-hour at the outside. But yet it has to be done, and every little that can be dispensed with and can be performed at home is a very great boon. I shall hail any improvement that is made in either gas bags, bottles, or other appliance appertaining to the lantern.

There is one great advantage with the bottles over the bags which, as Mr. Highley points out, must not be forgotten. Any amount of light can easily be obtained, as an enormous pressure is always at command, which is not the case with the bags, unless extra weights are loaded on, and this is not at all times desirable, especially if the bags have been in use some time. The chance of an explosion from the use of the bags never enters my calculation so long as the bags have plenty of room to work and are both under equal pressure, or nearly so. I always use the bags one on the top of the other, keeping the hydrogen at the bottom; this gives it a little more pressure, which is an advantage, as more of that gas is consumed than of the oxygen. Given good pressure and a clear gas way, I then think there is nought to fear.

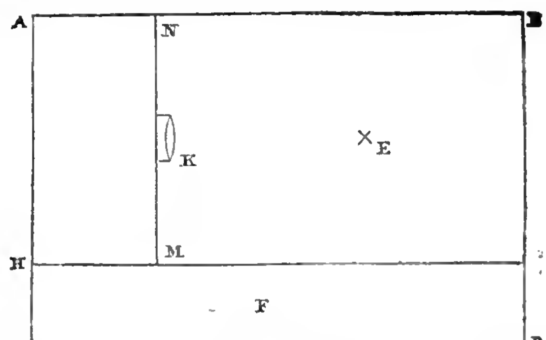
Lantern Slides.—Some time since Mr. George Smith wrote that a good slide ought to show well with any light. I think when he put that forth he was but imperfectly understood, as I have heard many argue the matter. I myself perfectly agree with him in this way. Take, for instance, a fair average slide—viz., clear in the highest lights, full of gradation to the deep shadows—and it will be found to show well on an eight- or nine-feet disc with a good oil light. The same slide will show equally well on a disc twelve to thirteen feet in diameter with a safety or blow-through jet, and equally well with a mixed jet on a disc (say) from sixteen to twenty feet in diameter. But beyond the latter size a more delicate slide is required, possessing just sufficient depth to give brilliancy. If, for the average slide before mentioned, an oil light were used for a twenty-feet disc, the light would not be expected to be sufficiently powerful; whereas with a mixed jet at its best and a nine- or ten-feet disc all the life and delicacy would be taken out of the picture by the intensity of the light. As a rule, I have noticed that amateurs generally make their slides far too dense. I make all my slides so as to be suitable for a very large disc and a powerful light.

W. Brooks.

THE CAMERA OF THE FUTURE.

After reading all that has been written of late about improvements in tourists' cameras, and having had plenty of experience at tourist photography so as to know what its requirements really are, I wish now to give some idea of the kind of camera I should like. The ideas which have been put forth by the various contributors who have written upon the subject indicate a desire for two classes of cameras for tourists, namely, box cameras and cameras which have to be used outside their packing-cases. There is much to be said in favour of each of the two classes, and both will probably find their way into the market; meanwhile I express personal preference for the box type, without asserting that the other type may not be as good.

I require a camera on the principle indicated in the accompanying diagram, in which A B C D represents the box, K the front of the closed camera, and A H the back. The end A C of the box pulls out entirely, exposing the translucent glass and the swing back; the end B D also pulls out entirely, exposing the lens K and the front N M of the camera, which have to be drawn out to E before the lens of shortest focus throws a sharp image upon the translucent screen, which should have a finer surface than



ground glass. When the front M N is not drawn out the space E is utilised to carry a light leather case, in which are packed the other lenses, the focussing-glass, and other necessaries. The space F is for six or more double dark backs—not slides, made on the American principle, to press and not slide into their places. Their shutters pull out entirely, like A C and B D; so none of them are left to flap about in the wind, thereby causing tremors. They are all stowed away for the moment in the space F while the view is being photographed. The double dark backs should be lighter, and be but about half the thickness of the wooden ones at present in use.

It is indispensable that the lenses shall be interchangeable at will in a moment, either by Mr. A. Pringle's plan or upon the rotating disc method. The latter is preferred, supposing that room can be found for the disc, and that the disc will not interfere with the action of a simple drop shutter fixed in the camera front, to be used if desired with any of the lenses. These latter points should be worked out in detail by practical camera makers. There should be some means of indicating when the swing back is absolutely parallel with the front of the camera, for at present the camera is not the instrument of scientific precision which it must become in the future. The camera should have a falling as well as a rising front, and with greater range of motion than at present.

The translucent focussing-screen, made with some better surface than that of ground glass, should not be fixed in its frame, but held "to register" by movable springs, so that when it is accidentally broken another can be substituted for it in a moment. Any thumb-screws used in the camera should be duplicated, that the operator need not be nonplussed by the loss of one. The duplicate screws for fixing the camera to the stand should each have a hole bored through its head, to permit the passage of a thick string.

The covering of the case should be of good leather, capable of resisting long exposure to rain and sunshine, and means must be provided of locking its two ends, otherwise the possessor is never happy when it is out of his sight among inquisitive persons at hotels and elsewhere. If a cheap substitute for leather be used great care must be taken in its selection, attention being given to its durability, its power of keeping out dust, and of resisting atmospheric influences. Possibly if the case were of wood, as in the old-fashioned box cameras, the weight might not be objectionable for small sizes. For larger sizes, and for all sizes when it is not desired to economise, is it not practicable to build up a skeleton framework of tough wood to give rigidity to the essential parts of the camera, and to cover it in with cork to support the outside leather skin?

The top of the stand should be a double one, so that the camera can be turned on its side instantly when desired. Means should exist to enable the camera to be taken out of its case for repairs. The power must be given of racking out either the back or the front of the camera, or both, until they project far beyond each end of the case, the object being to enable upon an emergency a lens to be used of at least three times the focal distance of the length of the largest plate the camera will take. A circular spirit level should be fixed in the case in an appropriate place.

These suggestions are not made to release "the camera maker of the future" from reading the past articles in the discussion, in which there are many suggestions that should not be overlooked by the manufacturer who intends to build up a reputation. The wide-spread interest existing in these matters is indicated by the excitement created by the appearance of Mr. McKellen's camera at the meetings of photographic societies, because of the novel points in it; but I did not see that it contained anything to remedy the chief defect of the present tourists' cameras, namely, that of unnecessarily wasting the time of the operator. W. H. Harrison.

LANTERN SLIDES ON COMMERCIAL PLATES.

Part II.

Having in my last chapter described the methods of slide-making by which I failed, or only partially and occasionally succeeded, I turn with greater pleasure to the method by which I have attained the success to which I aspired. That I may be thoroughly understood I may here state that my object was to produce, both by camera-copying and contact-printing, slides possessing the following qualities:—Perfect transparency in the highest lights, transparency in the shadows, a sufficient amount of half-tone both in lights and shadows, and a tone warm enough to suit my taste. With the process I have described I got one or other, or perhaps two, of these desiderata; but with neither wet collodion nor gelatine did I get all the qualities I insisted upon. With wet collodion I got clear lights, but lack of half-tones and a cold colour; with gelatine I got half-tone and pleasant colours, but failed in producing with certainty clear lights and transparent shadows. I think that with collodion emulsion, both "washed" and "unwashed," I can depend upon satisfying myself if I have to work upon a negative anything like making a decent print, and often with a negative too hard to make a silver print worth fixing.

I began work with a sample of washed emulsion sent to me by Mr. William Brooks. As I had never tried slide-making before in anything like a methodical way, I came to very big grief at first, and wasted a very great number of plates. My first failures were chiefly due to complete over-development. I could never remember that I was working on positives, and my first results would have been of good printing density for negatives. Then I was long perplexed by my plates refusing to fix. This was a (to me) unheard-of fault; however strong I made my cyanide there were always patches that would not fix. I blamed my india-rubber edging, but on omitting the edging the result remained as before—if I ever got the length of fixing—which, as a rule, I did not, simply because my film usually meandered down into the sink. I had had the cyanide for years, and possibly it was adulterated to begin with; but anyhow a new sample fixes the plates rapidly and thoroughly. But as I had never heard of K Cy going wrong, I was a long time before I replenished my stock, and even now I do not see why it should have fixed one part of a plate and not another. Possibly it was not the fault of the cyanide; but I do not care, as I have now no trouble in the matter.

Another vexation that for some time assailed me was the film partly slipping, even when I had edged the film previous to development. I now albumenise the plates first, edge them when the albumen is dry, and again edge them before development. No film ever slips with me now. Mr. Brooks's emulsion is a very thick one, and must be deliberately and slowly applied to the plate; nor should any attempt be made to thin it unless it becomes almost unpourable from evaporation of the solvents. I never pour the emulsion from the plate back to the bottle whence it came, but always filter it through medicated cotton wool after it leaves the plate. I am told that clean tow would be better, but the wool does quite well if not too highly rammed into the flannel. Mr. Brooks sends with his emulsion full instructions for use; but I think it will be well for my readers that I should slightly supplement and enlarge on his brief circular.

The first important point before developing is to be sure that you have pure and fresh ammonia carbonate. This salt is largely adulterated, and even when pure loses in a short time its pristine vigour. In buying the salt the purchaser must satisfy himself not only that he is getting the right article, but that the article is in a proper condition. If it have round the lumps a white powdery substance it is bad, and must be rejected; and the lumps should be not round or rounded, but irregular tablets evidently broken from a flat cake about half-an-inch thick. This, at least, is the appearance of the *good* carbonate I use (Hopkin and Williams's), while the salt I began with, and partially failed with, appeared to be broken from either a large lump or a tablet of much greater thickness. If the best carbonate be not used I prophesy failure. The ammonia carbonate is placed in a closely-stoppered bottle with a quantity of water, and for a day or two the bottle is shaken up occasionally, so that complete saturation may be obtained. Of this saturated solution two ounces are taken; to these are added acetate of soda one drachm, bromide of potassium half-a-drachm, and water four ounces. This mixture must not be heated, but kept in a bottle with an accurately-fitting cork, or a stopper smeared with vaseline. I do not dissolve my pyro. in alcohol, but keep it in its bottle, spooning it out a few grains at a time with a bone egg-spoon.

For contact printing I place my negative in a small printing-frame at the end of a long box, blackened inside. I carry box, printing-frame, and all to a position under a skylight of "obscure" glass, and I expose from half-a-minute to three minutes according to my negative. If the negative be very dense indeed I do not put it into the long box at all; if very thin I not only put it into the long box, but I cover it with a piece of ground glass. The positive must not require forcing in development, nor must it rush up red in all details as soon as the developer is poured on. *Experientia docet!* On removing the collodion plate from the negative I edge it with india-rubber solution, and let it remain about a minute. Then I pour on and off methylated spirits and water, equal parts. While the spirit is being washed off I take about three drachms of my ammonia, bromide, acetate solution, and on my egg-spoon I put about three grains, or less, of pyro. Then I pour on and off twice my ammonia solution, and add the pyro. After again applying the solution I wait for twenty or thirty seconds, and expect to see the image appearing. Some positives I develope to full density in this manner, others wanting contrast I stop short of full density, fix with cyanide, wash, flood with weak nitric acid, and intensify with water half-an-ounce, pyro. four grains, and six to eight drops of the following:—

Silver nitrate	30 grains.
Citric acid	25 ,,
Water	1 ounce.

This I pour off and on rapidly, examining the plate frequently to avoid overdoing the business. If the exposure has been about correct the resulting positive will be of a fine, warm tone; if the exposure has been too long, and the development too short, the positive will be almost a brick red; while if the brevity of exposure has entailed slight prolongation or forcing of development, the tone will be colder, but still pleasant enough. Rather than lose a plate entirely, when slightly under-exposed, I give it a drop or two of liquid ammonia and water, each one part, and bromide one part; but this must be carefully dealt with.

Before tackling the subject of camera-printing I must record a few of my mechanical troubles in this department. When I began I thought it was not of vital importance to exclude all light from the lens beyond what comes from the negative; but I am now satisfied that the best work is done when no light other than that passing through the negative reaches the lens. To obtain an arrangement by which this could be done, and adjustments of distance conveniently made, I spent a lot of time, trouble, and money. I had long boxes made to hold the camera at one end and the negative at the other, but they were all inconvenient and unsatisfactory. At last I hit upon a method that cost nothing. I took my largest camera, 10 × 8, put in the wet-plate slide with carriers for the negatives to be copied, placed the whole on a sort of studio stand, and canted the slide end up towards the sky. Removing the sliding front of the camera, I put into its place the nose of a quarter-plate camera, and closed the space at the sides of the little camera with pieces of cardboard. In the wet-plate slide I put my negative, and racked out the camera till the picture is the desired size on the ground glass of the small camera. Of course back and front of the large slide were open. Having focussed on the small ground glass, I put a piece of ground glass against the negative, closed the back of the slide, put in my small camera slide, open, covered the whole apparatus with a black cloth, raised the back of the large slide, and took note of the time. In from half-an-hour to two hours my exposure is finished. The ground glass behind the negative must not be omitted. The development for positives produced in this way is exactly the same as for those produced by contact printing, and the power of varying the process according to the kind of result required is perhaps even greater. The negatives I intend for silver printing are, as a rule, less dense than those I make with a view to making slides, and when making a slide of a thin negative in the camera I give a full exposure, stop development as soon as all details are up, and intensify the details I have after fixing. On the other hand, I have lately had to copy in the camera negatives not taken by myself, and far too dense to be good for printing. In these cases I give a long exposure, and redevelope with silver and pyro. after the first ammonia carbonate development, but before fixing. It is surprising to see what a variety of effect can be produced by such simple means if only a little sense be brought to bear upon the work.

Any positive made as above can be toned to various colours with gold, but I think preferably with platinum; yet I very seldom find my slides require toning. In fact, I have only toned them for the sake of experiment, or with a view to producing a slide in a colour similar to engraving black.

I have also had occasion to use an "unwashed" collodion emulsion supplied to me by Mr. J. M. Turnbull, of Edinburgh. In beauty of result this emulsion leaves nothing to be desired, but it requires rather more labour in coating the plates. After the emulsion is poured on the plate and allowed to set for about a minute the plate is rinsed in distilled water, and the salts washed out of the film; then the plate gets a swill of beer, and, finally, is again washed and set to dry. Mr. Turnbull's emulsion is very thin, Mr. Brooks's very thick, and Mr. Turnbull's is more rapid than Mr. Brooks's, but requires rather more development to gain density. I develope Mr. Turnbull's emulsion without bromide, merely using saturated solution of ammonium carbonate with two parts of water. I have not used sufficient of the unwashed emulsion to say whether it comes up to the washed; but I can aver that the unwashed is capable of giving slides of great beauty, particularly if soda acetate be added to the developer.

For the reproduction of engravings I have found a plan that surpasses any I ever hit upon before. I take a fully-exposed print on collodion emulsion from a small negative and develope it in the usual way, but stopping slightly short of full density. Having fixed, washed, and applied nitric acid as usual, I place the transparency in the platinum toning bath and leave it there till nothing but a ghost of an image remains. Then I wash well, and intensify to proper density with pyro. and silver. I have then a transparency in pure black and white, while, if my object be to produce a brown or sepia tone, I leave the plate for a much shorter time in the toning bath and do not intensify so much. I never saw finer "engraving-black" tones than those produced by a long toning and a brisk intensification.

I need not say anything upon varnishing and mounting the slides. I would, however, urge the use of a proper positive varnish—that is to say, a perfectly clear and not a yellow varnish; and the varnish must be filtered with the utmost care. It is a great vexation to spoil a perfect slide at the last operation, yet I have often done so from neglect of proper filtration. No care is lost upon a slide, for the smallest speck, either opaque or clear, in the slide is magnified to a monstrosity in the lantern. It will save trouble in the end if only the best patent plate be used for the slides; and for the covers the glass must be minutely inspected for bubbles, scratches, &c., before the slides are finally mounted. The binding strips ought to be broad, so as to serve for the thicker plates that sometimes turn up; and they should be at least fourteen inches long, so as to leave a bit to catch hold of in mounting. It saves a lot of money to cut one's own masks with a proper trimmer, and it is useful to have "templates" slightly varying in aperture for the various shapes. Before mounting let the gummed strips be thoroughly wet, and suit the shape of the mask as far as possible to the composition of the picture.

I do not know a more interesting, useful, or amusing pursuit for winter than lantern-slide making. ANDREW PRINGLE.

THE CAMERA OF THE FUTURE.

MOST of the cameras of the present day, however suitable they may be for studio or home work, are certainly not so portable as they should be for the tourist. They might be made considerably lighter, and with more simple adjustments without impairing their efficiency.

Being somewhat of a mechanic, I have always constructed my own photographic apparatus, lenses excepted. The last camera I made of ordinary construction was some twenty-five years ago. It was for $8\frac{1}{2} \times 6\frac{1}{2}$ plates, made of mahogany, and weighed three and a-half pounds, including a turntable, by the insertion of which I was able to dispense with a loose triangle.

I think few whole-plate cameras weigh less than this. I used it on and off up to last year, and then lent it, with a changing-box for eight plates which weighed one and a-half pound, to a novice, who has returned them to me in good condition; from this it may be gathered that they were strong enough for the ordinary work of a man's photographic lifetime. The slide and the focussing-glass each "took out;" in consequence I felt bound to cover the camera with the focussing-cloth during exposure, and sometimes to place the glass on the ground. The first was inconvenient in windy weather, and the last was objectionable when one stepped upon the glass. The latter feat I performed last year on a lone rock some twenty miles away from a plumber or glazier. I usually carry a spare glass with me, but on this occasion, of course, I did not, and so had a pleasant voyage to Inverness the next day, where I could procure only some very coarse stuff.

I might have adopted the modern plan of keeping the focussing-glass attached to the camera, but, being tired of a changing-box, and disliking the encumbrance of half-a-dozen "double backs," I resolved to construct a camera and dark slides, or, as I call them, "plate-cases," on an entirely new plan. This I completed last spring, and, having tested my invention during a ten-weeks' sojourn in Scotland with complete success, was so pleased with the result that I thought the apparatus deserved protection. I have therefore patented it, and it will, I believe, be shortly brought out by a well-known firm.

The camera itself, for whole plates, will weigh between three and a-half and four pounds. The double-plate cases weigh eight ounces each, and are little more than half-an-inch thick. The five pack in a light case three inches deep; and this case has rolled down divers braes without damage to its fragile contents. The focussing-glass, this time never having left the interior of the camera, has afforded me no opportunity of testing its friability.

The plate-cases are of a peculiar construction, on the shutter principle; and there is a contrivance within the camera which, attaching itself to the shutter of each plate-case as it is introduced, unveils the plate in perfect darkness. The facility with which these plate-cases are filled or emptied without the aid of any light is, I think, unequalled. As in my former camera a turnstile is sunk in the bottom, so that there are no loose parts. The camera is, therefore, complete in itself, and, with the tripod, which folds into a light walking staff five feet in length, can be set up or taken down—I will not say in how many seconds, but with sufficient rapidity and, which is of equal if not greater importance, with little trouble.

I do not believe in *the* camera of the future, for different uses will be better subserved by varied constructions; but the portability and simplicity of the camera described will, if I may judge by my own experience, be appreciated by many a tourist.

A few words as to things in general: One of your correspondents has most liberally suggested for an impromptu plumb-bob the use of his bunch of keys. Should I ever have the privilege of setting up my camera in his company I will gladly, if occasion demand it, avail myself of his fertility of resource—albeit totally unable to return his kindness should we ever meet again, as my own keys are of so truant a disposition that I should deem it highly improper to allow them such an excuse for slipping off and stopping behind. I should much prefer the insertion in the frame of our cameras of the small spirit level. This could easily be fitted, and would prove serviceable in many an awkward position.

What is the use of reducing the weight of cameras if the dry-plate makers do not meet us half way? It has been objected that thinner glass would be liable to fracture, and prove too expensive. In the plates I use some are double as thick as others. The gelatine covering, doubtless, strengthens the plates; of some 200 I have used this summer I have not broken the thinnest. A maker who took greater pains in the selection of his glass, or who even paid a little more for thinner sheets, would find it to his interest to be able to add to his advertisements a decrease in the weight per dozen of his dry plates. M. A.

THE OPTICAL LANTERN AND ITS MANIPULATION.

No. I.

SEVERAL useful books and articles in scientific and popular journals have been written on this subject from time to time, each giving valuable information; but it is thought by the writer that something more can yet be done, judging from the number of queries sent him from time to time, to make matters a little more clear to those who are to a certain extent uninitiated in the use of the optical lantern, and have not the opportunity to get practical instruction.

Having on several occasions started and fairly launched many gentlemen with the most complete triple lantern apparatus without one personal interview, I venture on this little matter with the hope that I may be as successful now in imparting some information to the amateur readers of the Journal that will enable them to work with confidence;

and, at the same time, there may be one or two observations worthy the attention of professionals photographers or hints worth examining.

The old title of "magic lantern" still clings to projection apparatus, no matter how costly or improved, and no doubt will do so for many years to come; for most people revere traditional names and titles, and are slow to appropriate others even if more suitable—such, as in the present case, "optical" for magic lantern. There are very few of the rising generation who think "magic" has anything to do with the entertainments now so familiar in connection with showing photographs on a screen or producing dissolving views, and why? Because the instrument has become so popular that it is to be found in almost every home—if not in an advanced state, as a toy. It is proposed to deal with it here as an instrument for imparting instruction or higher-class amusement and as a practical adjunct to photography.

The essentials of a good optical lantern are—1. Means of adequately illuminating the object to be projected.—2. Suitable lenses to project the object without distortion.

As regards the first: "adequate illumination" may be defined as that amount of light which will enable the object to be *properly* seen by the audience, or, in case of enlargement of photographs, that will produce a clear outline and detail on the sensitised paper. If the object be opaque nothing but the strongest available light at present known (the lime light) is sufficient to give a moderately-satisfactory result; but with transparent objects, such as photographs on glass or paintings on glass, a light produced by *a good oil lamp* will enable a projection to be obtained of from five to nine feet in diameter, according to the form of the burner or burners, supposing also the optical arrangements are satisfactory. This *maximum* (nine feet) can be sometimes exceeded; but, as a matter of fact, it is only under exceptionally-favourable circumstances and accompanied by drawbacks that more than counterbalance the extra size obtained. When a projection is required larger than this, the lime light in some form must be adopted, and the following may be taken as a fair average for the limit of each:—

The Oxycalcium.—Oxygen from a bag or holder forced through a flame of spirit on to a lime cylinder or ball—12 feet diameter.

The Oxyhydrogen Light (unequal pressure).—Oxygen from a bag or holder being forced through a flame of common house gas on to a lime cylinder—15 feet diameter.

The Oxyhydrogen Light (equal pressure).—Oxygen from a bag or holder being forced through a mixing chamber of carburetted or pure hydrogen (under pressure of about the same amount) from a bag or holder, and after ignition impinging on the lime—20 to 30 feet diameter (according to pressure used and form of jet).

I leave out the ethoxo light, because I think in its ordinary form it should only be used by those who have had large experience, and who understand the nature of ether and how to avoid risk.

It will be gathered from the above that the greater the amount of oxygen that can be used proportionately the better the light will be; and the difficulty in getting a very powerful oil light is the fact that as the size of wicks or the number is increased the extra supply of air to support combustion is hard to obtain. Two, three, four, and five wicks have been tried in different forms of burners and arrangements with varying success; and, although the four and five wicks have been found to give an increase of light, the excessive heat renders the manipulation of the optical lantern with them as the source of light a matter of discomfort. Thus, at the present time the three-wick lanterns may be said to carry the palm for practical work.

Another reason against too great a multiplication of wicks is the fact that, if the area of the luminant exceed half-an-inch diameter, a number of false rays pass through the optical system and result in the definition of the picture being impaired. This has been proved by the writer by employing a good average-quality front lens working at nearly full aperture (and so allowing nearly all the light to pass)—first, on a lantern illuminated by the lime light, and then by a multiplex oil lamp. In the former case the definition was all that could be desired; but in the latter the picture was blurred and hazy until a diaphragm was inserted in the objective so as to allow only those rays that were *central* to pass, and this definition was obtained at a considerable sacrifice of light.

The greater the number of wicks the more difficulty there is in regulating them for proper height and for draughtway, and some ingenious arrangements of chimneys have been devised to control the latter; but, notwithstanding all this, the four- and five-wick lamps cannot be said to have given the satisfaction originally anticipated as luminants for the optical lantern, although useful for certain special purposes. G. R. Baker.

FOREIGN NOTES AND NEWS.

Dr. Geiger on the Stability of Certain Dyestuffs.—Honour to Major Volkmer.—Wilde on the Pitting of Gelatine.—Dr. Vogel.—Transatlantic Novelties.—A Handy Cement.—A Bleaching Medium.—The Photographic Wing at the New Technical High School, Berlin.

Dr. Geiger, of the aniline manufactory, placed a series of solutions of dyestuffs in bottles and exposed them all to the light together, when he found that the bottle containing "extra phosphin" bleached much more rapidly than that containing fuchsin; while a third dye, which is a mixture of fuchsin and phosphin, and is known in commerce as "cardinal," bleached as rapidly as pure phosphin did, from which it would appear that the sensitiveness of fuchsin to light was increased by the presence of another substance sensitive to light.

Major O. Volkmer, who takes charge of the photographic department of the Imperial Military Institute at Vienna, has just been decorated by the King of the Netherlands with the Cross of Knight of the First Class of the Order of the Lion.

In the *Correspondenz* Herr F. Wilde writes:—"'Pits' in the stiffened gelatine film are popularly supposed to originate in grease in the gelatine. I have found that when grease is added to a gelatine which stiffens free from 'pits' the addition does not induce the formation of 'pits.' Gelatines having a strongly-acid reaction show a strong tendency to become pitted. The tendency of gelatine to form 'pits' is increased by the addition of acetic or citric acid. The formation of 'pits' also depends greatly on the temperature at which the gelatine film stiffens. If the film stiffen slowly the 'pits' formed are both more numerous and deeper than when the stiffening takes place rapidly. The proportion of gelatine to water also exercises an influence upon that point. The proper proportion of water varies according to the quality of the gelatine. It is not *always* possible to prevent pitting during the stiffening of films, even of the best kinds of gelatine; and these 'pits' are of consequence, as they often cause spots in the developed negative."

The same gentleman says, also, that gelatino-bromide of silver stored in alcohol is popularly supposed to ripen and become more sensitive. He has, of course, found that the alcohol acts as a preservative, but has not discovered that it otherwise improved the gelatino-bromide of silver. Indeed, the alcohol in which gelatino-bromide of silver has been preserved for some time becomes dark in colour when standing exposed to the light, and gives off flakes of glue—a proof that the alcohol does not always act as a pure preservative, but may sometimes act injuriously. Films prepared from gelatino-bromide of silver which had been preserved in alcohol gave glossy negatives, or, at least, negatives the shadow parts of which were glossy. His experience as a daguerreotypist had made him acquainted with the action of chloride of iodide, and for some time back he has been in the habit of adding a little chloro-iodide of silver to the gelatino-bromide of silver. He found that it secured films upon which the negatives covered well and gave thoroughly-worked-out details, with well-worked-out gradations of tints for the different colours.

Dr. Vogel, of the *Mittheilungen*, has been travelling through Germany and Austria on purpose to visit and observe the different photomechanical establishments and the processes worked in them, and will probably publish an account of his observations.

Our transatlantic friends are always on the *qui vive* for something new; they must have the latest invention in photography as in everything else. They have floured their faces and hair, draped themselves in Greek costumes, and been taken as statues; they have replaced the President's head by their own in postage-stamp portraits; they have had themselves caricatured as "out on a fly" or "on a ride" by having their own heads photographed on a large scale, while in front of them a picture of a large goose or a donkey, with a diminutive, headless man on its back, is fitted so that the head of the real sitter seems to belong to and complete the headless one. They have collected portraits of hands, babies, and dogs. Now they go in for portraits of cats; and American photographers, on the principle of "making hay while the sun shines," have raised their prices for cat portraits to double what they charge for their human sitters. Another contemporary has a piece of news from Saratoga, which, if true, strikes a death-blow at the business of the retoucher:—Freckles have become fashionable amongst the *belles* of that resort of the *beau monde!* But if there be no more employment in removing freckles from negatives for the unfortunate retoucher, his case is not altogether without its consolations. The same journal says those ladies whom the sun does not spot naturally in the coveted manner have the desired freckles painted on, and pay at the handsome rate of two shillings per freckle!—one painting warranted to last, with care, for three days. Perhaps removers of freckles (retouchers) thus thrown out of work may find employment as painters of freckles!

The *Archiv* recommends the following almost colourless cement as a very handy thing to have in the laboratory:—Dissolve seventy parts of finely-divided, unvulcanised caoutchouc in one hundred parts of chloroform, and then add fifteen parts of mastic. The mastic will require a few days before it becomes perfectly dissolved. The cement should be kept in a well-corked bottle.

The *Polytechisches Notizblatt* says that experiments in bleaching bones and objects prepared from them (does that include gelatine?) have been carried out lately in the laboratory of the Bavarian Industrial Museum, in which phosphorus acid has been found a useful bleaching medium. Bones, after having all fat removed by means of benzine or ether, are dried, then laid for a long time in a one-per-cent. aqueous solution of phosphorus, and washed and dried again, when they will have assumed the appearance of ivory.

For a number of years back the Technical High School at Berlin has been very much cramped for room, and the photographic department was not the smallest sufferer; indeed, the *Photo. Notizen*, from which we get this information, says that photography was the Cinderella of the sciences taught there. In its treatment, with regard to accommodation, there was a fairly-sized glass house, but the other apartments were mere closets in which four persons could hardly turn themselves at once. In this place Dr. Vogel had often to teach eight persons at a time; and the state of the ventilation may be imagined when it is stated that the height of the zinc roof was only seven and a-half feet. All these drawbacks are about to be remedied; for a splendid new Technical High School, half as large again as the Imperial Palace at Berlin, has just been finished, and adjoining it is another large building devoted to laboratories. One wing of this latter building is devoted to photography and spectral analysis, both of which departments are under the charge of Dr. H. W. Vogel. In the lowest storey there are the work-rooms, which require to be cool, and also a machine house, in which a five-horse-power gas engine drives a lighting machine, by Siemens and Halske, capable of feeding six arc lamps, each giving a light equal to 1,200 candles. A conducting wire reaches from this room to the glass house in the third or uppermost storey, where these lamps, giving collectively a light equal to 7,200 candles, should surely render the photographers independent of weather and of sunshine. A wide and easy staircase leads to the corridor of the second storey. A number of rooms open from both sides of it, while the wall spaces between the doors are used for the exhibition of the large collection of landscape, technical, historical, artistic, and scientific photographs, and to specimens of old and new processes collected by Professor Vogel during the last twenty years. On this floor are three rooms devoted to the positive process—to silver, carbon, and platinum printing. One large room is assigned to printing and washing, a smaller one to the dark room, and the third (a large one of the same size as the first) is where the prints are trimmed, mounted, retouched, and pressed. On the other side of the corridor are the teacher's *bureau* and work-room, and two rooms for lichtdruck adjoining the class-room. There is also, further to the west, an enlarging room, where phototypes (or light relief prints) and *heliogravures* (or photo.-zinc prints) are made. The negative process is carried on in the third or uppermost storey, which, like the second, is furnished with a lift for raising heavy apparatus, &c. The glass house is thirty-five feet long and twenty-two feet wide, and faces the north. Near it are the room for cleaning plates, &c., the laboratory, and dark room No. 4, which is specially devoted to wet plates. Dark rooms Nos. 1, 2, and 3 are for dry plates, and there is a special laboratory for the preparation of dry plates, fitted up with digesting apparatus, ice-box, levelled stands, &c. There are also a number of smaller work-rooms, which are intended to be placed at the disposal of artists or scientists who may be conducting independent investigations. The whole building is properly ventilated, and is heated by means of hot-water pipes. The dark rooms are lighted by Edison lamps. The adjoining photometric and spectral analysis laboratories and work-rooms are all fitted up with the latest improvements and inventions, the whole of the arrangements being calculated to excite the envy and admiration of all other cities. Vienna has long been desirous of having a similar establishment, but has been put off with the excuse of want of space and funds. However, if it should now obtain the desired grant it will be able to profit largely by the examination of the new building at Berlin. That we should have one in this country, also, is improbable, and perhaps not so very desirable, as State endowment of specific technical studies does not seem to be so much in accord with the idiosyncracies of our national character as it is with those countries that are governed on the "paternal system."

FORGOTTEN PROCESSES.

[Abstract of a paper read before the Photographic Club.]

PHOTOGRAPHY seems to me only as a rare and valuable amusement, in which I enter into the result of the labours of others, without in any way contributing to them. It is open, however, to me to think over and to marvel at the progress that photography has made. Men are not now old—in the modern use of the word—who saw its birth as a science, but it had prior to this a long record of forgotten processes. It did not spring full-armed from the head of any inventor, like the block-making machinery at Portsmouth, which is probably unique, as no improvement in it has been found possible since it was first designed.

There were heroes before Agamemnon, but they had, we are told, no Homer to record their deeds; so it is possible that others may have seen visions and dreamed dreams before Fabricius in the early part of the 16th century, when seeking the elixir we should all be so glad to find to confer perpetual youth, threw some sea salt into a solution of nitrate of silver. He noted that the precipitated chloride of silver, which he found as white as milk, became black by exposure to the sunlight. He recorded the fact in his "Book of Metals" published in 1536, but did no more. What bearing could such a thing have on the elixir of youth? Schule, in 1777, re-discovered the fact; and in 1780, Professor Charles, the inventor of the hydrogen gas balloon, turned it to practical use by spreading a solution on paper. He then projected on it a strong beam of sunlight, with the head of one of his pupils interposed, and found that the part exposed became rapidly darkened; and, following the outline of the head, the first *silhouette* was produced—the parent of those fearful and wonderful objects in black paper which are still occasionally to be met with, and were supposed to represent the grandfathers of the present generation.

It is a long leap from Professor Charles to Isidore Niépce and Daguerre. The former, as an independent worker from 1817 to 1826, and afterwards in conjunction with Daguerre, discovered that bitumen of Judea, if spread thin on metal plates and exposed to sunlight under a print or similar object, became white in the exposed parts, and insoluble in essence of lavender. Subsequently, he etched the bare metal with acid, and named the process "heliography." Meanwhile Daguerre had been working out his own idea—still with bitumen; but, by one of those happy accidents—which only genius appropriates—he chanced, it is said, to lay a silver spoon on a metal plate which had been treated with iodine, and lifting it afterwards he discovered an image of the spoon on the metal. From that time bitumen was abandoned. Silver plates were exposed to iodine vapours and heated at first with petroleum and afterwards with mercury for a developer; and on the 10th August, 1839, Daguerre demonstrated his process before the Institute of France, and photography became a fact. Paul Delaroche, who was present, is said to have exclaimed—"Painting is dead from today;" but still it lives, and will never be killed by photography, for this deals only with the objective. The imagination in it has no place. It cannot give to airy nothing a local "habitation and a name;" and while poets dream and ideal beauty beckons the painter will interpret them as best he may. It detracts nothing from the title of Daguerre to a place on the scroll of fame that the daguerreotype must be classed with forgotten processes. So beautiful were its results that they will always be regarded with interest, and it is possible that even now curiosity may here and there still cause it to find votaries; but from this begins the era of forgotten processes, for where are now the amphitype and authotype of Herschel, the calotype of Talbot, the hiergyatype of Hunt, the coffee process, the tobacco process, the Beechy process, and hosts of others—dear to their discoverers, but to few besides? Where are last winter's snows?

But the world owes a large debt of gratitude to men like Robert Hunt, who gave time and thought and money to the advance of this beautiful art. A few names stand out with especial prominence. Claudet, who, in 1841, discovered the use of bromine as an accelerator for daguerreotype plates, and made portraiture possible; Talbot, who invented the calotype process; Herschel, the astronomer, who discovered the use of hyposulphite of soda as a fixing agent; and, greatest of all results, Scott Archer, who, in 1851, with the generosity of a noble mind, gave to the world, free and unfettered, the collodion process. But although this latter, too, has been superseded by the gelatine process, the subjugation has not been complete; the two Richmonds remain in the field, and if the former is vanquished it still retires with strife. And now what shall be said of the future? Has perfection been attained, or are there still worlds to conquer? If we look at the work of the masters of the art, some of whom are present and whose blushes I will spare by not naming them, we might think that the last page was written, and that nothing more remained to be done. But it is those whose work is the best who see room for improvement, and who still go on and strive for perfection yet unobtained. Still remains the dream of photographing in colours—more a wish than an expectation; but the constantly-advancing uses of photography are no dream. The Woodburytype process enables portraits to be multiplied to any extent without fear of fading. The photogravure of Goupil makes collections of engravings despair, for the various "states" of a plate can be so exactly reproduced that no specimen can now be looked upon as unique if it has been in their possession. And its latest application, stellar photography, is perhaps to some the most interesting of all. The mind reels in contemplating the awful depth of space where worlds in myriads spangle the darkness like golden sands: or nebulæ in fantastic forms, the raw material of unformed systems, perplex the astronomer.

Photography is finding its way into book illustration, and it may be that, before many years are past, wood engraving may be driven from the field by its newest rival, and become a forgotten process, which is ever seeking new worlds to conquer. If, as it says in "Locksley Hall,"

"Science moves but slowly, slowly,
Creeping on from point to point,"

so far as photography is concerned it makes good advances.

F. H. CARTER.

RECENT PATENTS.

AMENDED SPECIFICATION.

No. 1380.—"Preparation of Pictures and Photographs." R. BROWN, R. W. BARNES, and J. BELL.—*Dated* 1883.

PATENT SEALED.

No. 11,556.—"Method of and Apparatus for Taking Photographs by Artificial Light." EUGEN HIMLY.—*Dated August* 22, 1884.

APPLICATIONS FOR PATENTS.

15,542.—"Holders for Photographic Films." A. J. Boult.—*Dated November* 25, 1884.

15,757.—"Heliographic Copying Apparatus." H. J. Haddon.—*Dated November* 29, 1884.

15,684.—"Compound Analysing and Polarising Prism." J. Swift.—*Dated November*, 28, 1884.

Improvements in Photographic Cameras.

Alexander Crawford Lamb, Reform-street, Dundee.

The object of this invention is to enable photographic cameras to be carried conveniently in the pocket, while being readily opened up and adapted for use at any time.

The invention consists in connecting the front part of the camera in which is fitted the lens, and the back part or frame which carries the dark slide, by means of springs or spring bars which admit of the front and back parts being brought close together to close the camera, or opened out and rigidly held when it is to be used.

According to one modification of the invention the front and back frames of the camera are connected together by four jointed spring stays or bars similar to those used in collapsible opera hats, and fitted at each corner. Each spring stay is made in two lengths or bars, and jointed in the middle, so that it can fold inwards to close the camera. Between the parts of the stay bar a bearing shoulder is formed, and the bars are held in their distended position by means of helical or other springs which are attached to hooks or catches formed on the bars. When fully distended the two parts of each bar bear on each other at mid-length, and form a rigid stay. The stays thus formed at each corner suffice to hold out the camera in its open position. The usual bellows or dark cloth is connected to the end pieces to form the box-like body of the camera.

The inventor claims—first, the improved collapsible photographic camera; second, connecting the front and back parts of photographic cameras by means of spring stays.

Exhibition.

PHOTOGRAPHIC SOCIETY OF IRELAND.

[Final Notice.]

We have not up to the present mentioned the exhibits of the School of Military Engineering (Nos. 6, 266, and 493), all of which are remarkably well-selected views. We much admire the frame printed in platinotype.

We must not omit to draw the attention of visitors to *Views in the English Lake District* (No. 196), by Mr. Cecil V. Shadbolt, whose balloon views have already excited such wonder. We confess, however, that we would much prefer working *our* camera in the beautiful places which are depicted in this frame, in preference to the higher regions.

The two frames of racing or sailing yachts (Nos. 212 and 196), by H. Symonds, are very fine. We think it would have been better not to have vignetted some of them so much, unless there were substantial reasons for doing so, as it gives a too airy idea and takes away from the reality of the scene.

The Ploughman's Baggin' (No. 214) by Mr. L. Berry.—This title is not understood in Dublin, but adds the charm of a conundrum for the many admirers of the fine pair of horses, which are fully appreciated.

Some large direct pictures by Mr. G. Nesbitt are well worthy of study. No. 206 (a child looking through a frame which she holds on her knees) is rather stinted in idea and strained for effects; nevertheless it pleases the public, but we prefer any of the others shown by this gentleman. *Returning Home* (No. 222) depicts a girl crossing a stream on stepping stones.

Close by hangs *Instantaneous Sea Studies* (No. 242), by Mr. W. P. Marsh, which are really excellent, and some charming portraits (No. 238) by Mr. A. Debenham, the upper pair of children (No. 250) especially being very winning. Here hangs also the frame of small portraits by Mr. J. Lafayette, for which the silver medal was awarded. They are so numerous and so good that it is difficult to make a selection from such a creditable display.

In the inner room is the large collection of mechanical prints (or "photo. etchings," as they are labelled) by R. Schuster, to one of which, *Ein Auto-dafé*, a bronze medal has been awarded. The pictures bear a striking resemblance to the photogravure process of MM. Goupil et Cie., but are somewhat softer and possess greater delicacy in the detail with corresponding absence of depth in the shadows. They are well worth the inspection of print collectors.

The Hon. Assistant Secretary of the Society shows several frames, but we prefer No. 529, consisting entirely of interiors, which are really good.

The Old Town of Hastings (No. 524), by Mr. H. J. Godbold, is a fine instantaneous picture of a gale, showing a wave breaking against a house on the quay. We note, also, stowed away in this room, two fine views, *A Breaking Wave* (No. 718) and *The Folkstone Boat* (No. 720), which, with Nos. 717 and 719, are the contribution of M. Chas. Grassin, of Boulogne.

Mr. Edwin Smithells sends a very nice collection of *genre* pictures. We like *The Unfamiliar Tune* (No. 521), or the *Reverie* (No. 486). *Just Let Loose from School* (No. 264) by the same artist has also been much admired. In the inner room a small view (No. 605) by Mr. T. A. Green (inadvertently spelled "J. A. Greene" in our last notice), the winner of the silver medal for large landscapes, is worth examining. It is not well placed and might be overlooked.

A large collection of ceramic photographs sent by Mr. H. N. White are staged in the ante room or hung in the inner room, and some of them are good examples of their class.

In concluding our notice of the pictures we are fully conscious that we may have omitted much that would be well worth drawing attention to, but out of eight hundred exhibits it is not humanly possible to give to each the attention they might deserve were time of less object than it is.

Apparatus.

Although there is not a large display of apparatus, still a particularly interesting collection—especially to amateurs—has been got together. In considering the quantity it must not be forgotten that many well-known makers do not care being exhibitors, for the principal reason, in our opinion, that the goods sent are likely to be injured; in fact, if one considers the number of people who take on themselves to handle them—a great proportion of whom know nothing about such instruments, and who seek in a very unscientific manner to find out for themselves how and when they bend or open, and in doing so cannot fail to cause injury—it is often to be wondered that any at all are sent. We note that the committee of the Exhibition have reduced this complaint to a minimum by providing locked glass cases containing the more delicate apparatus and lenses, thus ensuring their safety. Any genuine inquirer could have the cases unlocked by the Curator, who would afford every facility for *bonâ-fide* examination, and in many instances information on certain improvements which even an intelligent investigator might not readily discover for himself.

We note that a bronze medal has been awarded to Mr. J. V. Robinsen, of Dublin, for his improved patent camera. From our own knowledge of it as a working instrument we would prefer it to any we have ever used. It is extremely difficult to convey its peculiar points; but the folding fronts into the back, the manner by which the swings are obtained, the reversing arrangement (which, by-the-bye, is known and used in the camera trade in Paris, and consequently not original), and the circles on which the lens is mounted are all valuable improvements, fully justifying the special award of the Committee.

Mr. Thomas Mayne, of Dublin, shows a collection of various camera stands, ruby lamps, &c.

Messrs. Watson and Sons, and Messrs. J. F. Shew and Co., of London, also make a good display. Amongst the novelties shown for the first time in Ireland are the plate-box with glass bottom, intended to facilitate the examination of the contents for the satisfaction of custom-house officers, and the folding tripod stand, which closes up sufficiently to go into a small bag or portmanteau.

A number of instantaneous shutters are also well worthy of inspection—by amateurs in particular; indeed, we are glad to see that this section of the Exhibition is attracting the attention of almost all the practical visitors to the rooms.

As nothing "succeeds like success" we are glad to be able to announce that, financially, the Exhibition has produced much better results than was to have been expected when taking into account that the Committee had to defray all the carriage on the exhibits, and it has been proved by the number visiting it that the venture is fully appreciated. We hope, therefore, to see it repeated even on a greater scale three years hence, if not considerably sooner; in fact, it becomes now an important duty of the Photographic Society of Ireland to see this carried out.

The usual Monday evening lantern exhibition, on the 1st instant, was largely attended, although we would like to see this portion of the programme receive more attention in its details than seems to have been devoted to it. We speak critically and from a photographic-art point of view solely; for we have reason to know that the major portion of the audience were evidently pleased with the entertainment, and "where ignorance is bliss" it is, perhaps, "folly to be wise."

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
December 9....	Great Britain	5a, Pall Mall East.
" 9....	Bolton Club....................	The Studio, Chancery-lane.
" 9....	Newcastle-on-Tyne	College of Physical Science.
" 9....	Glasgow Amateur (Ann. Meet.)..	Institution Rooms, Buchanan-st.
" 10....	Photographic Club	Anderton's Hotel, Fleet-street.
" 10....	Cheltenham Amateur	
" 10....	Bury	Temperance Hall.
" 11....	London and Provincial	Masons' Hall, Basinghall-street.
" 11....	Manchester	Manchester Technical School.
" 12....	Ireland	Royal College of Science, Dublin.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society, held on the 27th ult., the chair was occupied by Mr. W. Cobb.

Mr. W. M. Ashman said that he had had a batch of plates which frilled persistently. He tried various methods of treatment without being able to get over the difficulty, until he thought of increasing the temperature of the developing solution. He tried this and found that it proved successful.

Mr. Trinks had for a similar trouble adopted a method which was in part the reverse of that employed by Mr. Ashman. After an hour's soaking in a solution of chrome alum he had developed in a dish surrounded by a freezing mixture—nitrate of ammonia. This proved effectual. Mr. Trinks then passed round a negative which, in the first place, had been placed in a dish of ferrous oxalate to develope. No image appearing after some time the pyro. developer was tried, and this had the effect of turning the whole of the film jet black. The plate was next immersed in a mixture of hydrochloric acid and water and the image appeared.

Mr. A. L. Henderson, reverting to a suggestion made at a previous meeting by Mr. F. W. Hart, to use bichloride of mercury as an antiseptic in a finished emulsion, said that he intended to try it in place of thymol.

He thought that it would be less likely to be influenced by the action of the atmosphere, and that it would at the same time harden the film and prevent frilling.

Mr. W. K. Burton remarked that he had been experimenting in the sensitising of albumenised paper with a view to obtain some test of the length of time required for floating with different papers and under different conditions. He demonstrated a method which he thought should be a good indication of the paper being brought into the proper condition. He applied a solution of potassium chromate to the back of the paper previous to floating. The change of colour in the part of the paper so touched, caused by the formation of chromate of silver, indicated that the paper had been floated for a sufficient length of time, and the time occupied in doing this was that which should be given to the particular paper on that strength of bath.

A set of prints forwarded by Messrs. Marion and Co., and printed by development upon their new paper, was then passed round. The tone and character of these productions were considered so unlike those associated with prints by development as to be indistinguishable from gold-toned albumen paper proofs.

Mr. Trinks inquired what was the experience of members as to the relative exposure required to bring out details when using the pyro. developer and that prepared with ferrous oxalate. His own practice was to find that pyro. would act with a somewhat shorter exposure than iron.

Mr. A. Cowan remarked that Captain Abney had stated that most detail was brought out by iron development when the solution was prepared in the old-fashioned way with oxalate of potash and ferrous oxalate.

Mr. Ashman had found that he could considerably reduce the exposure by using Monro's developer.

Mr. F. W. Hart said that he had further reduced the exposure to one-thirtieth part of what would otherwise have been required, by using caustic potash and pyro. He thought, however, that this developer was too energetic for practical purposes, and it produced fogging.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

The second general meeting of the session of the above Association was held in the Religious Institution Rooms on Thursday evening, the 27th ult.,—Mr. John Urie occupying the chair. The minutes of last meeting were read and approved. The question-box contained nothing of interest. Mr. Wm. G. Tannahill was elected a member of the Association.

Mr. Patrick Falconer initiated an interesting discussion on the best medium for the dark room, which was continued by several members. Numerous specimens of different-coloured glasses were shown; also some dry plates which had been exposed to different lights.

The Chairman promised to give a demonstration on the daguerreotype process at some future meeting.

After the usual vote of thanks the meeting was adjourned.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

The annual meeting of this Association was held on Thursday, the 27th ult.,—Dr. Kenyon, President, in the chair.

The minutes of the October meeting were read and confirmed, and Messrs. Atkinson, Pooley, Pawson, Roose, Taylor, Webster, and Webb were elected members.

The appointment by the Council of officers for 1885 was then read by the Hon. Secretary, and confirmed by the meeting, as follows:—*President:* Mr. J. H. Day.—*Vice-Presidents:* Mr. A. W. Beer and Mr. P. H. Phillips.—*Treasurer:* Mr. J. H. T. Ellerbeck.—*Council:* Messrs. W. Atkins, Rev. G. B. Banner, Rev. T. B. Banner, Mr. R. Crowe, Mr. J. A. Forrest, Dr. Kenyon, Mr. W. H. Kirkby, Rev. H. J. Palmer, Mr. H. Rutter, Rev. A. J. Scott, Mr. E. Twigge, and Mr. W. A. Watts.—*Librarians:* Messrs. R. Crowe and W. W. Hughes.—*Auditor:* Mr. W. H. Wharmby.—*Hon. Secretary:* Mr. H. N. Atkins.

The Hon. Secretary read the annual report as follows:—

Annual Report.

At the close of the twenty-first year of the Liverpool Amateur Photographic Association the President and Council have every reason to repeat their annual congratulation of the members upon the increasing prosperity and usefulness of the Association.

The accession to the numbers of names on the books has been the largest annual increase recorded in the archives of the Society. Thirty-seven new members have been elected. There have been seven resignations, and no losses during the year by death. The numbers of members on the books at the close of each of the last five years are as follows:—1880, 71; 1881, 78; 1882, 93; 1883, 115; 1884, 145. There has been no falling off either in the interest of the monthly meetings of the year or of the numbers of members attending them.

The following papers have been read:—*Liverpool to Trieste in a Cunard Steamer.* By Mr. G. A. Thompson.—*Development of Instantaneous Negatives.* By Mr. J. H. T. Ellerbeck.—*Development of Instantaneous Negatives.* By Mr. Watts.—*A Day's Photography at Hawarden.* By the Rev. H. J. Palmer.—*On Enlarged Paper Negatives.* By Mr. H. N. Atkins.—*Stellar Photography.* By the Rev. T. E. Espin.

Mr. H. N. Atkins gave a demonstration of his method of enlarging.

During the summer months numerous excursions have been made under the auspices of the Association, and these were productive not only of much enjoyment but of profitable photographic experience and work. Among the most successful of these excursions may be mentioned those to Rufford, to Beeston Castle, and across Mid-Shropshire from Shrewsbury to Wenlock.

Donations to the Library have been received from Captain Abney, Rev. H. J. Palmer, Mr. Watts, Mr. Maurice Jones, and Mr. Stott; and to the album from Messrs. H. N. Atkins, Watts, Williams, Hartley, Wharmby and others.

The beneficial effect of the annual competitions, as incentives to useful emulation, and as spurs to careful and artistic work, has shown no diminution in the past year, and the Council trust that the subjects selected for the competition of 1885 will be productive of a similar satisfactory result. These subjects are as follow:—"Instantaneous," "Farm Yard," "Rocky Shore," "Stereoscopic," "Cottage Door," "Animal Study," "Interior," and "Shipping or Marine."

At the annual *soirée* in St. George's Hall, given by the Associated Artistic and Scientific Societies of Liverpool, our Society contributed a large and interesting exhibition of pictures and apparatus, and the Rev. H. J. Palmer gave a popular lecture on *Mountain Passes among the Alps*, with lantern illustrations from his own negatives.

A presentation print will be selected by the Council before the close of the year for distribution among the members.

The labours of the Hon. Librarian, Mr. J. H. Day, in the past year have been so arduous, and, moreover, so acceptable to the members of the Association, that the Council have requested two gentlemen to undertake the office, the one acting as coadjutor to the other, and they are glad to say that Messrs. Crowe and Hughes have consented to share the duties of the office.

The thanks of this Association are due to the Library, Museum and Arts Committee of the Corporation of Liverpool, for the use of the meeting room in the Free Library; to the Photographic Society of Great Britain for copies of the *Journal;* to Messrs. Scovill, of New York, for copies of the *Photographic Times;* to Mr. F. H. Davies, of Chicago, for copies of *Photography;* to the Liverpool Engineering, Microscopical, Field Naturalists', Philosophical, Philomathic, and Geological Societies, and to the Newcastle Photographic Association, for copies of the annual report of their proceedings and transactions.

Mr. A. Boothroyd proposed, and Mr. W. H. Kirkby seconded, a resolution that the report be adopted. This was carried.

In the absence of the Hon. Treasurer from illness, Mr. Wharmby read Mr. Ellerbeck's report, which showed a balance in hand of about £40. This also was passed.

The Rev. T. B. Banner spoke very warmly of the labours of the Hon. Secretary now about to retire from his post.

The Chairman also referred in complimentary terms to the Secretary's work on behalf of the Association.

The Rev. H. J. Palmer expressed his cordial thanks not only to the Rev. T. B. Banner and Dr. Kenyon for their kind words with regard to him, but also to every member of the Society, both present and absent, for their kindly feeling towards him, and for their forbearance in overlooking the many inefficiencies and neglectfulnesses of the discharge of his somewhat onerous duties.

The Chairman announced donations to the Library from the Rev. H. J. Palmer and Mr. Stott.

Mr. J. H. Day called attention to the large number of subscriptions still unpaid.

Mr. A. W. Beer moved an addition to the Rules, of which notice had been given:—"All members elected on and after the January meeting, 1885, shall pay an entrance fee to the Treasurer of ten shillings and sixpence" He (Mr. Beer) pointed out that, with the exception of the present year, an increase in the number of the members of the Association had invariably been followed by a decrease of the balance in hand at the close of each financial year. This was due to the fact that the meetings were now much more largely attended than of yore, and the consequent expense of the tea provided had been greatly augmented.

Mr. Day seconded the resolution, and, after discussion, it was adopted.

The Chairman reminded the members of the *soirée* in St. George's Hall on December 10th, and gave notice that all exhibits for the Association's display should be sent to Mr. Ellerbeck, 54, Bold-street, on or before December 9th, or on the 10th to the Committee in St. George's Hall.

Mr. Day proposed the re-election of the members of the Hanging Committee who had acted last year, namely, the Rev. H. J. Palmer, and Messrs. Beer, Crowe, Forrest, Guyton, Paris, and Whiteman.

Mr. Tyerman seconded the resolution, and it was carried unanimously.

At this point the judges in this year's competition—Messrs. Beer, Pelham, and Thompson—entered the room, and Mr. Pelham announced the awards as follows:—

Subject.	Prize.
The Brook	Mr. W. H. Kirkby.
Cattle	,, J. H. T. Ellerbeck.
Fruit	,, P. G. Hall.
Architecture	,, W. H. Kirkby.
Mountain Forms	,, P. G. Hall.
Snow Scene	Not awarded.
Shipping	Mr. J. H. Day.
Repose	,, P. G. Hall.
Own emulsion	,, W. H. Kirkby.
Best set of pictures	,, P. G. Hall.
Best picture of all	,, P. G. Hall.

The Chairman cordially thanked the judges for their kindness in officiating, and for the trouble they had taken in making their decisions.

Dr. Kenyon then proposed for re-election the names of the following gentlemen as hon. members:—Messrs. Thompson, Riley, and Banks.

Mr. Kirkby seconded this, and these gentlemen were re-elected, *nemine contradicente.*

The Chairman said that the Council would be glad to receive negatives suitable for enlargement for this year's presentation print, and requested that such negatives should be sent to Mr. Ellerbeck, 54, Bold-street, on or before Monday, December 15th.

Mr. Phillips proposed, and Mr. Beer seconded, a resolution that the following by-law, recommended by the Council, be adopted:—"That after due notice has been given by the Treasurer, if arrears of subscriptions be not paid within three months, members in arrears shall cease to receive notice of meetings." This was passed.

The members then adjourned to a lower room for the inspection of the competition pictures of the present year.

Correspondence.

[*All communications for the* EDITORIAL *department of the Journal should be addressed to the "Editors, 2, York-street, Covent-garden, London, W.C."*]

LANTERN TRANSPARENCIES AT THE RECENT EXHIBITION.

To the EDITORS.

GENTLEMEN,—In the letters on the above subject in your last issue, signed "George Smith" and "William Brooks," there are statements regarding matters of fact which are incorrect. Will you allow me to state that Mr. Gale personally handed to the Assistant-Secretary at the Gallery before 9 p.m., on Thursday, September 25th, a box containing twenty lantern slides made by himself from his own negatives, together with a letter of advice; that these were the only slides received from him; and that they are the same slides that were shown on the screen before the judges at the time of the competition for the medal.

The paragraphs in the Society's circular relating to lantern slides read as follows:—"Slides (which must not exceed three and a-quarter inches in height) must be sent in either on or before Thursday, September 25 (to come with other exhibits before the Judges of Awards), and will only be eligible for award when both the negatives and the slides are the work of the exhibitor. . . . The Judges are instructed to reserve one medal for lantern transparencies (if they find them worthy of awards)." It will be seen, therefore, that the award was made strictly in accordance with the regulations.

I say nothing at present with regard to the other allegations in the letters referred to, which are either beside the point at issue (the legality of the award), or are matters of opinion only.—I am, yours, &c.,

W. F. DONKIN,

November 26, 1884. *Hon. S.c., Photographic Society of Great Britain.*

[Owing to delay in transmission through the post this letter unfortunately reached us too late for insertion in our last issue.—EDS.]

THE LATE PALL MALL EXHIBITION.

To the EDITORS.

GENTLEMEN,—You were good enough to mention in your review of the late Pall Mall Exhibition my pictures, *To the Rescue* and *Rescued*, and you described them as being sensational.

From remarks I have since heard I find there is a prevalent idea that they are sensational in what I may be allowed to call its worst or theatrical sense. I am told that the rocket and line are printed in, so as to make a sensational picture, but I wish to explain that such is not the case. It is really a true transcript by photography of a scene which occurred near here. I consider it the most extraordinary photograph I have ever taken, or that I ever expect to take. Such conditions are hardly likely to occur twice in a lifetime. *Rescued* is also a true photograph of the lifeboat containing the crew of this shipwrecked vessel "Isabella" (the same as in *To the Rescue*) reaching the shore.

Those only who have tried to plant a tripod among beach stones during a strong south-west gale, upon a shore where there is no cliffs to shelter, can appreciate the difficult conditions under which these pictures were produced. It is impossible to focus even if you could guess at what point the vessel would approach the shore.—I am, yours, &c.,

8, *Grand Parade, St. Leonards-on-Sea,* H. J. GODBOLD.
December 3, 1884.

OXALIC ACID IN THE DEVELOPER.

To the EDITORS.

GENTLEMEN,—Confirming what I wrote last week, I have now to add that I find the oxalic acid is better for an over-exposed negative, and the *liquor potassæ* (B.P., sp. gr. 1058) for an *under*-exposed negative.

I should recommend operators to begin with the developer and oxalic acid, and if the picture do not come out pour off this developer; then mix some more with the *liquor potassæ* without the oxalic acid, and I think it will be found that the latter will bring out all there is to get out. I have had to give up cyanide of potassium as a fixer, the fumes being disagreeable, if not worse.—I am, yours, &c., W. T. F. M. INGALL.

Greenhithe, Kent, November 27, 1884.

"LANTERN SLIDES ON COMMERCIAL PLATES."

To the EDITORS.

GENTLEMEN,—A very characteristic and interesting article has just appeared in your Journal on the above subject by Mr. A. Pringle. The information covered a large field of chemical diagnosis (if the term may be allowed); but may I be permitted as one who is not a "tender plant," and has not the misfortune to be forbidden access to my dark room by an over-zealous medical adviser, to offer a few plain jottings on the subject.

Just now, while the days are so short, we need to have our hands at work in the long evenings at something instructive and useful lest they should be tempted into less profitable exercises. I had recent occasion to communicate my experience with a novel developer in transparency work on gelatine plates. This I emphasise in contradistinction to albumen and chloride and other well-known commercial products. However, it is one thing to make experiments and another to secure the best *final* results under a *practical* test.

This I have done with some transparencies I recently made with the soda formula now well known to the readers of the Journal. Last night I had a party of young people at my house, and gave them a magic lantern entertainment—using, of course, the lime light, &c. The results were most satisfactory in every respect, and elicited from the adult guests the greatest admiration for vigour, clearness, and exquisite detail in the shadows.

Now, the point I wish to emphasise is this—that there is a subtle power in common washing soda (of course with the adjuncts of a now tested and recognised formula), to develope a latent image on a purely commercial gelatine film which no agent has to my knowledge hitherto done. This is a point which has not been touched upon in Mr. Pringle's communication, and I was much disappointed when I discovered the omission. We all know about the successes of albumen and chloride plates by careful and conscientious adherence to the published formula of their respective authors; but we have yet to know that silver salts, so fearfully and wonderfully supported in a gelatine pellicle, may be acted upon in some very mysterious manner through an agent other than the pungent fumes of ammonia (an agent not only injurious to the valuable health of Mr. Pringle but all other unbelievers in that very commonplace factor in the cleansing influences of the wash-tub of the laundress, namely, common washing soda), or even the ferrous oxalate developer.

Some very erudite thinker has remarked "that facts are stubborn things" (I don't know what he means). As far as my experience is concerned facts are nothing of the kind; indeed, on the contrary, they are most pliable, interesting, and amiable, for I have obtained as results from the use of this agent the most refreshing surprises and albeit uniform successes. Does it not commend itself to the unhappy experience of some of my readers that *ammonia fort.* is not a very reliable agent under the most favourable conditions, not to speak of the least favourable? *Verbum sat.*

I noted a further assertion in Mr. Pringle's jottings which all but took my breath away. He notes his experience thus—"I found that negatives absolutely or all but unprintable in silver, carbon, or platinotype yielded first-rate slides for the lantern." I had almost to hold a chair when I read it. The fumes of *ammonia fort.* were nothing to the sensation it caused me. I at once thought of the large number of deceased negatives lying in a corner of my churchyard (the nearest alluvial soil to my study), but the ghastly thought sickened me. I recoiled from it with religious horror, and continued strong in my conviction that it was a most unlikely contention and far too good to be true. He tells us that those dead negative failures lying in his garret and cellar were unearthed from their limbo, and in spite of mere "technical imperfections" did good service afterwards as "first-rate lantern transparencies." Verily, startling surprises will never cease. I fancy this will not be the experience of the majority of transparency workers. It certainly is *not* mine. I have come to this sober conclusion, after a considerable number of failures in the production of lantern transparencies, that the faintest trace of any "technical imperfection" in a negative will be fatal to the hope of a decent, not to say a superior, result.

Just one point more and I have done for the present. A great bugbear of Mr. Pringle's transparency work he admits to be the well-known difficulty of not knowing when to stop. He has the *Scylla* of the "blocking up" difficulty on the one side, and the *Charybdis* of the ghostly image on the other. Poor fellow! No wonder he is often perplexed! (and all this, too, in the teeth of medical advice). I feel deeply for him. Will he accept in the generous spirit it is offered the suggestion of a certain cure for the misery of the dilemma which hedges him? Try the formula I have suggested honestly and then stick to it, and at the same time give to Messrs. Genlain and Edwards all the credit of what is without doubt one of the most remarkable discoveries in the annals of photographic research. H. VICTOR MACDONA, M.A.

The Vicarage, Cheadle-Hulme, Stockport, November 29, 1884.

THE MERCURY INTENSIFIER.

To the EDITORS.

GENTLEMEN,—I send you an improved formula for the mercury intensifier:—

A.

Bichloride of mercury; bromide of potassium { Equal quantities in solution.

B.

Cold saturated solution of sulphite of soda.

The addition of the bromide causes a quicker deposit, also a less loss of density in passing through the sulphite solution. The sulphite of soda requires to be full strength.—I am, yours, &c., J. C.

Southport, December 3, 1884.

ENLARGING APPARATUS.

To the EDITORS.

GENTLEMEN,—As the introduction of argento-bromide paper offers such great facilities for the production of enlargements, I, for one, should be very glad if some of our practical brethern would suggest the best way to make an inexpensive enlarging apparatus oneself.

I was present at the demonstration given by M. Hutinet, of Paris, some time ago, and if I recollect rightly the apparatus consisted chiefly of a box containing an argand gas burner. About six inches from that was a piece of ground glass to diffuse the light on the negative, which was placed three inches in front of the latter; then a bellows camera and a lens, which projected the enlarged image on the prepared paper, and was for convenience held in a frame under glass, supported on an easel. M. Hutinet employed gas as the illuminating power; but would not paraffine give a more actinic light? I have tried the latter, but have not been successful in obtaining sufficient intensity of light to cover (say) an $8\frac{1}{2} \times 6\frac{1}{2}$ negative. Enlarging by the lantern is, of course, practical with small negatives, but we often require to enlarge from $8\frac{1}{2} \times 6\frac{1}{2}$ or larger view negatives, and I think the suggestion of a plan of easily producing these enlargements would be a great boon to many a photographer.

I failed to notice whether a reflector were used to concentrate or diffuse the light. This would, of course, be an important point.

Basingstoke, December 3, 1884. CARL STACKEMANN.

Notes and Queries.

A. H. BAILEY inquires if there be any difference except in name between the present collodion transfer pictures and what used to be called "photo-crayon" portraits.——In reply: There is a very great difference between the pictures styled "photo-crayons" and those known as "collodion transfers." The former is a thin collodion transparency on glass, which is backed up with tinted or white crayon paper. On this paper are some hatched lines which, when judiciously used, give the finished and framed picture very much the appearance of a crayon drawing. A collodion transfer is a similar collodion transparency, though somewhat more intense, but with the film transferred from the glass to paper.

G. B. B. asks why it is that when he proceeds to develope some of his carbon prints on a flexible support many of them frill round the edges, while others do not? He adds—"Singularly enough, all those I print with a masked border—that is, those with a white margin round the picture—never frill."——The querist has unconsciously told us the reason of his failure. Those pictures which do not frill are provided with what is known as a "safe edge" in the shape of the mask. In carbon printing it is always necessary that the edges of the tissue be protected from the action of light, and this in our correspondent's case is done by the mask. If he will paste a slip of opaque paper or run a narrow band of black varnish round the edges of all his negatives he will no longer be troubled with frilling.

R. W. wishes to know the influence of nitrate of silver upon albumen.——Nitrate of silver gives a white precipitate in albumen, which precipitate is soluble in ammonia. The precipitate contains 16·15 per cent. of oxide of silver, and while moist it turns black in the air, even in the dark. Solutions of nitrate of silver containing a large excess of acid give, on the addition of albumen, a precipitate containing but 8·9 per cent. of oxide of silver, which lessening of the affinity for the oxide throws some light, perhaps, upon the preservative effect upon albumenised paper of the organic acids. The yellowing of the whites rather than the fading of the blacks of prints on albumenised paper is the point which demands the attention of chemists. Something should be done to remove the slur upon the historical value of present-day photography by abolishing fugitive positive prints.

"HAVING seen a strong recommendation in your columns to use india-rubber gloves for developing and other operations where the fingers are liable to become stained I bought a pair the other day, but they are practically useless. I cannot get them off without peeling them—that is, turning them inside out; then they take so long to put right again, and in the operation get so soiled as to stain all my hand instead of my fingers only, as occurs without gloves, that I am ten times worse off than when not using any such help. As they are such expensive articles I write to warn others against buying them.—J. OWEN."——You are quite right in holding yourself up as a warning to others; but the warning is to take better notice of what you read. There are india-rubber *and* india-rubber gloves, one sort being just as useless as you describe. As much as this was stated in the article to which you refer. You should, if you use gloves with fingers, purchase the cloth-lined sort, not too tightly fitting. You will find that they will slip on and off in an instant, and after a little practice you will be as well able to work with them as without. The objection to them is their liability to wear or, perhaps we should say, cut in handling plates. We would rather recommend, particularly for dry-plate work, the use of mittens—fingers all in one piece; there is less wear upon a single spot. Those of thick, unlined rubber may be used easily if too small a size be not chosen, and then an immense amount of wear can be got out of them.

J. E. G., Westward Ho., asks which of the following we would recommend for his dark room, which faces north:—1. Ruby.—2. Stained red.—3. Cathedral green, with canary medium.——In reply: Stained red, flashed with oxide of copper on one side and oxide of silver on the other, is better than ruby. With artificial light and the strength of the flame, together with the distance from the lantern at which development is effected, intelligently regulated according to law, No. 3 is likely to give the best light. When daylight is used canary medium is risky, because of its imperfect colour. What safety it gives is due chiefly to its thickness. The strongly-yellow bookbinders' cloth, in two layers, would be better for daylight. With variable daylight as the original source, so good a light in the developing room cannot be obtained as from a steady flame always of the same size and at the same distance behind the screen. The lantern should have all four of its sides a translucent yellow, and not one side alone translucent with the other three opaque. The light from the other three sides does not fall directly upon the developing dish, and it assists with safety in the general illumination of the room. Every operator should ascertain by experiment the fogging power of his developing-room light upon each make of plates—say at one foot distance from the screen. It gives him courage in his work, and, when fogging occurs, prevents his occasionally ascribing it to the wrong cause. Many undeserved sins are credited to the uncomplaining light of developing rooms.

"I ENCLOSE plan of my premises and my neighbour's. I should like your advice on the subject of the lights I have put out, having gone to great expense. You will perceive I am more than six feet from my neighbour's house, yet he has sent me a letter threatening me with legal proceedings if I do not take down the new lights which overlook his premises.—THETA."——In reply: Let us first inform you that, in cases of rights of light, questions of six feet, five feet, or any number of feet, have nothing to do with the matter, the popular superstition notwithstanding. So long as you do not encroach upon your neighbour's property by throwing out window sills, spouts, &c., where none projected before, there is no legal process whatever, either in common or statute law, to make you remove either your windows, lights, or even a single pane of glass. His only remedy is to block them up. He cannot knock nails into your wall; but he may build against it any erection that will shut out your light, provided you had no rights of light—that is, no window previously existing in the same wall upon which your side-lights now are. It would seem reasonable to suppose from your plans that there must have been windows already there, and in that case if he erect anything to block up your new lights it must not interfere with your old lights in the slightest degree. If he should do this you could sue him for damages, or obtain an injunction to restrain him from continuing his obstructions. The latter is a very expensive procedure, and, whatever the result, would leave you out of pocket considerably, even if you gained the day "with costs."

Exchange Column.

No charge is made for inserting these announcements; but in no case do we insert any article merely OFFERED FOR SALE, *that being done at a small cost in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a* NOM DE PLUME *be thought desirable), otherwise the notice will not appear.*

I will exchange a slide tinter or other sciopticon apparatus for photographic apparatus.—Address, S. WELLS, Goole.

Wanted, a sciopticon lantern, in exchange for a twelve-inch burnisher in perfect condition.—Address, ALEX. WALKER, photographer, Larbert, Stirlingshire.

I will exchange a hot rolling-press, *carte* size, and gem camera, twelve lenses, for interior backgrounds.—Address, A. JENNINGS, photographer, Skipton, Yorks.

I will exchange stonework pedestal, balustrade, and steps, for a round-backed garden seat and garden scene.—Address, A. WARD, 54, Brixton-road, Kennington, S.E.

I will exchange a pair of double dry-plate slides, $7\frac{1}{4} \times 4\frac{1}{2}$, for a sciopticon camera or Lancaster's quarter-plate *Le Merctoire* apparatus.—Address, JAMES THOMSON, Tynes, Fochabers.

I will exchange a large portrait lens, four-inch diameter, seventeen-inch focus, for 8×6 or 10×8 pictures. What offers?—Address, G. POIRIN, 2, Eardley Villas, Eardley-road, Streatham, S.W.

I will exchange a 10×8 burnisher, worth £2, and two ornamentally-wrought L gas pendants, cost £3 10*s*., for a 15×12 sliding-body camera or a good *carte* repeating-back ditto.—Address, 149, Cheltenham-road, Bristol.

I will exchange a first-class enlarging-lantern, four and a-half-inch condenser, also $8\frac{1}{2} \times 6\frac{1}{2}$ lenses, by Ross, cameras, rolling-press, &c., for anything useful.—Address, W. SLATER, 282, Albany-road, Camberwell

I will exchange a Right and Butler patent eclipse heating stove, five burners, in good condition, do nicely for a green-house, for anything useful in photography.—Address, F. LEWIS, 70, Station-street, Burton-on-Trent.

I will exchange two plano-convex lenses, three and a half inches diameter, mounted in wooden block for condensers, for something useful in photography.—Address, W. A. W., Charlesville, Farnworth, Widnes, Lancashire.

Wanted, a whole- or half-plate wide-angle rectilinear lens, also a half-plate bellows-body camera, in exchange for high-class oil or water-colour paintings.—Address, ARTIST, Claremont Cottage, White Hart-lane, Barnes, London, S.W.

Gem camera, new, in exchange for backgrounds, head-rest, &c.; also steam pressure-gauge, fret machine, castings, and wire for dynamo, in exchange for photographic apparatus, &c.—Address, W. W. EVERS, Wath, near Rotherham.

I will exchange a mahogany biunial lantern, by-pass gas dissolving tap, safety jets, achromatic objectives, with rack, four-inch condensers, a quantity of slides, effects, &c. What offers in good apparatus, &c.?—No. 6B, Norfolk-row, Sheffield.

I will exchange four large backgrounds on rollers, $7\frac{1}{2} \times 7\frac{1}{2}$ mahogany sliding folding-back camera complete, and two head-rests, for Dallmeyer's 2B or other good portrait lens.—Address, N. E. WHITE, 77, Crofton-road, Camberwell, S.E.

I will exchange a nickel-plated cabinet rolling-press and a handsome asbestos gas fire-stove for a rolling-press or burnisher, to take 12×10 prints, or a studio camera in good condition; difference adjusted.—Address, T. S. HICKS, 141, Cemetery-road, Sheffield.

I will exchange a good thirty-hour revolving night clock, with opal globe and lamp, almost new, cost 30*s*., or a seven-foot mahogany folding bagatelle board with cue, for a good tourist's quarter-plate bellows-body camera, with double dark slides, to take plate horizontal or vertical.—Address, A. CLARK, 48, Wellington-street, Woolwich.

Wanted, a symmetrical or wide-angle landscape lens, in exchange for Woodbury and Marcy's patent sciopticon lantern; also excellent 10 × 8 double dark slide in exchange for a good instantaneous shutter.—Address, H., Levens Hall, Milnthorp, Westmoreland.

What offers for superior archimædian double-geared studio stand, large grass mat, several backgrounds, interior and exterior, cabinet burnisher, small operating van, large rolling-machine, and several chromo printing-frames?—Address, JOHN HODGE, 31, Union-street, Stonehouse, Devon.

I will exchange a four-inch centre Brittania Company's lathe, back gear, 3 feet 6 inches gap bed, extra-large face-plate, and all tools and fittings, cost over £18, quite equal to new; also Hughes's six guinea pamphengos, new, and Entrekin's cabinet burnisher. Wanted, a 12 × 10 camera, for outdoor work, with double slides, and a studio camera and lens, and studio stand.—Address, W. DAKIN, Parade Chambers, 1, High-street, Sheffield.

I will exchange a rapid tricycle, with luggage rest, lamp, and gong, capable of carrying whole plate, outdoor kit, reversible gear for hill climbing or speed, in good condition, for a good studio or field camera and lens for *cartes* and cabinets. Camera must be in good condition and lens by good maker.—Address MANAGER, the Studio, Wote-street, Basingstoke, Hants.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

NOTICE.—*Each Correspondent is required to enclose his name and address, although not necessarily for publication. Communications may, when though desirable, appear under a* NOM DE PLUME *as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.*

PHOTOGRAPH REGISTERED.—

Miss Catherine Midleton, Anglesea-place, Southampton.—*Photograph of the Standback.*

ERRATA.—In Mr. W. H. Harrison's article last week for "condemn real glass utterly," *read* "condemn *red* glass utterly." In last paragraph of *Notes and Queries*, for "sufficient nitrate of soda" *read* "sufficient *citrate* of soda.

AN INCANDESCENT PLATINUM LIGHT.—See reply to "Asbestos" in our issue for last week.

W. H. M.—The work is, we believe, out of print, but you may be able to procure a copy by advertising.

O. O. O.—We shall write to you privately. Thanks for the promised article. Kindly forward it at once.

H. A. B.—In putting the lens together you have evidently reversed the components. The remedy is obvious.

AMATEUR.—A stove on the principle of the calorigen will answer best. Do not let the temperature exceed 80°.

A SIX-DAY TRADESMAN.—Your letter is too strongly worded for publication; besides, the matter has been sufficiently discussed.

PUZZLED.—If you adopt the plan of mounting described a few weeks back you will not be troubled with the cockling of the mounts.

PEMBROKE MARSHALL.—At the moment we do not remember to what you refer. We certainly do not recollect the gentleman's address.

LANTERN and one or two other correspondents have not conformed to our rule by sending their names and addresses; hence their communications remain unanswered.

K. A. Y.—The cause of your failure is very obvious if you have been using the salt of which you enclosed a sample, as that is the iodide and not the bromide of ammonium.

TOODLES.—The block appears to be by the Miesenbach process. We do not know if the Miesenbach Company grant licenses to work their process. Write to them; their address is Farringdon-street, E.C.

THE BICHROMATE DISEASE.—Several correspondents who have made inquiries on the subject will find their queries answered in a leading article in last week's number, to which they are referred.

ASPIRANT.—To make the colours "take" on carbon prints rub them over with a piece of fine felt charged with cuttle-fish powder. This must be very finely powdered, otherwise it will scratch the picture.

HERTS.—We should advise you to build the studio according to sketch No. 2. There is very little difference practically between it and No. 3, except that the former will be the more convenient to work.

H. BOWMAN.—So far as we can see the pictures appear to be *bonâ fide*, and not, as you surmise they are, produced by "some dodge or trick." There is no reason why they should not be what they are represented as being.

SPOTTER.—Try the effect of spotting the prints with oil colour and allowing it to thoroughly dry. The oil colour sold in tubes and thinned with turpentine will, we think, answer your purpose. If it do not, write again.

R. M.—Your failure may be due to one of two causes:—First, that the paper you are using is not one which will yield black tones: second, that the negatives are not vigorous enough even if the paper be of the right character.

A. G.—The address of the Willesden Paper Company is Willesden, Middlesex, N.W. The best material with which you can coat the wooden vessels, so as to render them waterproof, is paraffine wax. That will have no effect on silver solutions.

J. J. W.—From the very insufficient data you give we can scarcely hazard an opinion as to the cause of the spots. From what we can see you have allowed air-bubbles to remain between the prints while they were in the fixing solution or in the first washing waters.

F. J. SHARPLES.—From the appearance of the plates we imagine you have forgotten to iodise the albumen. If this be the case no wonder you have failed. If you had followed the instructions as published you should have obtained a very different-looking plate.

GEORGE DRUMGOOLE.—The water in which you have washed the prints has evidently been contaminated with hyposulphite of soda. Perhaps you used the same dish for washing in which you had previously fixed some prints, and it had not been thoroughly washed.

A STAFFORDSHIRE AMATEUR.—Your difficulty arises from adding too large a proportion of alcohol to the emulsion. As you do not say the quantity you have used we can scarcely set you right, but you will do well to try with half of what you have been using hitherto.

H. B. J.—By all means, for that size of slide, have three and a-half inch condensers. We recommend you to get a "blow-through" jet until you have had more experience with the lime light. When you have gained this then you may with safety adopt the mixed jet.

G. MITCHELL.—The failure in your first essay in the collodion process, no doubt, proceeds from your using such a very old sample of collodion After keeping for "six or seven years" the pyroxyline has, doubtless, become decomposed. Try again, and use a collodion of more recent make.

A. X. A.—The markings on the negatives are manifestly due to the glass not being cleaned before the emulsion was applied. In order that he should see them we should advise you to send some of the negatives to the maker. Plate cleaners cannot always be relied upon, and, of course, the manufacturer cannot himself examine every plate before it is coated; hence he must always, in conducting a large business, be more or less at the mercy of his assistants.

PHOTOGRAPHIC CLUB.—At the forthcoming meeting of this Club, at Anderton's Hotel, Fleet-street, on Wednesday next, the 10th instant, the annual dinner will take place at seven o'clock p.m.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—The next ordinary meeting of this Society will take place on Tuesday next, the 9th instant, at 8 p.m., in the Gallery of the Royal Society of Painters in Water-Colours (whose Winter Exhibition is now on view), 5A, Pall Mall East.

THE AMATEUR PHOTOGRAPHIC ASSOCIATION OF VICTORIA.—This Association is progressing rapidly, and has proved a great boon to amateurs in the colony, as well as to several of its members in the adjoining colony of New South Wales. At the last monthly meeting, held October 6th, a paper was read by Sergeant Fenton, on *The Preparation and Purification of Photographic Chemicals.* The reader of the paper is well known in Victoria as an efficient amateur chemist.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. STEWARD, Optician,
For three Weeks ending December 3, 1884.
THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

Nov.	Barometer.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max. Shade Tem.	Min. Tem.	Remarks.
13	30·34	E	47	45	—	50	45	Overcast.
14	30·49	E	42	40	—	48	40	Foggy.
15	29·47	E	40	38	—	45	38	Foggy.
17	30·34	NE	40	37	—	45	33	Foggy.
18	30·32	NE	42	40	—	46	36	Foggy.
19	30·48	NE	40	39	—	45	37	Cloudy.
20	30·23	NW	40	38	—	47	37	Overcast.
21	29 77	NNE	41	39	—	44	36	Raining.
22	30·16	NE	37	35	—	42	32	Hazy.
24	30·17	SW	38	36	—	40	31	Foggy.
25	30·30	NW	31	—	—	39	28	Foggy.
26	30·29	NW	37	35	—	39	30	Foggy.
27	30·18	W	44	42	—	49	35	Cloudy.
28	29·84	W	44	42	—	47	42	Overcast.
29	29·76	NW	37	36	—	40	33	Overcast.
Dec. 1	29·91	SE	36	35	—	39	30	Raining.
2	29·87	SSE	35	35	—	54	33	Foggy.
3	29·43	W	54	53	—	56	36	Overcast.

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1284. Vol. XXXI.—DECEMBER 12, 1884.

PHOTO-CRAYON PORTRAITS.

Since allusion was incidentally made a few weeks back to the now almost, if not entirely, defunct photo-crayon portrait, we have had more than one inquiry as to what was that particular style of enlargement. Only last week we had to explain to a correspondent, in our *Notes and Queries* column, the difference between the photo-crayon and the collodion transfer picture, and whether the two styles were not identical except in name. The article on the permanence of the gold-toned collodion image in our last issue has brought further queries on the same subject, one more particularly asking why, if this process be capable of yielding such undoubtedly permanent results, as well as pictures which are said to possess considerable merit, it has fallen into a state of desuetude. As this is a very pertinent question, and one similar in purport to others received, we shall here make some remarks on the subject generally.

In the first place, it may be explained that a photo-crayon picture is an enlarged collodion transparency on glass, backed up with a piece of rough drawing or tinted crayon paper, upon which are some coarsely-hatched lines similar to those seen in crayon drawings. The manipulations in making the enlargement itself are precisely similar to those followed in the collodion transfer process, which are too well known to need description here. In a word, it may be said that a photo-crayon is essentially a collodion transfer—not transferred, but left upon the glass—with this important difference, however, namely, that the image must be *very* much thinner for the picture to be effective.

Now, the idea of producing a transparent picture on glass and afterwards backing it up with paper, both white and tinted, or with other material, such as oil or water-colour paint, at the time this particular style of picture was first introduced was by no means novel; but the backing had, in most instances, hitherto been placed in optical contact with the glass. The novelty introduced in the picture of Mr. Sarony consisted in backing the transparency with a rough-tinted crayon paper pressed close to the glass, but not in optical contact with it, which gave the picture a totally different appearance to any of its predecessors. On this paper, as we have before mentioned, were a few hatched lines put in with a crayon. These lines were always made in such a position that, when the paper was placed at the back of the picture, they would come just beneath where the image was softened off in the vignetting; hence the hatching showed through the more delicate portions of the image. These pictures were always framed in a style suitable to drawings, which added materially to the crayon-like effect. The actual claim to novelty made in the patent by Mr. Sarony was only for the production of the hatched lines by means of lithography.

Last week we made reference to the artistic merits as well as to the permanence of a series of these photo-crayon portraits which we recently had an opportunity of examining. The gentleman who afforded us this opportunity, in answer to our inquiry as to why, in his opinion, this style of picture had died out so quickly, said he believed it was because so few operators could produce them successfully unless recourse was had to mercurial toning, which, as time has proved, jeopardised their permanency. The chief difficulty experienced by those who failed, he said, was to secure a transparency sufficiently thin yet full of detail, and at the same time of a good tone.

To illustrate the thinness of image requisite one of the pictures was removed from its frame. When the backing was taken off, and the picture itself examined as a transparency in a strong light, scarcely anything was to be seen upon the glass, so thin and phantom-like was the image. When the glass was placed upon a piece of white paper, the image, though of a rich warm black, was sufficiently thin to permit of printed matter being easily read through it, as the image appeared to be composed of a delicate stain rather than of an actual deposit. Our friend remarked that the image was always very thin indeed before toning, but this operation rendered it still thinner and more transparent; at the same time it conferred upon it a blacker tone. It is colour and not density that is required for photo-crayons.

Having explained the exceeding thinness of the image, which is so essential to good results, it will easily be seen why these pictures, when finished and framed, possess such a crayon-like appearance. It is because the grain of the paper and the hatching upon it shows through the image itself, except, perhaps, in the very deepest shadows, where in a veritable crayon drawing the texture of the paper is hidden by the pigment. Hence the illusion is so perfect that if the glass bearing the image be free from imperfections, and the photograph neatly vignetted, no one, as we have said before, would imagine but that the picture was really a portrait in crayons on the paper itself.

In our volume for 1881 we advocated the employment of the photo-crayon in preference to the collodion transfer process, as a method of producing effective though inexpensive enlargements, and subsequently [see pp. 231 and 275 of the same volume] we gave some practical hints on their production. Our opinion is still unaltered that this process is one which might well be employed in the production of cheap enlargements, as it is capable of yielding far more refined and artistic pictures, and at the same or less cost than many of the "wretched daubs" which are continually being issued as the so-called "club portrait." Upon mentioning this matter to a member of a firm who produce a considerable number of the latter class of pictures, he remarked that "those who go in for club portraits like plenty of colour, and would not be satisfied unless they had it." This, in many instances, we think is a mistake, as the taste of the humbler classes, who are the main supporters of the club system, has undergone a marked change of late years, and we feel assured that if they could obtain an equally good likeness, and at the same time a picture of greater artistic merit for the same money, they would much prefer it to a gaudily-coloured collodion transfer.

There is no reason why a photo-crayon should not be tinted in such a manner as to add to the effect rather than otherwise. Some years back we saw some very satisfactory examples in this direction. The colour was roughly applied to the crayon paper with a stump, very much after the principle that water-colours are sometimes applied to a second photograph when the system of colouring from the back is employed. As the colour has to be seen through the photographic image it matters very little how roughly it is put on, provided that it occupies the right position when the paper is placed at the back of the transparency.

DIFFICULTIES IN COPYING OIL PAINTINGS.

In following the progress of the copying of an oil painting, we last week discussed the possible effect of the presence of the now common sheet of glass in front of the picture, and showed how it neither added much to the difficulty of the work nor detracted from the quality of the results. The presence of glass is the very least of the stumbling-blocks in the way to success; that is, of course, assuming the glass to be clean on its inner surface. If dimmed through being coated with actual dust, or that film so fine as to be like a stain, which sometimes forms, no picture can be expected to present an appearance of clearness and richness in the photographic transcript.

At the same time, when no difficulty be placed in the way of removing the canvas from its frame, we should by all means recommend the photographer to remove it. The frame, from its weight alone, especially in large pictures, causes any attempt at removal to be most awkward and laborious. Failing the presence—an unlikely contingency—of a well-constructed artist's easel upon the premises, the plan we have seen adopted of simply placing the picture upon the floor, then giving it a slight backward tilt to prevent its falling, and enabling it to be placed at right angles with the axis of the lens, recommends itself to us as being as efficacious as it is simple and ready; but, at the same time, a forward tilt renders the exclusion of reflections more easy of attainment.

The picture resting upon the floor, the camera placed at a suitable distance and at the right height, and tilted so as to point duly to the centre of the picture, an examination may be made as to the presence or absence of glare or reflection. If the picture be a new one—smoothly painted—and the light admitted on to it rather at a sharp angle, the front lights being covered, all will be plain sailing. If, however, the impasto be of a different character, and the paint laid on in lumps and prominent streaks, a trouble will possibly arise from points and streaks of light; but by placing the picture at such an angle to the light as it was likely to be painted under—that is, a light from the painter's left—the bulk of the irregularities will disappear. It must not be put the wrong way up, unless the light come from the opposite—the right hand—direction, and then it must be arranged cornerwise upon the floor to obtain correct lighting.

If the picture have been painted some time all its peculiarities will be revealed when it is suitably illuminated, if not before. But the experienced hand will not wait so long; he will prepare the painting for copying before he thinks of putting it in front of the camera. It may be defective in many ways. It will, unless it have been well kept, in all probability be covered with a dull film of what is neither more nor less than dirt, which can be quite removed by a sponge and cold rain-water, followed by careful wiping with a soft linen cloth; the result will often astonish. Here let us say that little beyond this washing should be permitted by anyone who is not familiar with oil paintings. The expert can do almost anything, but one who knowing nothing about paintings should tamper with them in other ways would be guilty of a great wrong. He cannot conceive the ill that would ensue by means apparently the simplest.

When all the dirt has been removed—the deposit, perhaps, of scores of years—the picture may look perfectly fresh, or it may still have a dulled appearance, which, however, may often be cured by carefully wiping it with a clean, dry cloth made into a pad, and with a few drops of nut oil sprinkled upon it. This may sometimes bring it up with marvellous richness, and in the majority of cases will do so. Too much oil must not be applied, or there will be danger of cracks being filled with it, to the detriment of the work; for there are cracks other than those plainly discernible by the naked eye.

Still another defect may be seen, and this is incurable except in the hands of the expert picture restorer. The varnish itself may be "chilled"—a name given to a peculiar opalescence that appears either in patches or over the whole picture, which photographs in consequence, in the most indifferent manner, or, if the defect be very pronounced, with scarcely any detail. The picture now quite ready for photographing is carefully focussed—an operation requiring judgment; for the difficulties of reproducing a rectangular object so as to appear rectangular upon the plate are intensified in the case of an oil painting far beyond what is experienced in copying a plan or map, whose light colour is always an aid in focussing. As these troubles, however, differ in degree only, and not in kind, a mere reference to them is all that is needed here.

The picture focussed, exposed, and developed, an opportunity will be afforded of bringing into the field a variety of other difficulties. The negative may be weak; it may give no detail though sufficiently exposed, and it may be more exposed at one side than the other. The last named—due to the mode of lighting—will be the most probable fault, for an even illumination of a large picture in a small studio is next to impossible, and even with pictures of smaller dimensions it is always a source of trouble. The copyist's own judgment must teach him when a picture is likely to be unequally lighted, and his skill will be taxed to remedy the defect. With very spacious galleries, where the pencil of light received at any one point of the picture is little different in angle or breadth from that illuminating any other, there is little probability of trouble from this cause, which is, no doubt, one reason why direct illumination from the sun has been recommended. This plan possesses many advantages, but from the irregular surfaces characterising so many pictures, and the uncertainty of the sun's direct light, there is little need in these days of gelatine plates to resort to it. Besides these points, the possibility of chance reflections being shown that with diffused light would not appear must be taken into consideration.

The thinness of the image is a matter of small moment. There are plenty of methods of intensification capable of bringing up to good printing density very thin and weak negatives, and, should they fail, a negative, if sufficiently-exposed and possessing all required detail, can always be reproduced by taking a transparency, and from it another denser negative. Indeed, we may say that a close examination of many of the continental copies of the old masters leaves an impression that all the negatives they are printed from must have been so produced. When it is worth the photographer's while to go to this trouble and spend the necessary time, very good photographs of originals almost invisible may be produced; but, then, the added work bears to so great an extent the impress of the retoucher's hand that it became absurd to term them "photographs of the originals," as they possess no more value than engravings, and they are not nearly so pretty to look at.

The slight actinic value of some colours which gives rise to this difficulty—the last we now discuss—is likely to be always a stumbling-block, despite the use of a coloured medium to photograph through, or the employment of the comparatively-new stained plates devised to give "non-actinic" colours their true colour. Enough is not known of the latter to enable a confident judgment to be formed, and in any case they must be very slow for some colours to be impressed—better slow, perhaps, than not at all. As to a coloured medium, the plan has often been recommended either to lay a temporary stain upon the picture itself or to interpose a sheet of glass in front of the lens, and either possesses some value.

It is well known that when a ray of light passes through a sheet of coloured glass a second sheet of the same glass has far less obstructive effect. Similarly, in coloured reflections, it is but reasonable to suppose that the obstructive action of a yellow or red-tinted glass must have the greatest effect upon the reflections of colours of the opposite end of the spectrum, and so the power of the blues, &c., in the picture would be lessened, while the green and such like colours would be little interfered with, the effect being to give more value in the result to the yellow tints.

ELECTRIC LIGHTING IN PHOTOGRAPHY.

In fitting up an electric light installation for photographic purposes a point to be considered is that different kinds of arc lights give varying amounts of actinic power; it, therefore, is of interest to consider the relative values of different systems for photographic employment. In all such cases up to the present time arc lights are employed, the incandescent or glow lamps being insufficiently rich in chemical rays, and too expensive as regards the amount of light obtained for the power employed. The current which will give a light of from 1,200 to 2,000 candles in an arc lamp will produce but from 200 to 250 with glow lamps, and the latter amount has been found insufficient for practical working.

There are a considerable number of arc lights which vary with the nature of the current employed. The best for photographic purposes is a lamp having carbon electrodes nearly three-quarters of an inch in diameter, taking a current of twenty-five Amperes and thirty-five to forty Volts, or, practically, one Board of Trade unit consisting of 1,000 Watts.

These electrical standards of measurement should be used in specifying the apparatus required for photography. The Volts represent the amount of potential of the current, or its power of overcoming resistances. The Amperes represent the quantity of the current, or its power of doing work, such as heating substances, or throwing down a quantity of metal in electro-plating. A flash of lightning has high potential, for it can leap through a long length of air; but, like the long spark from the frictional electrical machine, it is useless for electro-plating or for doing any kind of practical work requiring quantity. On the other hand, a current powerful in quantity may have small power in forcing its way through obstacles or in giving a long spark.

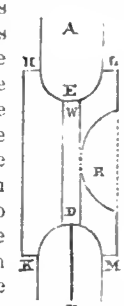
The electrical engineer, having as yet found but a small demand for his services in relation to photography, has sought more to produce a light pleasing to the eye than one rich in actinic rays, and for this reason in most of the apparatus now in the market the electrical horse-power developed is usually of low potential and rich in Amperes; that is to say, an effective light may be obtained from a current of about sixty Volts and twelve Amperes delivered at the lamp, the remainder being absorbed in the light and in the leading wires in the lamp. Such a current will give an arc varying from one-half to three-quarters of an inch in length. If the carbons be regulated to act at three-quarters of an inch apart the light is unpleasant to the eye, as an excess of the actinic rays is then produced. If, however, the lamp be so regulated that the carbons remain steadily at a distance of a-quarter of an inch from each other, the light is richer in proportion in the rays belonging to the red and yellow end of the spectrum. Should, however, the potential be reduced from sixty to forty Volts, and the proportion of Amperes increased for the transformation of the same amount of initial energy, it gives a more pleasant light still, or one richer in the rays near the red extremity of the spectrum. The carbon poles are then heated farther back, giving a more mellow and softer light. Thus, the efforts of electricians in the development of the electric light have been in the opposite direction to those required by the photographer, who, therefore, should pay attention to these points in considering the questions of relative economy and efficiency.

Experiment and study have also to be given to his own side of the problem by the photographer, if he make the demand of the electrician that the latter should give him the best light for his purpose. It may be one thing to produce a light rich in actinism, and another to produce one to give the best picture. As Professor G. G. Stokes discovered, the electric arc gives a light extraordinarily rich in the normally-invisible chemical rays of the spectrum; it gives a far longer actinic spectrum than the light of the sun. Glass is opaque to the more extreme section of these rays. How they will act when falling upon the face of a sitter, reflecting a large proportion of yellow, has yet to be examined; all may be as desired on the one hand, or possibly a tendency to blotchiness in the portrait may be produced in the other. These extreme rays when used upon bromide of silver are comparatively somewhat feeble in photographic power as compared with the blue and violet, so the former may tend to cause abrupt contrasts by absorption and unequal reflection.

There is another point arising from the foregoing conditions. The light falling upon the sitter must be diffused, and not fall directly upon him from an intensely-luminous small point. This diffusion of the electric light has been effected in practice by means of a whitened parabolic reflector, in the focus of which the electric arc is maintained. The direct rays are cut off from the sitter by a small screen, immediately in front of the reflector; the screen is not large enough to obstruct any but the direct rays from the arc. The light being reflected from the whitened surface is thereby lowered in tone and the rays of high refrangibility are degraded, so that the general effect is improved visually, whatever may be the result photographically, for the question remains whether unequal reflection of the extreme rays of the electric light has a tendency to produce blotchiness in the portrait.

By this reflection from a whitened surface there is an enormous loss of light. A translucent screen in front, intense enough to produce the required diffusion, would also very greatly reduce the luminosity, and this is one of the disadvantages of the arc light with a single lamp; but, notwithstanding this drawback, it has a great economical advantage over lamps on the incandescent system. Diffusion of the light for photographic portraiture is an absolute necessity, and almost the only hope of avoiding the present excessive waste of luminosity seems to lie in the direction of a greater division of the power, so that several small arc lamps can be substituted for one of the present normal large size.

Most of the light comes from the ignited carbon points and not from the arc itself, except in two curious methods of electric lighting now in the market. "The electric sun lamp," now at work in one of the picture galleries at South Kensington, gives a kind of combination of the electric and lime lights, and is noted for its steadiness. In this lamp, the carbons A E and B D are held firmly by springs against the hollows in the two ends of the block of marble H K L M. Through the centre of this marble the hole W D is drilled, open in its centre to the large hollow R, cut out of the side of the marble. One of the carbons has a hole through it, B D, through which a conducting needle is passed for a moment to make contact with E, and to establish the flow of the current. It is then withdrawn. When the lamp is in action the arc becomes luminous by means of the incandescent particles of lime driven off by the current, as evidenced by the exceedingly slow rate at which the carbons are consumed, for two pieces of carbon a decimetre long will last for fifty hours, whilst in the ordinary arc lamp they would probably be consumed in two hours. This light is of a reddish colour.



We shall resume this subject in a week or two.

We learn that the Northampton Photographic Exhibition will be formally opened by a *soirée* on Wednesday, the 17th instant, and *not* on the 16th instant, as previously announced. The Exhibition will remain open to the public until January 10, 1885.

Last Wednesday afternoon Mr. W. St. Chad Boscawen gave one of a series of well-attended lectures on Assyria, at the British Museum. He stated that modern research has given much exact knowledge about the Cities of Nimrod mentioned in the Book of Genesis; so that the customs of the inhabitants are now known, even down to their private affairs and their family squabbles, notwithstanding the lapse of three or four thousand years. The true translation of the name "Babylon" is "The Gate of God." The dwellers in the Cities of Nimrod knew the colours assumed by light. Mars was described as red, and Mercury as blue. In a hymn a scribe speaks of the sky being as blue as the sea. The Assyrians had names for the compound as well as the primary colours, including grey, reddish-brown, and green. Blue and purple gave them some idea of darkness, and he thought, but was not sure, that the same was the case in Homeric times. These public lectures on Wednesdays by Mr. Boscawen awaken so much interest that special abstracts of them are sent by Atlantic cable to one of the New York daily newspapers.

In the October number of the *American Journal of Science* there is an interesting paper, by Mr. Nichols, on the duration of colour impressions upon the eye. Plateau investigated the subject fifty years ago, yet but little further has since been done. Mr. Nichols' results, in the main, agree with Plateau's, and he has taken up other points. His researches bring out the fact that the stronger the light the shorter the time the impression lasts, and, further, that the duration of this impression is governed by the length of time the image has continued upon the retina, increase of time, like increase of brilliancy, reducing the duration of the after-image.

It is estimated by those who have studied the subject that the atmosphere of the earth absorbs twenty per cent. of the sun's rays falling upon it; but Professor Langley would double that estimate, founding his belief upon the numerous observations made by him at an altitude of fifteen thousand feet. He further believes that this absorption arises from other causes besides those usually assigned, dust—both near to the surface and at a great altitude—playing a more important part, both in general and selective absorption, than is usually believed. Photographers, who notice atmospheric changes more than other people, will be ready to coincide with Professor Langley's theory, for it is next to impossible, on any basis of absorption through moisture, to account for these singular variations in the actinic power of the light under apparently similar conditions.

A photograph of remarkable interest has been recently taken in Dakota by Mr. F. N. Robinson, of Miner County, and forwarded to the editor of *Nature* for publication. It is a photograph of a genuine tornado which, during its progress, killed several people and destroyed a vast amount of property. It was in sight for about two hours, and passed at a distance of twenty-two miles from the city. The huge mass of cloud seems in the picture to be roughly parallel to the horizon, and just from the middle of its lower surface projects the huge spout of the whirlwind reaching to the ground, while two other elementary spouts seem as if about to form and assist its career of destruction. A more emphatic testimony of the value of photography in depicting natural phenomena it would be difficult to conceive. On occasions of such extraordinary excitement as accompany the observation of this phenomenon it must be almost impossible to keep the hand from following the brain and describing exaggerated representations of the actual state of things.

We fully described to our readers last year Dr. Huggins' method of photographing the sun's corona, and at the vice-presidential address at the Royal Society's anniversary meeting an interesting account was given of work done under the system at Riffell, near Zermatt, in Switzerland. It may be remembered that a sum of two hundred and fifty pounds was granted by the Society and placed at the disposal of a committee for the purpose of making further experiments in the direction of photographing the solar corona without an eclipse. Mr. C. Ray Woods, whose name is well known to our readers, arrived at Riffell—a station eight thousand five hundred feet high—in July last, and, erecting the necessary instruments, continued at work till September 21st. It has unfortunately happened, however, that the present year has been exceptionally unfavourable for this class of work in consequence of an unusual want of transparency in the higher regions of the atmosphere. Mr. Woods thinks the results of the Krakatoa eruption may have caused this want of transparency; but, whatever the cause, the effect has remained, and, most unfortunately, when the atmosphere has been clear the sun has been surrounded with a large aureola. Dr. Huggins has been utterly unable to get satisfactory results in this country; but Mr. Woods has, notwithstanding all these difficulties, been able to obtain about one hundred and fifty photographs, of which more than half are sufficiently good to show the general form, and a smaller number the stronger details, of that part of the corona which lies within eight to ten minutes of arc of the sun's limb.

The Vice-President said it would be premature to discuss results, but he congratulated the Society upon the confirmation of the hope expressed at the last anniversary by the President that a new and powerful method of investigation had been placed in the hands of students of solar physics. Our readers will be glad to know how the opportunity of discussion is to be afforded, and will probably imagine that the negatives, or, at least, prints from them, were to be placed in members' hands. Nothing of the sort is projected. According to the report of the Vice-President's speech, which lies before us, we learn that the photographs "are now being *drawn*" preparatory to a full discussion. Photography is to be the drudge—the maid of all work—for science, but everything she does is to be covered over, as it is not sufficiently pretty. Prettiness first and correctness afterwards! We constantly raise our voice against this continued pandering to a false taste, and shall continue to do so until photographic results are given to the world in the shape of photographs, and not in a shape from which no one can formulate a rational judgment; for if he pin his faith to a theory founded upon appearances in an engraved reproduction he may at any moment be confronted with the original photographs to show that he is arguing upon false premises.

It is interesting to note the material of which Mr. Ray Woods' observing room was made. It was the Willesden paper, an account of the properties of which was brought before photographers some little time ago, and excited considerable attention.

In the same address some remarks pregnant with instruction were made upon the subject of the metric system to the International Congress, to which the Government recently gave their adhesion. This adhesion does not in any way bind the hands of the Government to adopt the system in any form. It simply enables them to pay their share of the expenses and, through their representative, to take part in the discussion, and to receive the benefit of the appliances at the command of the Bureau, whose standards far surpass in accuracy anything that is at present available in this country.

In the minds of many—mostly those who are, in effect, ignorant of the practical application of weights and measures among the mass of the people—an impression prevails that the metric system is proved to be undoubtedly the best that could be devised, and that the last word has been said. The truth is it is of great value for scientific purposes, if only because of its uniformity; but it is founded upon a theoretical measure which is inaccurately taken, so that the real standard is merely a piece of something carefully preserved for reference, while among the populations where it is established by law the metric system is found to be practically inconvenient from the size of the measures and weights being either too large or too small. In some countries, where by law it is established, it is not made use of by the people, and it is patent to anyone that a system of tens, which are only divisable into two equal parts, must be inferior for practical purposes to a system of twelves, which can be divided into three. The Vice-President said:—"Whatever may be the advantages of the metric system from a scientific point of view, the question whether a scale of weights, money, and measures, founded on a duodecimal rather than a decimal system, is not better adapted for the convenience of daily life is one that by many is regarded as fairly open to discussion."

THE SIEMENS' UNIT LAMP FOR PHOTOGRAPHERS.

[A communication to the Photographic Society of Great Britain.]

There are so many difficulties regarding a standard light that it has struck me I might say a few words with advantage regarding the auxiliary standard which was proposed by Dr. Werner Siemens at the late Electrical Congress held in Paris in April last. Recently Dr. Siemens kindly presented me with one of them, and I have experimented with it, both for photometric and photographic purposes. The lamp is illustrated in the diagram. The two principal portions of it are a tube five-sixteenths of an inch in internal diameter, through which the wick passes, and a gauge to measure the height of the flame, which has to be 2·6 inches high. Whether the wick be a closely-compressed one or loose does not seem to matter; cotton wool will answer every purpose. The material burnt is acetate of amyl which, though dear when obtained pure, is very cheap at all events in Germany, being sold at a few shillings a pound. It has a characteristic smell of pear drops, and is much used in confectionery, I am told, to give this particular flavour. The flame you see before you is a steady one when no draughts are about. In case of draught it may be enclosed in a glass tube with an air space beneath, but as a rule this is unnecessary.

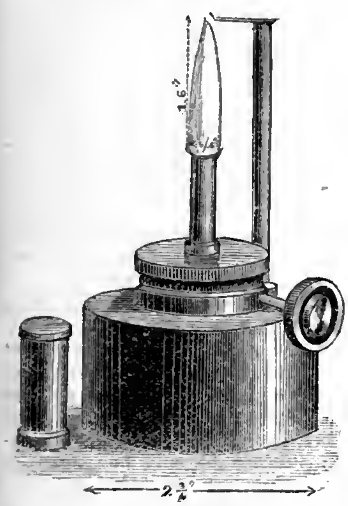
The wick is trimmed even with the tube, and when out of use there is an extinguisher or cap which screws over it, making it air-tight and thus precluding the evaporation of amyl acetate. After the lamp has been lighted a couple of minutes the flame assumes its normal height, and is regulated so that the point is just the height of the gauge. In this state it emits the light of a candle. It should be remarked that the acetate of amyl contains a large quantity of oxygen in proportion to the carbon, and hence requires but a small supply.

SUPPLEMENT TO THE BRITISH JOURNAL OF PHOTOGRAPHY. DECEMBER 12TH 1884.

MR ANDREW PRINGLE.

I have been trying this unit lamp for use with the sensitometer, and find that at a distance of eighteen and a-half inches from the plate, and with half-a-minute's exposure, it gives the same illumination as the phosphorescent tablet which is in my possession. I have repeatedly tried the same batch of plates at different times with the lamp, purposely disturbing the wick between times, and readjusting it to the height of the gauge. This gave always the same results on the plate exposed behind the sensitometer, showing that for this purpose it is a thoroughly reliable source of illumination. I cannot trace any effect of a difference in height of the barometer or thermometer. It is to be presumed that some slight variation must exist, but so far inappreciable, which is more than can be said when using the standard candle.

It may be asked, why substitute such a standard for the phosphorescent plate? The reason why I would do so is that the light emitted by the phosphorescence is confined to one small portion of the spectrum, as a previous paper of mine has shown, and that as you mix iodide with bromide the comparison of two plates—one iodo-bromide and the other bromide alone — when made by phosphorescence is in favour of the latter, since the place of a maximum sensitiveness of the former is below the point in the spectrum at which the phosphorescent tablet emits light. This being the case I should like to see some such standard as this used, as it is handy, and only requires the application of a match to start it. It is also convenient for use in taking transparencies by contact.



The exposure of a plate behind an ordinary dense negative, which registers 24 on the sensitometer at two feet distance, takes one minute to give a good image. Such a lamp, too, is handy for travelling. It can be enclosed in a shade of orange paper, or by the cardboard lantern which I long ago recommended, and which is the simplest form of any lantern with which I am acquainted, and plates can be changed or developed by its light. Now, as to the manufacture of such a lamp there is no difficulty; the form I have here is more expensive than is necessary. It will be seen that an ordinary spirit-lamp could be adapted to it by replacing the tube usually supplied by a slightly longer one, and making the glass cover a little longer than is now done; even this is not necessary. The point to be attended to is to keep the heat at a fair distance from the spirit. I need scarcely enter into the subject of photometry with this lamp; suffice it to say that if the burner be of the dimensions I have given, and the flame kept to the standard height, every one has it in his power to reproduce the light of an unfluctuating standard candle. Here, then, is a point gained at once. Mr. Spurge brought forward the idea of using a gas flame of a certain height, and issuing from a hole of fixed diameter, to illuminate the screen he proposed to use with his sensitometer. As gas is not always available it is probable that a modification, founded on the principles of the Siemens unit lamp, might be utilised.

W. de W. Abney.

WASHED COLLODION EMULSION *VERSUS* UNWASHED COLLODION FOR THE PREPARATION OF LANTERN SLIDES.

I venture again to broach this very interesting subject after reading the article by Mr. Andrew Pringle, and also the leading article on the same subject in last week's issue. I trust by the following remarks it will not be thought they have been written in any opposition to the Editors' leading article of last week, but are the results of a long practical experience extending over many years.

I commenced to make collodion emulsion as soon as it was introduced by the inventors, and have never ceased to work it in its various forms and phases. In the year (I think) 1875 I commenced to use it for making lantern slides. I then saw the beautiful results that could be obtained by the process, using unwashed emulsion with a preservative; then, as soon as washed emulsion was introduced, I decidedly gave the preference to it in that form for reasons which I will hereafter explain. As I undoubtedly prefer a washed emulsion to an unwashed emulsion for lantern transparencies, I will treat upon that point first.

I found that, as a rule, an emulsion which was in its best condition for negatives was but of little use for transparencies of the highest order, although with careful study exceedingly good results can be obtained; but it is far better to make an emulsion suitable for the purpose. A washed emulsion is far more expeditious in use than the sloppy mess of having to wash each plate singly. It very often occurs that I want (say) half-a-dozen slides in a hurry, and have no plates coated. I at once set to work coating the number I require—half-a-dozen or a dozen, as the case may be—which takes but a very few minutes. When I have coated the last one I immediately take the first ones coated and lay them on a hot-water bath that I keep for the purpose. They dry perfectly in about two minutes. I am then ready to make my slides, and nothing can be more simple.

I notice Mr. Pringle appears to have a little trouble with the india-rubber edging. This I have not the least trouble with. Perhaps he uses it too thin; if so I can understand his difficulty. I use mine as thick as possible—about the consistency of thick treacle, and with me the film never slips or becomes loose. I always use cyanide for fixing, as it is much more easy to get rid of the last traces out of the film than hyposulphite—the latter, if there be a trace of it left, being an enemy to toning. These remarks apply to all washed collodion emulsions.

In the leading article referred to reference is made to the emulsion of Mr. G. F. Williams. I have had a peculiar experience with that emulsion only a few days since. It is, I should think, about three years since that I made about one pint, working correctly to the form as he gave it; it worked well at the time, and in about twelve months after it gave a thin, poor image for negatives and a still worse one for positives. It has never been touched since, but a few days ago, after a vigorous shaking to take up all the sediment, I coated a plate; it worked splendidly, and gave an image of a nice sepia tint, which was capable of being toned to other pleasing tints. As a rule, in most old collodion emulsions, the first thing to give way is the pyroxyline; for, after coating the plate, it at once splits up into shreds on drying. This, being perfectly washed, had not done so, but had improved by age, which to me is remarkable, as my experience has been just the opposite.

I always prefer to use the emulsion as thick as possible, as I find that the image is far more bold and plucky. With a thin film, as a rule, the image is generally poor. All collodion emulsions I have found are insensitive to weak light—far more so than either gelatine or wet collodion plates. In a good light in summer time, with a fair printing negative, I find sometimes one second's exposure quite sufficient. With the old wet-collodion negatives the exposures can be judged far more readily than with the new gelatine plates. With the latter there is always a certain tinge of yellow or green, to which a collodion emulsion plate is very insensitive, but with contact it is a matter of very little importance. The difficulty is when the exposures have to be made in the camera; then with the gelatine negatives exposures have to be considerably increased. The best way to work is by sunlight diffused by a piece of ground glass about two inches from the negative. When there is no sun the ground glass is better removed and the negative pointed direct to the sky. With the diffused sunlight I seldom give more than one minute, unless the negative be very dense; with diffused light at this time of the year about a-quarter of an hour. The best style of gelatine negatives I ever saw were by Mr. W. F. Donkin; with diffused light five minutes were ample. The lens I always use is a Dallmeyer compound stereo. of three and a-half inches back focus. I prefer this lens to any other for the purpose. Practical experience is by far the best tutor.

Unwashed emulsion, I readily admit, is capable of producing good results, but for some subjects it has one fatal drawback, and that is owing to the preservative, be it either ale, coffee, tannin, &c. The plate, after being washed, is flooded with either of the foregoing preservatives, according to choice, and if the picture have any flat, delicate tints they are found to be more or less mottled or uneven, owing to the preservative. Another fault is those detestable drying marks which very often make their appearance and ruin the picture, and one is never safe from these defects. With a washed emulsion there is perfect freedom therefrom. I think if I were bound to go back to preservatives I would rather go back to wet collodion and silver bath. I find that a washed emulsion is developed quite as readily as an unwashed, and I have developed thousands. With a properly-prepared washed emulsion any amount of density can be obtained—quite as much as with the unwashed;

and, as far as my experience goes, I do not see there is any difference as regards fineness of film in the result.

I will give an instance of how readily a transparency can be made by one who is used to it. I timed myself one day as to how short a time I could make and finish a slide. The plate was already dry and ready for exposure. I made the exposure by contact, developed it, fixed, washed, toned, dried, and varnished it, and also mounted it within a-quarter of an hour. I did this as I had to catch a train. I do not think it could be done in a much shorter time—not even by an American.

I have not attempted to write upon this subject for some years, knowing that there was but little interest taken in the matter, and that only by a very small section. If the interest be now sufficient I should be pleased to write an article on development, which is very varied and produces different results, and also on toning, should the Editors approve of it. I think I may say that I have tried almost every known process, and have come to the conclusion that a washed collodion emulsion will equal, if not beat, the whole, and is far more simple.

Wm. Brooks.

HYDROXYLAMINE USED AS A DEVELOPING AGENT.

[A communication to the Photographic Society of Great Britain.]

Nearly two months have elapsed since Herr Carl Egli and myself published in the *News* the suggestion to use hydroxylamine as a developing agent, and I take this earliest opportunity to communicate to the Society the results of my further experiments. As hydroxylamine, prior to our publication, had not been introduced into the photographer's laboratory, perhaps it will not be out of place if I describe briefly the properties and preparation of the compound under consideration.

Hydroxylamine was discovered by Lossen, when investigating the intermediary products of the reduction of nitric acid to ammonia. This compound, which is represented chemically by the symbol NH_3O, is formed on the ammonia type, by the replacement of one of the atoms of hydrogen by the hydroxyl radical HO, as is seen in the following graphical representations:—

Ammonia.	Hydroxylamine.
$N\begin{cases} H \\ H \\ H \end{cases}$	$N\begin{cases} OH \\ H \\ H \end{cases}$

Like ammonia, it is a strong base, capable of forming several salts. It has not yet been obtained in the free state, but it can easily be produced in an aqueous solution. It possesses the somewhat remarkable property of behaving both as an oxidising and as a reducing agent. Perhaps no better example of its reducing action can be taken than the decomposition of silver bromide in the presence of caustic alkali, whereby metallic silver, alkaline bromide, and nitrous oxide, or laughing gas, are produced.

The reaction is represented by the following formula:—

$$2NH_3O + 4AgBr. + 4NaOH = Ag_4 + 3H_2O + 4NaBr. + N_2O.$$

Another important fact in considering the properties of hydroxylamine is that it does not absorb oxygen, even in the presence of alkali; thus, during the process of development, there need be no fear of the developing solution becoming decomposed from contact with the atmosphere.

The preparation of this compound has not received much attention from chemists, and thus the process generally adopted is the same as that originally proposed by the discoverer, namely, the reduction of nitric ether by tin and hydrochloric acid. When this method is resorted to a large proportion of the hydroxylamine is converted into ammonia, and thus the yield is comparatively small. Dr. Divers has recently published in the *Journal of the Chemical Society* a series of experiments on the formation of hydroxylamine from nitric acid. This investigator finds that a large yield of the desired compound is obtained by the direct action of tin and hydrochloric acid on nitric acid; in one experiment 87 per cent. of the nitric acid was converted into the base. It may be of interest to know that the hydrochloride, or hydrochlorate, is already in the market, but as this compound has hitherto only been used for scientific investigations the price is at present rather high, and would debar the professional photographer from adopting this method in his everyday practice; but there is very little doubt that, should a demand arise, the substance could be produced at a reasonable price.

With this, as with other developers, there is some difficulty in prescribing a definite formula, but the following, which is a modification of one recently described in an editorial article in the *News*, may be taken, I think, as a fair standard, and has given excellent results with certain brands of plates.

The following solutions are required:—

A.

Hydroxylamine hydrochlorine	30 grains.
Alcohol	1 ounce.

B.

Caustic potash	1 drachm.
Water	1 ounce.

C.

Potassium bromide	20 grains.
Water	1 ounce.

The ingredients used are in principle similar to those employed with pyro. Caustic potash takes the place of ammonia, for the latter alkali is not sufficiently powerful to assist the reduction of silver bromide. The soluble bromide is used, as with pyro. or oxalate, to restrain the action of the developer.

To develope a quarter-plate with the above solutions: take half-a-drachm of A, forty minims of B, and ten minims of C, diluted to one ounce with water. The exposed film is plunged straight into the developer without previous moistening. The process proceeds rapidly, and is completed in about five minutes.

The advantages claimed for this developer are:—Wide latitude of exposure, non-deterioration of the solution from external sources, and absolute freedom from stain—a gain that cannot too strongly be accented, especially at this time of the year, when printing is so slow.

Against the important advantages I should state that there is a minor objection, and that is the liability to cause reticulation, with plates prepared with soft gelatine, from the softening of the film by the caustic alkali, and the evolution of the nitrous oxide gas from the decomposition of hydroxylamine.

This developer is particularly suitable for gelatino-bromide paper, for while the resulting tone is apparently identical with that obtained by ferrous oxalate, there is no after treatment with acid required to remove the brown stain which is so objectionable when the latter is employed.

Gelatino-chloride is very amenable to this developer, and by varying the alkali used different tones are produced. Thus, potassium and sodium carbonates produce a *sepia-brown* tone; the same, but modified by the addition of a trace of ammonia, give a *chocolate;* and ammonia *per se* a brilliant *purple.*

A curious *dichroic* image is obtained with the ammonia developer by reducing the alkali therein to one-fifth the normal amount, and exposing the plate about fivefold; the deposit, when moist, appears of a brilliant *chestnut* colour, which dries to a deep *purple.* The same purple image again appears as a *brown* in gaslight. My experience with gelatino-chloride is confined to only one make of plates, so that probably the tones would be somewhat modified when this developer is used with other brands; for Dr. Eder has already shown that films prepared according to various methods often yield different tones, even when the same developer is used.

For the development of gelatino-chloride films the following solutions are required:—

D.

Hydroxylamine hydrochloride	15 grains.
Alcohol	1 ounce.

E.

Potassium carbonate	6 drachms.
Water	1 ounce.

F.

Ammonia, ·880	1 drachm.
Water	1 ounce.

A normal exposure for use with this developer is about ten minutes, one foot from a fish-tail burner. For a *sepia-brown* tone take half a drachm of D, forty minims of E, and one ounce of water. For *chocolate* tones the above mixture, to which has been added one minim of F. A *purple* image is obtained with half a drachm of F and half a drachm of D diluted with one ounce of water. To obtain the dichroic tone: expose fivefold normal and develope with half a drachm of D six minims of F to one ounce of water. The latter solution will probably prove useful for the development of gelatino-chloride prints, for I find that by backing a thin transparency of the dichroic kind with paper, a picture possessing a beautiful warm-brown tone is obtained.

In advocating the hydroxylamine developer for gelatino-chloride I claim freedom from stain, density of deposit, and variation of tone. It should be remarked that as the alkalies used are comparatively weak, no reticulation of the film is produced when the small proportion of alcohol included in the formula is used. In conclusion, I beg to express the hope that photographers will give hydroxylamine a fair trial, and communicate the results of their experience.

ARNOLD SPILLER,
Member of the German Chemical Society.

DEVELOPERS AND DEVELOPMENT.

[A communication to the Dundee and East of Scotland Photographic Association.]

WHAT I am to read this evening is not intended for professional photographers or proficients, but I would like to say my say to those who are wanting and willing to learn. There are many developers and many modes of using the same developer. Some allow a rapid and and others a slow mode of working. Some like to use a rapid developer, and to get freedom from stain or fog (and with some plates this is necessary); others slow, so as to have more control over results. Each is good in its way, and excellent results may be got in either direction, but much depends upon the nature of the subject.

As to which is the best formula, or whether slow or rapid development is the correct thing, I am not able to say, for I believe each worker will have some pet formula that will yield what he considers the best results, while the same formula in the hands of another might yield nothing but failure. There is no doubt but what a rapid-working developer is best or most suitable for portraiture in the professional photographer's hands, as it would be annoying and costly to have to keep customers waiting so long after each exposure till the operator could report upon the result and allow the sitter to depart. As far as the amateur is concerned medium or slow development is, or I think should be, the most suitable, as it enables him to have more command over his plate. There are times, however, when rapid working would yield better results.

The professional photographer, working constantly with his apparatus and plates, can always estimate correctly or, at least within very narrow limits, what is the correct exposure to be given, and either rapid or slow development will give satisfactory results; but the amateur has necessarily a hap-hazard mode of guessing his exposure, and the result may be a very wide margin on either side of the correct one. In this case slow development will give him more chance of correcting either over- or under-exposure. Again: there are some plates that will only yield fair results with very slow development, and if hurried in any way will only give ghosts of what they should be. Other plates will not give good results with slow development. Of course, if it were possible to get one good developer which would act equally well with all makes of plates it would be a great step in advance, but I fear that cannot be. I remember some time ago having got some Swan's plates which gave me very good results with the developer I then used (I believe Edwards's), and I heard others complain of them as being bad. I put them aside as useless, but some time after I had to fall back on them, as I had no others at hand. This time, fortunately, I thought I would try Swan's own developer, which works very rapidly. The result was a firm conviction that I had never used more satisfactory plates. I again tried my other developer, but with no better results than before. I had repeatedly used the same developer with Swan's plates without finding anything of which to complain.

Again: about two months ago I required some very rapid plates—large sizes—and the only ones I could get were Wratten and Wainwright's drop-shutter plates. When developing I used the formula accompanying the packets, and the result was failure. A brother amateur developed some of them with the sulphite developer, the result being as bad. I then tried the remainder of them with the potash developer, and the result was better—fair negatives, considering the subjects and the time. I may here say, in passing, that plates of my own make and also England's (twenty-five times), used on the same subjects and same exposure, gave much better results and were far more rapid than the drop-shutter plates, so that makers' statements as to rapidity should not always be considered correct till tried.

During the last few years there has been a constant stream of new developers or modifications of old ones. The pyro., ammonia, and bromide have branched off into endless combinations—Edwards's, with glycerine and alcohol; Nelson's, with sugar; and Berkeley's, with sulphite of soda and citric acid. Then there is the soda developer, the potash, and the combination of both. We have the ferrous oxalate, the hydrokinone, and now we are threatened with a new one with a regular jaw-breaker of a name which I am almost afraid to try and pronounce—hydroxylamine, hydrochlorate, and caustic soda. There is an endless variation in the proportions of the ingredients, and, of course, each one is best.

There is no use to lay down formal rules for development, for no hard-and-fast line can be drawn. Though formulæ are given, it is impossible to use them always in the proportions mentioned, even supposing the exposures to be correctly timed. There are so many cases in which a little more or a little less of any one or more of the ingredients is required to bring about the best result. One of our leading scientific writers on photography says that he rarely uses the same proportion in his developer twice in succession, as there are so many extraneous circumstances to take into consideration—light, exposure, nature of subject, class of negative wanted, and many other things—which only can be provided for as they occur. You cannot take a formula as given by any plate-maker and adhere to it for all subjects—that is, if you want to make the most of the plates. We all know that pyro. gives density, ammonia, soda, or potash (whichever is used) detail, while bromide restrains and keeps the shadows clear; but that is not all, for you must have a knowledge of how to proportion them so as to give the best results for each class of subject. For instance: we will suppose you have a number of exposed plates to develope, that correct exposure has in all cases been given, and that you have open landscapes, architectural subjects, woodland scenes, and interiors, one strength of developer will not give the best results with all. For landscapes having hills in the distance, or open country, the pyro. must be increased and the ammonia and bromide reduced. For landscapes having buildings in the foreground and no distance, or for architectural subjects, slightly increase the proportion of ammonia and reduce the bromide. For subjects having very deep, dark shadows, such as woodland scenes, reduce the pyro. and increase the ammonia. If your subjects have strong contrasts of light and shade keep down the pyro. and develope rapidly. If the subject be wanting in contrast increase the pyro. and, at the same time, develope slowly. The slower you do it the better; in nine cases out of ten you will get more brilliant negatives.

There are very few plates in the market but what will develope with any of the standard formulæ, if only they are watched and studied in the proportion of the ingredients; and there are very few photographers, professional or amateur, who do not have a favourite formula—one which seems to give better results in their hands than any of the others. I have my favourite—1. Ferrous oxalate; and 2, the pyro. and potash, though I very often use the sulphite of soda and ammonia developer. I think the best for amateurs is neutral oxalate of potash (saturated solution), protosulphate of iron (saturated solution), to which is added one drop of sulphuric acid to each four ounces of solution, and used in the proportion of one to three. I find this developer gives good results with almost all makes of plates, and is very much under control. Any strength of negative can be made if the exposure be correct, the shadows clear and full of detail, and the high lights perfectly dense. If the plates are over-exposed a very small addition of bromide of potassium will give perfect command of the result, while, if the plate has been under-exposed and will not come up with sufficient density and detail, one or two drops of a one-per-cent. solution of hyposulphite of soda will do all that can be desired.

ALFRED GUTHRIE.

(To be concluded in our next.)

HOME PORTRAITURE.

[A communication to the Glasgow and West of Scotland Amateur Photographic Association.]

IN drawing attention to the subjects we are to consider tonight I wish you to understand that I do so more particularly in regard to their bearing on that delightful branch of our art—portraiture. It seems to me that by far the larger proportion of amateurs give their attention to landscape work—at least in my circle of acquaintance. I seldom find those who seem to take a special delight in portraiture; nor is the reason far to seek.

It is generally thought that, without the aid of a studio, with its special advantages for lighting, &c., the amateur can have no chance alongside a professional photographer who possesses this benefit. Now, I am not one of those who think thus; on the contrary, I maintain, and hope to be able to demonstrate to you tonight, that there is no reason why an amateur should not produce quite as good results in portraiture as the professional. At the outset I wish it to be distinctly understood that I do not underrate the necessity for a proper lighting of the subject. I consider it, perhaps, the most important of the whole; still, with a little practice any well-lighted room can at times be made to give most excellent results—indeed, quite as good as can be obtained in many studios—and it may be news to some of you to be told that professionals have to labour long before they arrive at the best manner of lighting their sitters, even in their specially-constructed glass-houses.

Now, although lighting does not form part of our subject for consideration, seeing it is so intimately associated with the success of home portraiture, I must ask your indulgence for a few minutes, while, in passing, I give the results of my experience.

In the first place, allow me to say that one of the chief errors amateurs fall into lies in using too strong a light. If, for instance, you place a sitter (say) about five feet from any ordinary window having a good northerly or north-westerly exposure, and step back and carefully observe the effect of the lighting on the face, you will at once see that the contrast from light to shade is too great; the side next the window is too light, while the off side is too dark. This is the result of a want of diffused light.

Now, diffusion of light may be divided into two classes:—1, natural diffusion; and, 2, artificial diffusion. Natural diffusion may be described as follows:—The atmosphere everywhere and at all times is filled with floating particles of matter, and all of these are more or less opaque. Those which are opaque reflect a portion of light and absorb a portion. Those that are transparent refract a portion and absorb a portion; this constant changing of the course of the rays until they are thrown in every conceivable direction is known as "diffusion"—that is, natural diffusion. When any translucent screen is made to intercept the direct rays of light, and the atoms of which the screen is composed reflect or refract the rays, so that those which come through have lost their general direction—some passing one way and some another—are said to be "diffused." This is artificial diffusion. Natural diffusion is beyond our control; not so artificial diffusion. With it we have all to do, and we bring it to our aid. By it we soften high lights, break up too strong shadows, and give proper modulation and solidity to our image.

Now, to obtain artificial diffusion; procure a muslin screen like this. I made it myself, and it cost me about threepence. Place it between the sitter and the window, out of range of the lens, in such a manner that all the rays of light which fall on the face must pass through the gauze. Step back again and take another look, when you will at once see that a very material change has taken place. Not only has the high light on the face been softened down, so to speak, but the dark side of the face will appear to have been lighted up, thus reducing the violent contrast which had previously existed. Now procure an ordinary clothes-horse commonly used for drying clothes on, throw over it a white sheet, and so fold the divisions of it into such positions that a reflected light (not too much of it, mind) just increases the light on the darkest part of the shaded side, and at the same time throws a little front light on the face, so as to soften or blend the high light into the shade, taking care to preserve some light and shade, which is the soul of portraiture, as well as other branches of our art. This done, your subject should be well lighted, which may be ascertained by seeing that the catch-lights are the same on both eyes.

Having said so much about what we may call the proper "quality" of light, it may be interesting to learn a little about the strength or actinic power of this mode of lighting, or, in other words, what is the average time of exposure. Later on I shall have the pleasure of handing round some specimens of my home work, and these will give you an idea of what can be done in the manner stated. On tolerably good days I obtain a properly-exposed negative, using a No. 3A Dallmeyer lens, with its No. 2 stop, in from seven to ten seconds, on a Wratten's plate. On very bright days I, of course, expose for less time. Now these exposures will compare favourably with those of many studios. If a person seat himself in front of an ordinary window having (say) a clear aperture of about seven by three and a-half feet, and ascertain the vertical and horizontal angle of the light that falls upon him, he will find that it is in excess of the light commonly admitted in photographic studios. This is a fact that may be determined by simple measurement and comparison. It is not the size of the studio or its window that determines the force of the illumination, but the angular relation of the window to the sitter; hence a window which is twelve feet square may in reality admit a far less degree of light, so far as a special sitter is concerned, than one of six feet square, the area of which is only one-fourth of the former.

From what I have said you will have perceived that if a person sit sufficiently near a window more light will fall on him than would be the case in many studios. For the same reason it will be seen that in proportion as he removes himself from the window the light diminishes according to the square of the distance, thus showing that any ordinary window with its diffused light can be made to give quite as much light as a studio. But you may ask me—"What about the facilities for various modes of lighting?" Let us examine into this also, and I think we shall find that the amateur is not tied down in the matter.

If you examine the specimens I have brought with me tonight you will find at least four entirely different styles of lighting. No. 1 is an example of the Rembrandt style, and is a picture of my little girl. She was placed about four feet from the window with her side to it, so I moved my camera, as it were, into the middle of the room, and pointed against the light. No. 2 is an example of three-quarter lighting. The sitter was placed about five feet from the window and almost facing the glass, and then the head was just turned round until only a dash of light fell on the off cheek. In this case the camera was placed so that the lens pointed from the source of light on to the sitter—almost the reverse of the Rembrandt style. No. 3 is a style very popular with Americans. In this instance the sitter, as it were, turned the head away from the light, so that the light came from the direction of behind the ear, thus giving a full side view with the off cheek in shadow. Another pleasant way is to place the sitter so that the light falls on the cheek next the window, the off cheek being in shadow. A full face is obtained by this means.

You will thus see that the amateur is not tied down to any one style of lighting, but that he has quite a choice; so he may exercise his discretion in choosing this or that one as most suitable to the requirements of his various sitters. Can more than this be obtained in any studio? I think not.

Having said so much about lighting I now come more particularly to the subjects we are specially to consider, in which later on I hope to give some practical demonstration, namely, retouching and enamelling. No matter how well and artistically you may light your subject (passing over the consideration of proper exposure, development, printing, toning, &c., with which, no doubt, you are all conversant), unless the amateur be able to retouch his negatives and then to finish his prints in a superior style he will still be far behind the professional. Later on I hope to show you the *modus operandi* of retouching, and also how to enamel prints. I claim no singularity in either case, as you will learn. I propose to deal first with enamelling, and before proceeding to give you a practical demonstration of it I will just say that, whatever may be urged for this or that one's opinion for or against enamelling, there can be no doubt that most of the leading professionals now adopt this style of finishing their portraits. I maintain that increased softness and detail in the shadows are brought out in an enamelled print which would be lost otherwise. In discussing this matter with several of my friends I was struck with the similarity of their objections, which nearly all came to this—that it was very troublesome and not worth the mess. Now, this is all nonsense. With a little practice and ordinary care an amateur can enamel his prints with great ease and success, and this is the first thing I propose to do tonight. I have no doubt many, if not all, of you have read about enamelling, and know well enough how it is done. Still, I am inclined to think very few of our members have ever practised it, and were they to proceed to do it from the knowledge which they have acquired from what they have read, I do not hesitate for a moment to state that nine out of their first ten attempts would end in failure; but when you come to have ocular demonstration the thing becomes easy of accomplishment and within the range of practical photography for amateurs. T. N. Armstrong.

(To be concluded in our next.)

RECENT PATENTS.

PATENT SEALED.

No. 4,989.—"Changing Sensitised Plates in Photographic Cameras." James Sturrock, Dundee.—*Dated March* 17, 1884.

APPLICATIONS FOR PATENTS.

No. 15,887.—"Photographic Cameras." W. Middlemiss.—*Dated December* 3, 1884.

No. 16,087.—"Photographic Cameras." C. Sands and J. J. Hunter.—*Dated December* 6, 1884.

An Improved Form of Lantern Front for Magic Lanterns.

William Charles Hughes, Optician, 82, Mortimer-road, Kingsland-road, London.

This patent, illustrated with drawings, refers to the construction of the brasswork front of the lantern, for carrying slides varying in size, and permitting the use of long-focus objectives with advantage. The condenser tubes have an extending arrangement.

THE SOIRÉE OF THE ASSOCIATED SCIENTIFIC SOCIETIES OF LIVERPOOL.

This year's *soirée* of the combined learned societies of Liverpool took place on Wednesday last, the 10th inst., at St. George's Hall.

The Liverpool Amateur Photographic Association collected together for exhibition probably the finest gathering of pictures and apparatus ever placed before the Liverpool public. The hanging committee, Messrs. Beer, Crowe, and Guyton, under the superintendence of the Hon. Secretary, the Rev. H. J. Palmer, were at work the greater part of the day of the *soirée*, and by opening time had arranged their display very effectively.

Among the exhibits may be mentioned the splendid series of enlargements of Alpine negatives by Mr. W. F. Donkin, which gained for him the gold medal at the recent Pall Mall exhibition. Mr. J. H. T. Ellerbeck displayed an extraordinary number of good pictures of this year's work in Norway and in Wales. Dr. Watling showed a large selection of the prize pictures of the Amateur Society of England. Dr. Paul's very fine series of illustrations of Norfolk abbeys and towns were greatly admired, as also were the framed enlargements exhibited by Messrs. Beer and Cornish. The Rev. H. J. Palmer also showed a fine enlargement illustrating this year's work in Switzerland. Among the other exhibits by members of the Association may be mentioned, as specially worthy of praise, the competition pictures of this year, which are unusually good; and collections by Messrs. Cross, Beer, Atkins, Haworth, and Crowe.

Outside the Society were a splendid collection of Egyptian pictures exhibited by Mr. Pugh. Every phase of Egyptian life, manners, and architecture were represented here, and greatly was this portion of the exhibition appreciated. Messrs. Robinson and Thompson contributed some very beautiful pictures, and among them an enlargement in opal of a portrait of the Premier by the Rev. H. J. Palmer. Messrs. Cussons and Co. showed cameras and apparatus of every kind.

On the whole, the Association may be congratulated on having produced in Liverpool an exhibition of such singular interest and merit.

BURY PHOTOGRAPHIC AND ARTS CLUB EXHIBITION.

The second annual exhibition and *conversazione* of the above Club was closed on Saturday last. It proved very successful, and met with the cordial support of the public. Mr. F. Cooper, one of the Vice-Presidents of the Society, sent twenty views, which were excellent in every respect. Mr. C. H. Openshaw, one of the younger members, contributed sixteen pictures. Mr. F. W. Livsey contributed a very large collection (no less than eighty-five) to the photographic portion of the Exhibition. Miss Rosa Scott sent seven capital photographs of local views. Mr. T. J. Hutchinson contributed an equal number, and Mr. T. Entwistle four of views near Whitefield. The photographs exhibited by Mr. J. Nelson were very excellent indeed, and some of the finest in the room.

Mr. H. M. Dearden contributed sixty views of Welsh scenery, Prestwich Clough, and other objects of interest in the neighbourhood. Of the thirty pictures shown by Mr. Robert Grundy, Jun., of Parkhills, many dealt with Welsh scenery and were beautiful in their effects. Mr. E. W. Mellor, of Polefield, Prestwich, sent a number of small photographs, which were deservedly admired.

The oil paintings and water colours were hung on a wall immediately below the gallery, and included two by Mr. C. H. Wood—one lent by Mr. Walter Ashworth, and the other by Mr. Grundy. Mr. W. S. Barlow sent half-a-dozen paintings, which were extremely good in colour. Mr. F. W Livsey sent *Boat on Conway Bay*, and a large picture, which occupied the place of honour in the centre, *The Finding of the Body of Harold*—a copy of the picture by J. C. Hook, R.A. Mr. J. Holding, of Manchester, had two landscapes in monochrome and three water colours. Mr. Whitehead lent a picture by Mr. J. Shaw, representing the top of Bolton-street in days gone by; and Mr. Joshua Entwistle had a study in colours and some plaques.

Mr. E. W. Mellor exhibited Beard's patent self-centering slide carrier, which had been kindly lent by Messrs. Stewart, of London, and met with the general approval of the members.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
December 16 ..	Bolton Club	The Studio, Chancery-lane.
,, 17 ..	Photographic Club	Anderton's Hotel, Fleet-street.
,, 18 ..	London and Provincial	Masons' Hall, Basinghall-street.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

THE ordinary monthly meeting of this Society was held on Tuesday evening last, at 5A, Pall Mall East,—Mr. James Glaisher, F.R.S., President, in the chair. The proceedings were opened with the usual routine business, and three new ordinary members elected.

Captain ABNEY, R.E., F.R.S., read a paper upon *Testing Gelatine*, which set forth that dry-plate makers were aware that the quality of gelatine varies as regards tendency to frill, and their idea that this tendency is governed by the amount of water different specimens would take up was generally but not altogether true. Different gelatines dried in different times, and threw those stains upon the plate which were the cause of the tendency to frill. He, therefore, prepared a solution of gelatine of such a strength that five grains of the colloid were made to form a film upon each quarter-plate; after being dried the films were stripped from the glass and accurately measured. Some were then placed in water to soak; others were treated with ammonia of the strength usually employed in developing, while more were soaked respectively in solutions of monocarbonates of soda and potash, in which they were allowed to swell for one hour. The tabulated results showed that ammonia promotes swelling, whilst the monocarbonates of potash and soda have less tendency so to do; consequently they are in this respect better for developing. He added that an easy method of getting emulsion to flow freely over a glass plate was to cover a squeegee with swansdown and to rub it over the plate just before coating with emulsion. His experience with silicates as a substratum to promote the flow of gelatine had not been good.

Mr. W. BEDFORD wished to know if Captain Abney would have obtained the same results had he used soft gelatine artificially hardened with alum.

Mr. LEON WARNERKE was in favour of the use of monocarbonate of potash, as he had recently stated in public, and he agreed that it gave less tendency to frilling. Gelatine was firmer the quicker it was developed. When he wanted to avoid frilling he added alum to the first washing water in which the emulsion was squeezed out in fine threads; the succeeding washings cleared out the alum again. He used ordinary alum—not chrome alum. The threads became crisp under the treatment, and did not increase in bulk. The plates developed quicker than when there had been no treatment with alum at all, but the increase in rapidity of development was small.

Mr. W. K. BURTON wished to know the proportion of alum used in the first washing water.

Mr. WARNERKE replied that the maximum was five per cent.

Mr. T. SEBASTIAN DAVIS stated that, if gelatine were moist for a long time, decomposition had a tendency to set in near the centre of the plate. He had made one batch of plates with Heinrich's very hard gelatine, and another batch with Nelson's No. 1—a very soft gelatine. The latter were four or five days in drying without artificial appliances for the purpose, whilst the former dried in forty-eight hours under similar circumstances. The hard gelatine had no direct tendency to blister.

Colonel STUART WORTLEY remarked that, of course, the long drying was for experimental purposes, and not for ordinary practical applications.

Mr. SEBASTIAN DAVIS said that for practical purposes he liked plates to get quite hard within twenty-four or thirty-six hours.

Mr. WARNERKE had no doubt the experiments had been carefully made, but the results did not harmonise with his experience, for he found that when plates dried too quickly there was liability to blister. He liked to keep his plates in the drying-room from four to six hours, and then to store them.

Mr. SEBASTIAN DAVIS found twenty-four hours to be a good time for drying, but thought three or four days promoted blistering under development.

Mr. WILLIAM ENGLAND found twelve hours to be a reasonable time for the drying of plates. When the time was longer they increased in sensitiveness in the centre.

Mr. JOHN SPILLER, F.C.S., stated that alum or a very little sulphate of zinc was sometimes put into glue by the manufacturers to promote the hardening. The effect of metallic salts upon gelatine ought to be tried by experiment, for probably some of them would be found to give the plate much less tendency to frill.

Mr. W. E. DEBENHAM asked the proportion of sulphate of zinc sometimes used by gluemakers.

Mr. SPILLER did not know, but it was exceedingly small—a mere trace, in fact. In very hot or very cold weather they could not get the films to dry when spread out on the netting. The least touch of frost spoilt the glue.

Colonel STUART WORTLEY said that the gluemakers employed one-half per cent. of sulphate of zinc.

Captain ABNEY, in reply, stated that his experience with soft gelatine artificially hardened was that its expansive power was materially lessened. If plates were forty-eight hours in drying he should be astonished if they did not frill and blister. He should get perfect fog under the circumstances. The use of a substratum prevented the mark round the edge of the plate in drying. Not less than eight hours or more than twenty-four hours was the best time for drying, and quick drying by alcohol tended to blistering. Altogether, sixteen hours was a good time for the drying of plates. Mr. England was a good and experienced plate-maker, but his experience in relation to the effect of slow drying on the centre of the plate showed that his emulsion was not sensitive enough at the time of coating if he desired the maximum of rapidity. Nitrate of zinc had a hardening effect upon gelatine, and with the use of bromide of zinc for decomposing the nitrate of silver there was no risk of getting slowness; but the zinc salt was not so "certain" as the potassium salt.

Mr. GORDON then exhibited a washing machine, in which each print was placed upon a separate wire work frame, and washed separately in the same bath with other prints. Mechanical arrangements at the side of the bath emptied the water now and then, allowed a certain time for the prints to drain, and then admitted a fresh supply of water. The number of changes of water per hour could be automatically governed at will. There might, for instance, be twenty, six, or four changes of water per hour, according as desired. The apparatus would go on working by itself so long as the water supply lasted.

Mr. DEBENHAM had seen one of these machines at work in the hands of a friend, and was so pleased with its action that he intended to buy one for himself. It would hold as many prints as an ordinary photographer would be likely to require to wash at the end of a day's work. The lower prints were drained by it as well as those uppermost.

Colonel STUART WORTLEY thought the wood of the frames would get saturated with thiosulphate of soda.

Mr. ENGLAND recommended the substition of sheets of gutta-percha perforated with holes.

Mr. W. M. ASHMAN recommended soaking the present frames in melted paraffine.

Mr. GORDON had had the present frames in use for two years without disadvantage.

The proceedings closed with the usual votes of thanks.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

THE annual meeting of the above-mentioned Society was held in the House of the Society of Arts, John-street, Adelphi, on Thursday, the 4th instant,—Mr. E. W. Foxlee in the chair. In opening the meeting, the CHAIRMAN proposed that the members should constitute this an ordinary meeting as well as an annual one. Several of those who had on the last general meeting been proposed as members of Committee had withdrawn their names, so that at present there were not sufficient names to form a committee of twelve, as was intended. The gentlemen who had withdrawn their names were Mr. A. L. Henderson and Mr. A. Mackie. Several of those who had been proposed were found not to be members of the Society. Mr. T. Bolas was proposed as Vice-President, and in that capacity would be a member of committee. If the meeting were constituted a general one new names could be added to the list.

The proposal was agreed to, and the meeting, therefore, proceeded as an annual ordinary meeting.

The Hon. Secretary read the report of the past session, and also the Treasurer's report. The reports were adopted.

TWENTY-FIFTH ANNUAL REPORT.

IN submitting the annual report the Committee regret to have to record the great losses the Society has sustained by the hand of death during the past year of the Rev. F. F. Statham, M.A., F.G.S., who had been President from the Society's formation in 1859; Mr. Jabez Hughes, one of its earliest members, and for many years one of its Vice-Presidents; and Mr. H. Baden Pritchard.

The death of the Rev. F. F. Statham was unquestionably a great blow to the Society, and so severely was this felt to be that suggestions were made to bring the Society to an end in consequence. In order to ascertain the feeling of the members on this question, a special meeting was held and circulars were sent to them. The Committee much regret that so few took sufficient interest either to attend the meeting or reply to the circulars.

The annual lantern meeting in January was, as usual, crowded. Slides were exhibited by Messrs. Beasley, Jun., Page, H. Trueman Wood, F. York, J. J. Brigginshaw, J. Gale, W. Brooks, F. A. Bridge, Wheeler, W. Cobb, and others.

During the year papers have been read as follows:—*Willesden Paper*, by Mr. F. A. Bridge; *Old Photographs*, by Mr. E. Dunmore; *Polarised Light*, by Messrs. C. and F. Darker; *Composition*, by Mr. Norman Macbeth, R.S.A., and *Furnell's Lens*, by Mr. W. Ackland.

Numerous questions from the question-box have also been discussed. It had been arranged to hold a festival dinner on the twenty-fifth anniversary of the Society (May 10). The lamented decease of the President, however, necessitated its being abandoned.

An outdoor meeting was held in July as usual, and, notwithstanding the unpropitious state of the weather, a pleasant meeting resulted.

It having been decided that the last technical meeting was deficient in interest, Mr. J. Traill Taylor kindly promised a lecture on *Florida* for the November meeting, which was well attended.

With regard to the artistic competitions, the Committee are scarcely in a position to report, the pictures having only just been received. They trust, however, the result will be satisfactory, and hope this distinctive feature of the Society will meet with the success it deserves.

The Treasurer's report showed that the Society had a balance of £1 6s. 1d. in hand.

The Secretary went on to remark on the number of subscriptions that were in arrears, pointing out that the balance in hand was now very small.

After this there was a great deal of desultory conversation as to whether it was possible to continue the existence of the Society at all or not, and, if so, how it was to be done.

A letter from Mr. W. M. Ashman to the Secretary, in which he (Mr. Ashman) warmly advocated the continuance of the Society, and proposed certain modifications in its method of working, was read.

The CHAIRMAN pointed out that the Society *did* exist, and that the only way in which to bring about its end, were that desired, was by some member proposing, and another seconding, a resolution to the effect that the Society cease to exist.

Mr. A. COWAN, in proposing that the Society be brought to a close, said that he had the greatest respect for the South London Photographic Society. He thought that his respect for it was shown by the fact that since he had become a member he had never missed a single meeting. Now, however, he thought the Society must cease to exist, and he, therefore, moved that it be brought to a termination.

Mr. H. TRUEMAN WOOD thought it would be well that a motion be taken, and that the matter be settled one way or another. There was a sufficient attendance that night to show that there were enough members to keep the Society going. Nevertheless, it would be better for the Society to take this opportunity of ceasing to exist than that it should die in a miserable fashion. It would be best for the members to express their opinion by a vote. For his own part he thought there was room for a Society such as the South London Photographic Society, although he knew the great difficulty in its continuing to exist was that the field was taken up by the weekly meetings, which were of a more convivial nature. Still, he did not see why, because these weekly societies were somewhat more free and easy than this one, there should not be room for a society where the science of photography was treated in a rather more serious manner than at the weekly societies. He thought, moreover, that there should be room for both the Parent Society and the South London Photographic Society. The present, when photography was increasing so greatly in popularity, was not a time for a society to cease to exist. However, if the the thing were not to go on in a vigorous way it were better that it be wound up respectably than allow it to die a lingering death. He did not know that it would be quite regular for him to second Mr. Cowan's motion after what he had said, but if no one else would second it he would.

The CHAIRMAN, in putting the motion to the meeting, said that as, perhaps, the oldest member of the Society, he now found himself in a very unpleasant position. He had been proposed as a member of the Society by the late Mr. Jabez Hughes at its second or third meeting, and had made it a rule to attend every meeting at a time when he was younger and perhaps more enthusiastic than at present. Since his election he had been continuously a member of the South London Photographic Society, and since the North London Photographic Association had ceased to exist he had belonged to no other until he joined the offshoot of the South London Photographic Society—the Photographic Club. He had his own opinion as to the desirability of the continuance of the Society or the reverse, but, being Chairman, he did not feel called upon to express them. It was with pain that he put the motion to the meeting.

It was carried by a large majority that the Society should not cease to exist.

The following gentlemen were then proposed as members of the committee in addition to those who had been suggested at the last meeting:—Messrs. C. Poirson, T. J. Collins, Jun., W. M. Ayres, and G. A. Garrett.

A ballot then took place, and the following gentlemen were elected as officers of the Society:—*President:* Mr. W. Ackland.—*Vice-Presidents:* Messrs. T. Bolas, H. T. Wood, and F. York.—*Committee:* Messrs. W. Ashman, W. K. Burton, W. Cobb, E. Dunmore, J. A. Harrison, W. H. Prestwich, H. Wilmer, C. Poirson, T. J. Collins, C. Hussey, Jun., W. M. Ayres, and G. A. Garrett.—*Hon. Secretary* and *Treasurer:* Mr. F. A. Bridge.

A vote of thanks to the officers for the past year was proposed by Mr. Burton, seconded by Mr. A. Mackie, and carried unanimously.

The Secretary proposed a vote of thanks to the Society of Arts, coupled with the name of Mr. H. Trueman Wood, for their kindness in lending their room. This was carried by acclamation.

The CHAIRMAN proposed a vote of thanks to Mr. F. A. Bridge for his exertions as Secretary and Treasurer. This was also carried by acclamation.

The January meeting was appointed for the exhibition of lantern slides, and Messrs. King, Cowan, Wheeler, Poirson, Garrett, and Ashman promised to bring slides.

It was then announced that the annual dinner of the Society would take place at the Holborn Restaurant, on Tuesday evening, the 16th instant, at half-past six o'clock.

Mr. Ashman promised a paper for the February meeting.

The meeting was then adjourned.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AT the meeting of this Society, held on the 4th instant, the chair was occupied by Mr. A. L. Henderson.

Mr. W. E. DEBENHAM said that when Mr. J. T. Taylor some little time since showed an American vignetting-frame he had observed that in some points it resembled those which he was accustomed to use, and he now brought examples of his vignette presses and appliances to illustrate the system of working which he employed. An ordinary printing-frame had a double thickness of millboard attached to the front, with openings cut through both thicknesses opposite to where the figure would come upon the negative. These openings were slightly larger than the largest opening required in the vignette "form." The vignette "forms" themselves were cards with openings cut in them of the various sizes that would be required. In order to have a system of numbering and identifying the size of opening used with any negative, so that the same might be taken at another time, the "forms" were numbered according to the eighths of an inch that the openings were long. Thus No. 8 represented one inch, No. 14 an inch and three-quarters, and so on. Any that were either wider or narrower than the standard proportion were marked W or N in addition to the number written on the card. The cards were pushed between the two millboards, and might be adjusted to any position over the face or figure of the sitter without fear of slipping during the printing of an order. The frames having no projection were turned over upon the bench to be changed exactly as with ordinary presses. This system he had had in use for about twenty years, and he continued now to employ it; but when carbon printing and vignetting with tinted margins came into practice about seven or eight years ago he had arranged another frame, of which an example was also shown. In this frame the adjustment was made by shifting the negative upon a plate glass which the press contained. There was a movable front consisting of a deal frame which buttoned into the front of the pressure-frame, and into which were buttoned, when double printing was required, glasses containing an opaque paper mask. For tinting the margin a corresponding mask, but with the centre opaque, replaced the mask with central opening. The paper was kept in the same registry for printing and margin tinting by being laid against the top and one side of an inner back.

The CHAIRMAN thought the whole system good. It was much like the plan that he himself adopted, but in his frames the openings were cut in opaque "empire" cloth. This cloth was held between two glasses, and the adjustment was made by pulling the edges of the cloth, which were allowed to project beyond the edges of the glasses, through spaces left in the binding. He thought it an advantage to use glass in the front of the vignetting-frames, as they need not be so hurriedly brought in and wiped in case rain came on.

Mr. DEBENHAM said that his vignettes were printed under a sash glazed wit ground glass.

The CHAIRMAN inquired whether Mr. Trinks could speak of vignetting as applied to photo-mechanical printing.

Mr. J. H. TRINKS said that vignetting had always been a difficulty in phototype processes. In the production of plates for this purpose it was necessary in order to obtain the finest results to print with parallel rays. A satisfactory method of keeping the rays parallel was to have a projection rising some distance from the front of the printing-frame, and to note that the shadow of this projection fell always upon the same part of the frame.

Mr. W. H. PRESTWICH said that no doubt Mr. Debenham's plan was a splendid one. There had lately been published a specification of a patent for a process for vignetting in the camera itself, by having a screen in front of the lens, with a opening in it, and vandyke edges. It seemed to be what he had used many years before for vignetting positives.

The CHAIRMAN said that in 1872 he had advocated the use of a vignetting screen, made up of several layers of wire gauze, the opening in each layer being cut a little larger than that in the next layer, and had pointed out that such a screen might be used either in the camera or in the ordinary way. In the collodion positive days it was necessary to vignette upon the plate itself, and this was commonly done by a screen with a central opening placed between the camera and the sitter. He had preferred, however, to produce the effect by exposing the plate to diffused light, either before or after exposure in the camera. There was a glass in front of the plate with an opaque central disc preserving the figure from the destroying action of the light.

Mr. J. B. B. WELLINGTON said he believed it was generally understood that colloid bodies acted as restrainers in the developer. He had added glycerine to ferrous oxalate developer in order to restrain it, but found that it served as an accelerator, less exposure being required than without it. If equal exposures were given the plate developed with the added glycerine came out the quicker.

Mr. TRINKS said that he wished to offer a prize of £50 for competition, the subject to be decided by the Society itself—whether process, apparatus, or what might be thought best.

The proposition was warmly received, and it was arranged that at the meeting to be held on the 18th instant the subject should be chosen. Members unable to attend were invited to send suggestions by post to the Secretary.

Mr. WELLINGTON inquired whether the Chairman had experimented with bichloride of mercury as an antiseptic in emulsion, as he had proposed to do. He (Mr. Wellington) had tried it in tho proportion of half-a-grain to a ten-ounce batch. He had mixed it with the bromide in the first instance, and found that it slowed the emulsion very much, the resulting plate giving 9 on the sensitometer instead of 20. The plate, however, was remarkably clean; there was no green fog whatever.

Mr. DEBENHAM observed that chloride of mercury appeared to have a remarkable desensitising effect upon chloride of silver. In the old process for whitening positives bichloride of mercury was used, and chlorides of silver and mercury were left upon the plate. The chloride of silver, however, did not blacken by exposure to light as it would do in the absence of the chloride of mercury.

Mr. F. W. HART had some positives that were whitened in this manner some thirty-six years ago, and the chloride of silver was still white.

The CHAIRMAN thanked Mr. Wellington for relating his experience with bichloride of mercury. He (the Chairman) intended to experiment with it, and should have used a comparatively strong addition, but would now commence with a very small quantity, and would add it after the emulsion was made up. That might make a difference in the effect as regarded slowing the plate.

Mr. HART said that a much smaller quantity than that used by Mr. Wellington would prove a sufficient antiseptic. The pits sometimes formed in plates when setting were, he believed, due to a fungus, and to such organisms bichloride of mercury was fatal.

The CHAIRMAN said he had never seen pits in emulsion plates which could not be prevented by adding ammonia, more or less, to the emulsion.

It was announced that at the meeting to be held on the 18th instant Messrs. Marion and Co. would demonstrate the printing and development of their new paper.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

At the usual Board meeting of the above Association, held on the 3rd instant, at 181, Aldersgate-street, E.C., Mr. W. T. Smith, of Liverpool, and Mr. J. G. Gibson, of Tynemouth, were elected members. The Board considered the advisability of appointing local secretaries in large towns, and would be glad to hear from any persons willing to act in that capacity.

After disposing of other business the meeting was adjourned until January 7th, 1885. Assistance in response to applications was granted at this and a previous Board meeting after due consideration.

EDINBURGH PHOTOGRAPHIC SOCIETY.

The second meeting for the current session was held in the Society's rooms, on Wednesday, the 3rd instant,—Mr. Norman Macbeth, R.S.A., President, in the chair.

The minutes of last meeting having been read and approved of, the ballot box was opened, and the following gentlemen declared duly elected:—Messrs. W. A. Bryson, G. Napier, Charles Murray, Aitken, W. Skinner, J. W. Miller, Henry Cowe, Herbert W. Eibbs, Robert Lindsay, Donald Mackenzie, and Alexander Thompson.

The following candidates were proposed for election at next ordinary meeting:—Messrs. John Coubrough, Thomas Burns, A. N. M'Alpine, B.Sc., George Gowie, William Grey, H. Pummell, David J. Lawson, James Sharp, George W. Heathcote, and T. A. Douglas Wood.

The report of the Council on the study of the picturesque was then submitted, as appeared in last month's *Transactions*.

The Chairman, in submitting this report, stated that of course this was a mere experiment, and it was impossible to say yet how it would succeed. It was thought by some that it would be well to hang the pictures for criticism on the walls; but after consideration it had been decided that it would be better to hand the pictures round for examination individually, and after all had been examined to give the members an opportunity of being heard on their merits and defects. A large number of pictures were then laid on the table and handed round for inspection, after which, when they were all returned, the Chairman called the attention of the members to a portrait of a lady. He said that, in the meantime, the names of the artists were to be withheld, so that members might freely express their opinions; afterwards he would, so far as he knew, inform the members of the names of the parties submitting the work.

Mr. Crook said the picture submitted appeared to him harsh in tone in the whites; there was a want of detail in the delicate shadows, while the arm and hand which fell upon the white dress was much too dark. Then the pose of the head and the hand on which it was leaning were too forced; the head ought to have inclined towards the hand, and shown that it was resting on it. This was not so in the present case, and the pose was altogether too evidently studied and artificial, and it seemed under-exposed. Twice the exposure would, he thought, have improved the picture to a very great extent, and given a much better effect.

Mr. Mitchell stated that the figure was too low down in the picture, and that to raise the head a little and cut a portion off the left side of the picture would improve its effect.

Mr. McKean thought that more exposure would have done no good, but rather increased the harshness to which allusion had already been made. He thought the fault lay entirely in the lighting; but the pose was also bad. The hand at the head was too prominent and badly arranged, while that on the dress was too dark; the lines were too straight.

Mr. Howie said it was by no means a pleasingly-arranged picture. The position was angular, the figure fronting too much, the dress too white, wanting in detail, and needing to be subdued in tone; while the hand on the dress had too much the appearance of a claw, and was not carefully posed.

Mr. Turnbull thought that had the hand been a little bent it would have improved the picture, while the fingers at the side of the head were too low, and the portrait was rather much of the front face for the portrait of a lady who had a large mouth, which was too markedly shown.

Mr. Brebner considered the chief fault of the picture was that the contrasts were too prominent. There was probably too little colour in it; it needed half-tones and more grey, otherwise he liked the picture very much.

The Chairman stated that to his mind the picture was remarkable for its breadth—a quality rarely seen in a photograph, because many of the lines of and connected with a subject could not be controlled, and this was a power the painter had which the photographer had not. He said the portrait was that of a celebrated Russian actress taken by Mr. Kareline, who gained the gold medal at the great photographic exhibition in Edinburgh, and it was considered one of the best specimens of portraiture in the exhibition at the time. Since then it had considerably faded; many of the finer half-tones and lines had disappeared, and the background had begun to get stained. He quite agreed that the head was too low on the picture, that there was far too little in the skirts of the dress, and he would be inclined to cut of a portion both at the top and at the sides. There was a considerable force of character shown in the face, but there was a weakness shown in the hand at the head as if she were studying too much not to spoil the lines of the face and hand by pressure. He had brought this picture with a view to mark the peculiar characteristics of Kareline's treatment, and he thought that one of the objects in keeping out the lines of the dress was to give value to the flesh tints, which he thought were most beautifully represented.

The next picture offered for criticism was a mezzotint engraving after Sir Thomas Lawrence, also belonging to the Chairman, who stated that his object in bringing it was to show the members what he considered, perhaps, one of the most elegant poses possible—a very fine example of composition in lady portraiture, for which Sir Thomas was famous. It was certainly tinged with mannerism, but that was probably the fault of the time in which he lived. This picture passed without comment.

There was then shown a picture by Mr. H. P. Robinson—*Yn Cymraeg y Saesneg*—two young women reading a notice bill printed "in Welsh and English" pasted on a deserted cottage door.

Mr. Howie said he had a feeling that comment on the pictures sent in by Mr. Robinson might to a great extent be impertinent; but he felt that in this picture the figures seemed too obviously posed for effect. The subject of the notice was not one likely to interest two country girls.

Mr. Brebner thought the subject a very difficult one to treat. It seemed to him that there was a want of balance in the picture.

Mr. Crook said the two girls might be interested in the notice, and thinking that "there was as good fish in the sea as ever came out."

The Chairman said his feeling was that the bare stonework on the left was rather too prominent, and swamped the delicacy of the figures. It was a difficult thing to contend with light dresses against a strongly-marked stone wall. The picture required some object, however small, to break the monotony of that wall, and give balance to the picture. The other side was well contrived, and the placing of the broken sieve on the ground, and the piece of wood put into the window, were very admirable. It was difficult to control the square forms of doors, and this was admirably done here.

The next was a photograph of some sheep, also by Mr. Robinson.

Mr. Crook thought the sky was too palpably printed in; the clouds of the horizon were too large and round to be true to nature. The direction of the light and everything else in the picture was beautiful.

Mr. Simpson considered that there was not enough light on the foreground, while the sheep were well lit, and the two did not correspond.

Mr. M'Kean stated that this was a fault common to all shutter pictures.

Mr. Stewart pointed out that this could not have been an instantaneous picture, as several of the sheep had moved during the exposure.

Mr. Bashford said this, to his mind, was one of the prettiest photographs he had ever seen. He had a copy for some years, and had picked it out of a number as one of the sweetest expressions of a sunny landscape possible. It was well balanced, the details were exquisite, and the picture of the sheep and their surroundings was very pleasant.

The Chairman shared Mr. Simpson's opinion as to the lighting, and there was too much uninteresting foreground which could have been remedied either by cutting a bit off the bottom or by placing a single sheep immediately in front.

Mr. Howie thought the latter would be a mistake.

Mr. Brebner differed from Mr. Howie. The base line of the picture being straight, the horizon line being straight, and the line of the sheep straight, the placing of a stray sheep would have removed the objectionable repetition of the straight line.

A Short Road in Summer, by Mr. Robinson, was then submitted.

Mr. Tamkin said his objection to the picture was that the figures were placed too exactly in the centre of the picture. He placed two cards over portions, cutting off about half-an-inch from the bottom and an inch and a-half from the right side, and showed how greatly the value of the picture was enhanced by this means.

Mr. Brebner perfectly agreed with Mr. Tamkin.

The Chairman concurred in this opinion. The picture was too evenly balanced; there was nothing left for the mind to do—it was too satisfying. The alteration shown by throwing the figures out of the exact centre set the mind in action to find the balance, and that gave the picture the interest it now wanted. Otherwise it was a very beautiful representation of a well-chosen little bit of nature.

Artist and Model by Mr. Robinson was the next picture put up for criticism.

Mr. Tamkin thought that the clouds in this picture were not well chosen. The sky was over-crowded, and not in keeping with the rest of the picture. The models, again, were standing in a peculiar way—neither natural nor graceful.

The Chairman pointed out how well this picture illustrated the power of balance, one single figure balancing the large group on the other side.

Mr. Robinson's picture, *Haymaking*, came next.

Mr. Simpson said this picture contained many elements of interest, and the feeling of relief in it was superb.

The Chairman said the effect was admirable, but the posing was too apparent. The action of the girls with the rakes was not that of country girls making hay. There were too many repetitions of the same pose, and too much apparent self-consciousness of posing for the purpose. A picture of *Loading Grain*, by another artist, was shown in contrast to this, in which the artist had much more successfully caught the natural positions and expresions of the workers. This was a much less pretensious picture, but there was an utter want of self-consciousness that made it more successful.

Owing to the lateness of the hour the further examination and criticism of the pictures, of which a very large number had been sent in, had to be postponed.

The Chairman hoped that the owners of those pictures which had not been commented on would either permit them to remain in the hands of the Curator, or would return them for a future occasion. He thought that the night's proceedings had been full of interest and education for the members, and they certainly seemed to be thoroughly appreciated by them. In regard to Mr. Robinson's pictures, he (the Chairman) said that these had been sent in consequence of a part of his address at last meeting, in which he had expressed a fear lest professional photographers would not send pictures for criticism. Mr. Robinson had certainly been generous enough, as these were not nearly all he had sent. He handed round a printed list of Mr. Robinson's pictures, and stated that members wishing to have copies of these pictures could be supplied at the prices there stated. He concluded by stating he could guarantee that all meetings for conference of this nature would be as full of interest as this had been.

Mr. J. B. READMAN then read *A Plea for a Work Room for the Use of Members.*

Mr. M'KEAN was heartily glad that this subject had come up again. What was wanted was not only a dark room for amateurs, but one in communication with the meeting-room, so that facilities might be had for practical demonstrations without the inconvenience which now attended them. The Society consisted of professional and amateur photographers. The professional did not need such accommodation as this proposed, but the amateurs, who constituted a very large proportion of the Society, do; and unless such a convenience as this were provided they might possibly get one for themselves and form a fresh society, splitting up this one, which would be left by such a split in a very awkward position. The question required careful consideration, and he trusted it would be taken up and considered, and the sooner the better.

Mr. TAMKIN thought that if it were found necessary for amateurs to separate from the professionals in this matter they might separate altogether, and it was matter for serious consideration whether more suitable premises could not be found having this convenience.

Mr. CRIGHTON did not understand that there was any proposal to sever the connection between the amateurs and the professionals. To him it had always been a great drawback that the Society had no place in which, besides holding ordinary meetings, they could meet informally to talk over matters, see the photographic papers, and where amateurs could have facilities for developing and printing their pictures. But he deprecated any idea of severance.

The idea brought forward in this paper struck Mr. BREBNER as being a peculiarly happy one, and, if carried into effect, would, he thought, meet a long and generally-felt want, not only for a dark room but also a reading-room and library, and a meeting-room for the members. A great many members, both amateur and professional, were theoretical enthusiasts; and it might happen that a man had a theory on which he desired to have the opinions of others, like himself, but had no facilities in his own premises for this. To such men a proper dark room and meeting-room would be invaluable.

Mr. BASHFORD said this was a subject which had often been before the Society, and last year it was remitted to a committee to make inquiries with a view to finding other premises which would meet the requirements of the Society. They failed, however, to find any place to suit except one, the rent of which was so heavy that the idea of taking that was abandoned. Under these circumstances the Council, he thought, were justified in coming to the conclusion that in the meantime they could advise no change in the place of meeting.

Mr. HUME highly approved of Mr. Readman's proposal, but it seemed to him entirely a matter of expense. By taking increased subscriptions from the members who desired the use of such a convenience, there would be no difficulty in getting what was wanted. But very great care would have to be taken, and stringent rules made about leaving chemicals around loose, and other matters of that kind. He had had some experience of students having uncontrolled use of a laboratory, and certainly, unless very stringent rules as to its use were made and enforced, the whole thing would very soon go to wreck.

Mr. TURNBULL stated that rooms apart from the ordinary meeting-rooms could easily be got at a moderate rent, if sufficient members came forward willing to pay (say) ten shillings extra per annum for such accommodation.

The CHAIRMAN said the Society was extremely indebted to Mr. Readman for bringing forward the matter, and for the trouble he had taken in getting so much information enabling him to put the proposal in practical shape, and he proposed that the matter be now remitted to the Council for inquiry, discussion, and report. In the meantime those willing to join in such a scheme might send in their names to the Secretary. He proposed a hearty vote of thanks to Mr. Readman for his interesting paper.

Mr. Bashford then exhibited to the meeting "ye phantom shutter"—a most ingenious invention by Mr. A. A. Pearson, of Leeds, combining an instantaneous drop shutter and a flap for ordinary hand exposure. After explaining its working he handed it round for inspection by the members, who greatly admired and commended it. Some interesting photographs taken by Mr. Pearson with the aid of the shutter were passed round, and also an exceedingly-successful photograph of a drawing room taken at night by gas illumination.

The CHAIRMAN called the attention of the members to the circular which accompanied the billet regarding the annual dinner of the Society, fixed to take place on Friday, the 12th inst., at half-past six.

A vote of thanks to the Chairman closed the proceedings.

GLASGOW AND WEST OF SCOTLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE usual monthly meeting of the above Association was held in their Rooms, 180, West Regent-street, Glasgow, on Tuesday evening, the 2nd instant,—Mr. Hugh Reid, President, in the chair.

After the approval of the minutes the following new members were admitted:—Miss M. H. Thomson, Miss A. L. Robertson, Rev. Thomas Summerville, Messrs. C. W. Laing, W. F. Finlayson, W. H. Gowans, James Fleming, John Dove, W. H. Turner, James Watt, and Robert Dalglish.

The election of office-bearers was then proceeded with, the result being that Mr. W. Snell Anderson was elected Treasurer, and the following six gentlemen members of Council for 1885, viz.:—Mr. James Elder, C. E., Mr. W. Goodwin, Mr. R. Cutting, Mr. A. Bovenstone, Mr. T. N. Armstrong, and Mr. Charles Coulson.

Mr. T. N. Armstrong then read his interesting paper on *Home Portraiture* [see page 791], showing how variety of posing and lighting could be obtained in an ordinary sitting-room. He (Mr. Armstrong) then gave a demonstration of enamelling and retouching. His demonstration of enamelling was particularly good, and he turned out a number of prints at the meeting finished in the very finest manner and quite equal to the best professional work.

Mr. PARKER, in a few well-chosen sentences, moved a vote of thanks to Mr. Armstrong, and said that he personally, and he was sure few in the Association, had any idea that such first-rate portraits could be done at home.

After some conversation about the Exhibition, which opens in the Fine Art Galleries, on Wednesday, the 17th instant, the meeting was adjourned.

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION.

THE third monthly meeting for the winter session was held on Thursday, the 4th instant, in Lamb's Hotel, Dundee, when there were about fifty members present. Mr. J. C. Cox presided.

An exhibition committee was elected, and Mr. D. Ireland, Jun., was chosen as honorary secretary to the Exhibition, the joint treasurers being Mr. John Robertson and Mr. V. C. Baird.

Mr. Alfred Guthrie then read an extremely able paper on *Developers and Development* [see page 791], detailing his experiences with the different formulæ.

On the motion of the Chairman a very hearty vote of thanks was awarded to Mr. Guthrie for his instructive communication.

The Society's lime-light lanterns were then put in operation and a large number of slides were shown, the exhibitors being Messrs. Valentine, Mathewson, Ireland, Lawdon, and Jones. With the exception of Messrs. Valentine and Lawdon's slides, most of the others were on gelatino-chloride plates, which are now being extensively used for this purpose. Mr. John W. Lawdon, assisted by the Hon. Secretary, presided at the lanterns, and a vote of thanks was passed to these gentlemen for their services.

The Treasurer (Mr. Robertson) showed some large transparencies on gelatino-chloride plates of his own preparation, and another member kindly sent two frames of West's instantaneous photographs for exhibition.

The meeting was then adjourned.

LEEDS PHOTOGRAPHIC SOCIETY.

THE annual meeting of this Society was held on Thursday, the 4th instant,—Dr. Thorpe, F.R.S., in the chair. There was a very large attendance. After the confirmation of the minutes, the Chairman called upon the Hon. Secretary to read the following

ANNUAL REPORT.

THE Committee, in presenting their report, congratulate the members on the success that has followed the alteration in the constitution of the Society. At the first meeting held after the alteration the number of members on the roll was thirty-six. During the year forty-one new members were elected, but eleven have been excluded for non-payment of subscription, leaving the number of members sixty-six.

During the year the following gentlemen have delivered addresses or made communications to the Society:—Presidential address, by Dr. Thorpe, F.R.S. *Enlarging on Gelatino-Bromide Paper*, by Mr. J. W. Reffitt. *Notes on Developers*, by Mr. A. C. Pocklington. *Experiences of a Beginner*, by Mr. C. H. Bothamley. *Lenses*, by Professor Rucker, F.R.S. *Sodium Sulphite, with Bichloride of Mercury as an Intensifier*, by Mr. F. W. Branson. *Ferro-Prussiate Process*, by Mr. W. L. Wildey. *Photographing in Savoy*, by Mr. D. G. Law. Lantern demonstration, by Messrs. Bridge and Brook. Two of the ordinary meetings have been spent in general conversation and the exhibition of prints. The open lantern night in March was a great success, and the Committee are arranging for another to be held in February, 1885.

Excursions have been made by the members of the Society to Adel Moor, Otley, Knaresboro', and Gledhow Woods.

The *Transactions* of the Society have been, at some expense, printed and distributed to the members monthly. The Committee, believing this to be of great service, are desirous to continue the publication. The preparation of these reports would be greatly facilitated if gentlemen making communications would furnish the Secretary with an abstract of their remarks.

After the adoption of the report, the meeting proceeded to the election of the Committee for 1885. Upon the collection of the voting papers the Chairman declared the following elected:—Messrs. F. W. Branson, W. Denham, T. A. Marshall, J. W. Ramsden, J. W. Reffitt, H. Rodwell, W. Teasdale, F. E. Thorpe, Thos. W. Thornton, and S. A. Warburton. The Committee elected the following officers:—*President:* Dr. Thorpe, F.R.S. *Vice-President:* J. W. Ramsden. *Treasurer:* J. W. Reffitt. *Hon. Secretary:* Thos. W. Thornton.

This being the night arranged for the annual technical meeting, the Society proceeded to the consideration of the following exhibits:—An enlarging apparatus, consisting of a pamphengos lamp and a bellows camera, by Mr. J. W. Reffitt. The light was thrown on the negative by a six-inch condenser, and a twelve-inch focus rapid rectilinear lens was used as objective.—Mr. F. W. Branson exhibited photomicrographical apparatus, consisting of a photographic camera, to which was adapted a removable extending bellows front to connect the camera to a monocular microscope with eyepiece. The illumination devised by the exhibitor was by means of a two and a-half candle Swan's incandescent electric lamp, with frosted surface, placed in close proximity to the stage of the microscope, no condensing lenses being used. Mr. Branson also exhibited a drop and flap shutter adjustable for instantaneous exposures, and having in addition a pneumatic flap action for slow exposures of any duration.—Mr. W. Teasdale: camera for taking photomicrographs, also another for taking microphotographs, and specimen of work done by each; two forms of extension fronts for ordinary cameras; simple forms of exposure shutters; view meter; and Gorham's pupil photometer. He also exhibited his form of sensitometer for testing with ease and certainty not only the relative sensitiveness of plates but also their capabilities in the way of rendering gradation of tones. Mr. Teasdale said the principle was that of accurately-timed exposure on the sensitive surface to be tested, and registration of the effect in graded bands. His form of sensitometer differed from the ingenious one devised by Mr. Spurge, chiefly in the matter of the exposure being timed rather than measured by area of aperture and equal diffusion; but he and Mr. Spurge were in accord regarding all forms of sensitometers as more or less unsatisfactory which involved the use of a graded medium to be printed through. Mr. Teasdale also exhibited a recent portrait of Mr. W. B. Woodbury and prints by the stannotype process, and, in illustration of the sensibility of the ferro-prussiate and other printing processes for copying delicate line tracery, numerous sheets of such were exhibited.—Mr. Warburton: an old-fashioned folding camera, very ingeniously converted into a modern bellows camera, and simple apparatus for the making of gelatino-bromide emulsian.—Mr. J. W. Foster: McKellen's new treble patent camera, size 12 × 10; weight with slides, seven pounds.—Mr. Pearson: an improved patent camera by Middlemiss, Bradford, the first of which had been finished that day and shown by the exhibitor. The cameras, from half-plate to 12 × 10, fold up when closed to under two and a-half inches. The tripod top—a mahogany board which, when not in use, serves as a protection to the ground glass—brings the total thickness to a little under two and three-quarter inches. The extension front draws out to twice the length of the longest side of plate used, one-half of the extension being performed rapidly by the hand, and the other half having a rackwork adjustment actuated by one pinion. The front swings in a vertical direction; the back has both vertical and side swing. The rising front carries the bellows with it, the whole sliding in a framework supported by a strong brass strut—not pivoted like a looking glass; this makes it extremely firm and rigid, and renders any displacement by accident impossible. The fact of the bellows being attached to the rising front prevents the cutting off of the top part of the light rays, which would otherwiso inevitably occur with the taper bellows. The back is reversible, enabling horizontal or vertical pictures to be taken without altering the camera. The compactness when closed and the long extension when opened out enables the shortest-focus lens or the one-half of a symmetrical or rectilinear to be used with equal facility. Mr. Pearson also exhibited forms of drop and flap shutters, and prints from negatives taken in a drawing-room by means of gaslight.—Mr. Thomas W. Thornton, Hon. Secretary: prints from Marion's new alpha paper, pocket slide by Blakey, Emerson's patent carriage head-rest, and other articles.

In addition to the above a large number of exhibits was on view, and were inspected with much interest by the members.

BRADFORD AMATEUR PHOTOGRAPHIC SOCIETY.

The usual monthly meeting of this Society was held on Thursday evening, the 4th instant, in the Law Institute,—Mr. Duncan G. Law, President, in the chair.

Several 15 × 12 photographs of Yorkshire scenery were exhibited by Mr. Forsyth, one of the members, including some shown in the Pall Mall Exhibition. Mr. G. D. Scorah (Hon. Secretary) exhibited specimens on Marion's new alpha paper, which were lent for the occasion by Mr. H. C. Lewis, their representative, and were much admired. A new French head-rest was also brought forward by the Secretary; it was of metal, nickel plated, and very strong but light. It fixes to the back of an ordinary chair, and is, therefore, suitable for use when taking portraits in rooms. A new patent camera was shown by Mr. Middlemiss, which had double swing front and back and some novel points in its construction, besides being portable.

The meeting was then adjourned.

HALIFAX PHOTOGRAPHIC SOCIETY.

The usual monthly meeting of this Society was held on Tuesday evening, the 2nd instant,—the Rev. W. E. Hancock, M.A., President, in the chair.

The minutes of the last meeting were confirmed, after which the following new members were elected:—Colonel Charles Grove Edwards (of Ashday Hall), the Rev. J. W. Hall, Mr. L. Hanson, Mr. Rowley, Mr. W. Simpson, and Mr. J. Helliwell (all of Halifax); also Messrs. Charles and James Smithson (of Lightcliffe).

Mr. F. Myott, who was to have given a practical demonstration of emulsion-making, having been called away unexpectedly,

The Chairman very considerately volunteered to exhibit his new four-wick lantern, together with a number of slides made from his own negatives. The great brilliancy of the light was a matter of much surprise to all the members. For pictures up to six feet in diameter it seemed to compare favourably with the lime light. The slides were produced by the wet collodion process, and were of high-class quality.

As the next meeting would fall inconveniently near the festive season of Christmas, it was decided to postpone the date to Tuesday evening, January 14th, when the usual annual lime-light exhibition would be given, the Chairman operating with his biunial lantern, and all the slides used on the occasion to be the work of the members. As many of the members have had some rather varied experiences with the camera in foreign lands during the past season, a very enjoyable meeting is looked forward to.

Mr. E. A. Caw understood there was a considerable number of amateurs who would like to join the Society, but were prevented from doing so from, possibly, a feeling of diffidence or an exaggerated idea of their own shortcomings in the art. He thought this feeling was only natural, but as there was always an emoryo stage to everything, the Society, to give encouragement to such, ought to have evenings set apart for the special edification of those just entering the portals of the art.

Mr. Thomas Illingworth quite concurred with the views expressed by Mr. Caw. It was a very hard struggle for an amateur to attain technical excellence in matters photographic unaided. There were times when a little help set a man on his legs, after which he was able to run without stumbling. He was prepared to lead the way by giving an elementary demonstration of developing, and he would endeavour to treat the subject in as clear and comprehensive a manner as possible, giving examples of the treatment necessary for under, over, and correct exposures, using for this purpose the several developing agents now in favour.

Mr. W. Clement Williams, without meaning any slight to the professional element, said there were very few even amongst that august body who could lay claim to any mentionable knowledge of photographic chemistry, but who—like the officer who had seen much active service, though he could not pray, knew how to fight—could take photographic pictures nevertheless. He thought it would prove to the benefit of all members if certain half-hours of the meetings were devoted to the study of this branch of chemistry, for it was only by a correct understanding of the nature and of the powers and properties of the chemicals used all round in the formation of the photographic image that success could be expected. He did not believe in "flukes" in photography; nor in its truest sense this did not mean success, neither did it conduce to the making of *old* photographers.

Mr. Councillor Smith always liked to know the why and wherefore of everything. He infinitely preferred dabbling and experimenting among his chemicals, even if at times it ended in failure, than to be content with simply purchasing his plates and developing by a rule-of-thumb formula. He would be glad to do all in his power to assist in carrying out the proposals of Mr. Williams.

The Chairman looked upon photographic societies as having educational duties to perform as well as those of a mere social character. He was sure that if they could carry out the ideas already expressed a great good would follow, and he was prepared to do all in his power to further such praiseworthy objects.

Mr. Joseph Whiteley promised to give lessons in making paper negatives. He had practised this branch of photography before glass was introduced for photographic uses, and had, therefore, served a fair term of apprenticeship. Apart from the use of paper negatives to take the place of glass, they would be found exceedingly useful for combination printing.

Mr. Edward Gledhill would give a demonstration of microphotography.

Mr. W. Clement Williams would read papers on the *Artistic Printing of Negatives, Composition, Light, and Shade in Landscape Photography.*

Messrs. Birtwhistle, Hancock, Smith, Bingley, and Jones were also willing to contribute papers, the subjects of which to be left for future settlement.

It was stated that Mr. Middlemiss would attend at the next meeting to introduce his new patent camera, the Chairman reporting very favourably of its merits.

A vote of thanks to the Chairman for his lantern exhibition terminated the meeting.

NORTH STAFFORDSHIRE AMATEUR PHOTOGRAPHIC SOCIETY.

The usual monthly meeting of this Society was held on Wednesday, the 3rd instant, at the Mechanics' Institute, Hanley,—Mr. C. Alfieri, President, in the chair.

A number of photographs from various sources were exhibited for the purpose of selecting a presentation print for the year 1884. Upon taking a vote of the members it was found that a 12 × 10 photograph, by Valentine, entitled *After the Storm*, had secured the greatest number of votes. A requisite amount of copies was, therefore, ordered to be obtained.

After general conversation upon various topics of photographic interest the meeting terminated.

ST. HELENS ASSOCIATION FOR THE PURSUIT OF SCIENCE, LITERATURE, AND ART.

Photographic Section.

A meeting of this section was held on the 19th ult., at the Association Rooms, 4, Salisbury-street,—Mr. Heather in the chair.

Mr. R. G. Brook showed a large number of full-plate negatives of American scenery, and Mr. Heather a series of lantern slides made from them.

Mr. Brook read a paper on *Experiences with the Camera with the British Association*, illustrated by transparencies. [This paper will be given in our next number.]

On the motion of the Chairman a hearty vote of thanks was passed to Mr. Brook, which brought the meeting to a close.

DERBY PHOTOGRAPHIC SOCIETY.

The first annual meeting of this Society was held at the London Restaurant, Irongate, on Wednesday evening, the 3rd instant,— Mr. Richard Keene occupying the chair.

Among those present were Messrs. R. J. Billinton, C. Bourdin, A. H. Bennett, A. J. Cox, H. Jarvis, J. E. Kaye, R. Keene, C. B. Keene, E. J. Lovejoy, J. Merry, Male, J. W. Price, F. W. Simpson, J. Scotton, and R. L. Warham.

The minutes of the last monthly meeting having been read and confirmed, the following officers were re-elected for the year 1885:—*President:* Captain W. de W. Abney, R.E., F.R.S.—*Vice-Presidents:*—Messrs. C. E. Abney, B.A.; H. A. Bemrose, M.A.; and R. Keene.—*Committee:* Messrs. A. J. Cox, James E. Kaye, and Thomas Scotton.—*Hon. Secretary and Treasurer:* Mr. Fred. W. Simpson, Hamilton Villas, Mill Hill.

The Hon. Secretary then read the following

Annual Report.

The Committee, in presenting their first annual report, congratulate the Society on the successful start which it has made. Although the Society has only been in existence for six months the members now on the books number twenty-eight. The indoor meetings have been very fairly attended, and the following papers have been read:—*Landscape Photography*, by Mr. R. Keene.—*Photography*, by Captain Abney.—*A Photographic Tour in Wales*, by Mr. C. E. Abney.—*Scraps from My Holiday*, by Mr. H. A. Bemrose.—*Reminiscences of the Old Collodion Days*, by Mr. J. W. Price. The Committee regret that the outdoor meetings have not been so well attended, and trust that they may be more successful during the coming season. Excursions have been made to Duffield and Matlock during the past season. The thanks of the Society are due to Captain Abney as President, to the retiring office-bearers, to Mr. A. J. Cox for his kindness in providing a room for committee meetings, and to the proprietors of The British Journal of Photography, the *Photographic News*, and the *Amateur Photographer* for copies of their papers. The balance-sheet shows the financial position to be satisfactory. This report is necessarily short, as the Society did not commence work until the middle of the present year.

The report was unanimously adopted.

A vote of thanks was passed to the Hon. Secretary, Mr. F. W. Simpson, for his services during the past year, on the motion of Mr. A. J. Cox, seconded by Mr. J. Merry.

Mr. Thomas Scotton then read a paper on *The Photographic Processes Used in Copying Drawings*, which he illustrated by some exceedingly-fine specimens of the various processes, those by Pellet's process certainly carrying off the palm.

Votes of thanks were passed to the Chairman and Mr. Scotton, and the meeting was brought to a close.

Correspondence.

[*All communications for the* Editorial *department of the Journal should be addressed to the "Editors, 2, York-street, Covent-garden, London, W.C."*]

December Meeting of the Photographic Society of France.—Sulphocyanide of Ammonium as a Developing Agent for Carbon Prints and a Fixing Agent for Gelatino-Bromide of Silver Negatives.—A Bust of Daguerre.—Gelatino-Chloride Positives on Opal Glass.—An Appeal to all Inventors, &c., &c.—An Imperishable Coating for Photographic Trays, &c.—Typo-photographic Proofs.—An Old Method Brought Forward to Calculate the Rapidity of Rapid Shutters.—A Proposition for an Actinometer Made to the Society.—Report on the French Alpine Club.—A Cold Varnish for Negatives.—Presentation by M. Balaguy.

The Photographic Society of France held their monthly meeting on Friday evening last, the 5th instant,—M. Peligot in the chair.

A communication was received from a photographer at St. Denis (Ile de la Réunion). He proposes that all carbon proofs should be developed in a solution of sulphocyanide of ammonium instead of the usual plan of hot water. He says the same solution is of great utility in fixing gelatino-bromide of silver negatives, as no slipping of the film can take place when once the gelatine film has been treated by alum, as it is rendered completely insoluble with a prolonged immersion in a solution of sulphocyanide of ammonium.

M. Davanne informed the members that a small bust of Daguerre had been ordered by M. Cheron, so that all lovers of photography could possess the image of one of the fathers of that interesting art.

M. Hutinet presented some positives on opal plates made by the gelatino-chloride process, all produced by direct contact. This process is so little known here that it caused astonishment among many present. The development of gelatino-chloride plates lies in the future.

Messrs. Morgan and Kidd have endeavoured to popularise the process, as well as enlargements upon their paper, but their exertions have not met with the reward they merit.

I had the honour to present to the Society specimens of lanterns and other photographic novelties forwarded to me by Mr. J. J. Atkinson, of Liverpool. The members expressed their pleasure at receiving anything new from other countries.

M. Chala presented a great number of pieces of cloth, canvas, linen, zinc, wood, slate, iron, &c., which had been covered by a solution rendering them impermeable to damp, acids, &c. This solution was suggested as a means to enable amateurs to carry on their excursions very light trays for developing and other purposes. A simple sheet of paper covered with this composition and bent into the form of a tray will render as much service as the most elaborately-made tray. A zinc tray was made by M. Hermont, which, having been covered with this composition, was submitted to the action of nitric, hydrochloric, and sulphuric acids during two hours without the slightest alteration. It was then submitted to other tests, such as boiling water, steam, carbonic acid gas, &c. This composition will render great service to photographers not only for repairing their trays and other receptacles, but to paint their walls to keep damp from penetrating, or to prevent it from entering from the exterior.

M. Alexeeff, a Russian gentleman, presented a number of specimens of his new typo-photographic process. The results are not superior to what we have been accustomed to notice in The British Journal of Photography, where the Editors give us the pleasure of seeing some of our photographic celebrities.

A Young Member then described his method of controlling the rapidity of his instantaneous shutter. "I take," said he, "a black background three yards high, and I place upon it a white rule divided into feet and inches by dense black lines. I place my camera at a certain distance from this rule and focus sharp. I place a gelatino-bromide of silver plate in the camera and set the rapid shutter I wish to try. I now take a metallic sphere or ball (silvered, if possible). An ivory billiard ball would do, but I prefer a silvered one. I then hold the ball to the top of the rule, and when everything is ready I let go the ball. When I think it has fallen about a foot I set the instantaneous shutter to work. I develope the image, and, according to the shape of the image of the metallic ball upon the plate, I know the rapidity of the shutter. If the image of the ball be round it is rapid; the longer the ellipse the slower has been the opening and shutting of the lens. The exact calculation can be made by the law of falling bodies, as it is well known that an object goes through a certain distance in such a length of time for the first yard or foot. Its increased velocity is known after a certain number of yards, therefore the ellipsis formed by the falling metallic sphere can be accurately measured and the exact time given." This is all true, but a complicated calculation must take place; for who can undertake to make the portrait of the sphere when it has travelled a foot from the hand which held it, unless the ball by an electric combination could in its flight automatically open the lens? But a hindrance, however slight, would derange the calculation and be a great source of errors. For myself, I prefer the system suggested by my friend M. Vidal, and which I explained in one of my late letters to The British Journal of Photography—that of a long needle or clock hand making a revolution round a dial face in a given time. The hand being set in motion, no irregularities in its speed need take place, and the distance it has advanced during the opening of the lens can be seen on the dial face, so that no mathematical calculation whatever is necessary. Simplicity must be the motto for all who come forward with apparatus and ideas for the benefit of photography.

M. Vidal proposed that the members should devote themselves to the attempt to create or construct a photographic sensitometer or, at the least, a standard. He mentioned the proposition of a gentleman at Angoulême, which consisted in the superposition of a certain number of strips of tissue paper, one upon the other, so that in the instrument the first little square was formed by one thickness of paper, whereas at the other end the twenty-five thicknesses.

A long discussion took place, and paper was set aside as wholly unfit for the purpose, no two sheets being alike. It was proposed to take the idea of Mr. Warnerke and employ a tinted film obtained by Woodbury's photomechanical process, the Society to have a standard and compare all others by the standard, and thus render signal service to the photographic community by giving their guarantee that every actinometer bearing the mark of the Society agreed with the standard belonging to the Society. Opposition was rife against the Society selling a mercantile object, but it was proved to the satisfaction of all that a loss would attend such a transaction, and therefore no one would undertake to manufacture, and that a rich amateur must undertake it *pro bono publico*. As Mr. Warnerke's system was good, it was proposed to base the actinometer upon his system. This instrument would be all that is required if those that are in the market were exactly alike, but, alas! notwithstanding the care taken by the inventor, a great difference is apparent between some of them.

The best and most regular light which could be employed (after a long discussion) was found to be the Carcel moderator lamp burning a given quantity of oil per hour. M. Bardy spoke with great eloquence of the "Siemens' unit" lamp. He proposed experiments to be made with this lamp.

M. Pector then read an analysis he had made of the report of the French Alpine Club. The number of amateurs of our art, he said, was increasing rapidly, and the service which photography did in demonstrating and illustrating the different excursions made by the Club was incalculable.

The new photographic varnish which had been deposited at the last meeting was very favourably reported upon by all the members who had tried it.

M. Balaguy exhibited films attached to wood, zinc, &c., in order that the amateur could use films without danger while on a tour.

E. Stebbing, *Prof.*

25, *Rue des Apennins, Paris, December* 8, 1884.

THE MERCURY INTENSIFIER.

To the Editors.

Gentlemen,—In your last issue, "J. C.," of Southport, in a letter to the Editors has published an improved formula for the mercury intensifier. Feeling that it would be a matter of interest not only to myself but to photographers generally, might I ask him, through the medium of

the Journal, to give fuller particulars as to proportions employed both in A and B, and his method of using them.—I am, yours, &c., H. B. H.
Elm Rectory, Frome, December 6, 1884.

LANTERN TRANSPARENCIES AT THE RECENT EXHIBITION.

To the EDITORS.

GENTLEMEN,—I think it only fair in disputes of this kind for either party to bring forward any evidence that may tend to an amicable settlement of differences.

A short time since I was in conversation with a gentleman—a perfectly disinterested party in the matter—who told me that he was present when Mr. Gale's slides were handed in in due time, which makes it perfectly clear that the conditions were fully complied with on the part of Mr. Gale, as by other competitors.

I make this statement in fairness to Mr. Gale; and at the same time wish to tender an apology to that gentleman for any imputation or reflection that he may have thought my letter, published a fortnight since in these pages, cast on him, and I entirely withdraw anything that he may have thought unjust. The cause of my grievance was and is with the Executive of the Society, and that body alone are, I consider, entirely to blame. I believe they have treated Mr. Gale unfairly in not bringing his slides forward for exhibition, and in not cataloguing them the same in common with the other competitors, as I am sure he has nothing to be ashamed of in the class of work he produces.

Being a *competitive* exhibition it is imperative that all works must be on exhibition and in the catalogue. The Society make the rules, and the Executive are responsible for the way in which they are carried out. I, for one, was fairly startled when I saw a name appear in the journals with the award which was in neither edition of the catalogue or on exhibition. I wrote to the Society asking the reason, and in reply I was coolly told "That it was immaterial whether the work in question was either in the catalogue or on exhibition;" and that "the rules of the circular had not been violated" (!!!). I have been a competitor in exhibitions for the past twenty years, and never heard of such conditions before.

If the slides had been put on one side and forgotten until the last moment, why not have said so?—I am, yours, &c., W. BROOKS.
Reigate, December 6, 1884.

THE CARBONATE OF SODA DEVELOPER.

To the EDITORS.

GENTLEMEN,—After the very strong recommendation given by the Rev. Mr. Macdona that the washing soda developer was the thing for lantern transparencies, I at once set to work to make the developer with all care, making a pint of solution. The result of my experience is absolute failure. The image took nearly a-quarter of an hour in appearing, and when it did show itself no amount of coaxing could force up any density. Mr. Macdona writes again this week reiterating the praises of the formula, so I feel bound to give my experience and to ask for the experiences of others. I may mention that the developer was tried on plates of my own making, which developed beautifully with the tartaric acid developer recommended by Mr. J. C. Stenning in last year's ALMANAC. The clearing solution recommended at the same time I can thoroughly recommend.—I am, yours, &c., WM. WAINWRIGHT, JUN.
Hoe Place, Woking, December 8, 1884.

THE PHOTOGRAPHIC EXHIBITION.

To the EDITORS.

GENTLEMEN,—Mr. Donkin's letter in reply to Mr. Smith on the lantern slide award does *not* correctly state the case. As Mr. Gale's slides were not to be found on view anywhere in the Exhibition, as were the other slides, they could not come before the judges of awards with the other exhibits at the opening of the Exhibition, as per rules; and, if they were sent in in time, why were they left out of the catalogue? Pictures at an exhibition are supposed to be on view the whole time it is open to the public, and to be catalogued. If Mr. West's and Mr. Robinson's pictures had been omitted from the catalogue, and had been shut up in boxes out of sight—like Mr. Gale's were—would they have been considered on view, and awarded medals? In making this award to one out of the competition the judges have acted most dishonourably to those few who complied strictly with the regulations.—I am, yours, &c., P. H. FINCHAM.
December 10, 1884.

THE LIME LIGHT.

To the EDITORS.

GENTLEMEN,—I have been much interested in the articles on the lime light which have appeared in THE BRITISH JOURNAL OF PHOTOGRAPHY. It is more than twenty years ago since I first obtained Mr. Highley's price list, and I was a subscriber for his book on the manufacture of slides, but I think it was never published.

I was rather surprised to see him mention lead as the most suitable material from which to construct a hydrogen generator. Lead is very heavy, and is very easily injured. It is a fact (although not a well-known one) that dilute sulphuric acid has no effect on copper. I have a hydrogenator that has been in occasional use for over six years, and it is quite good still. He mentions one shilling as being the price of scrap zinc per pound. There must be a mistake, as I get it from the plumbers at three-halfpence. Never having used gas bottles I cannot speak about them, but I know it is next to impossible to get all the gas out of bags.

It may surprise Mr. Brooks to know that a regulator for bottles or bags such as he requires is already invented, and was described in your pages with diagrams about eight years ago. If he wish to learn more about regulators he can communicate with me. I can fully endorse Mr. Baker's statement that better definition can be obtained with the lime light than with any form of lamp. How any person could think of getting the best results with a gas or lamp flame it is difficult to conceive. There is even much difference in the lime lights. Mr. Baker, in your last number, gives three forms. The carburetted and the pure hydrogen forms he clubs together, although there is a marked difference between them. One takes two parts of oxygen to one of carburetted hydrogen, and with pure hydrogen there is only one part of oxyen to two of hydrogen. The former only gives half the light of the latter, and the light is somewhat brown. The lime light with pure hydrogen gives the purest, the strongest, and the cheapest light, and the luminous area on the lime is the smallest, thus giving the best definition. Much valuable information on the subject is published in the appendix to Tomlainson's *Encyclopædia*, the results of experiments being given, and not the mere opinion of anyone who happened to be quite innocent of any knowledge of the matter. My experience is that with pure hydrogen one-quarter of a pound of chlorate of potash lasts with one jet, with a sixteen-feet circle, three-quarters of an hour, and six ounces of acid by measure lasts a little longer. The last chlorate of potash I bought cost one shilling per pound, and the acid three-halfpence by weight, but the latter would only cost half of that if a carboy were taken.

There is a want of commonsense in the construction of lime-light apparatus. For instance: the limes are put in non-collapsible tins or bottles, allowing more air to get at the limes when there are fewer cylinders to absorb it. I make my own limes, and have little tubes made of thin india-rubber, cartridge shape, so that no air can get at the lime cylinders. When an expensive jet with lime burner is bought the screw is so fine that the pits in the lime are not turned wholly clear of the jet when it comes round again. As I make my own jets, buying only the nozzles, I can make them to suit myself; but with the majority of those who use or may use them such is not the case. Why should we be confined to cylinders? Why not use lime of any shape so long as it has a flat face? If Mr. Brooks will try the india-rubber tubes for his limes he would never go back to the tin or bottle, with all the mess the powdered lime makes.—I am, yours, &c., WILLIAM BIRRELL.
Hamilton, December 9, 1884.

Notes and Queries.

W. WILSON wishes to know if his varnished, mercurially-intensified negatives are likely to fade soon, as he noticed that some of them in which one-half only is varnished already look paler in the varnished than in the unvarnished side.——If Mr. Wilson will varnish one-half of another negative, intensified in a similar manner, he will most probably notice a lowering in the density, this effect being almost always produced with a collodion negative, and frequently with a gelatine one. Although it has been stated that many of the "insoluble" salts of mercury, such as the sulphide, &c., are soluble in spirits of wine, we incline to the supposition that this effect is optical rather than chemical, the particles being bedded, as it were, into a transparent solid such as the film left after varnishing. There is thus less hindrance to the passage of light rays than when the particles are not in optical contact with a medium entirely surrounding them. Mr. Wilson need have no fear (at anyrate on this account) of his negatives fading, for rather the reverse would be expected.

R. BATSON writes as follows:—"Having heard that some French opticians supply with their portrait lenses two extra lenses—one a convex to shorten the focus, and the other a concave to lengthen it—and having also read that single or non-achromatic lenses may be added to a well-corrected lens without materially interfering with its correctness, I thought by placing a double concave lens—a spectacle glass—between the lenses of my 8 × 5 rapid symmetrical near the stop I should lengthen out the focus sufficient to make it cover a 10 × 8 plate. But I find, now that the extra lens is added, I cannot focus the image at all. What is the reason? Should the concave lens be in the front or at the back, instead of the middle of the combination?"——Our correspondent has placed the lens in the proper position and in the only place it can be efficient; but he has selected a lens with too deep a concavity. Another lens must be obtained with much shallower curves. Its strongly negative character is too great for the combination. Any working optician will supply lens of different depths for a few pence each. A number may be purchased, and the one while on trial is most suitable utilised.

W. W. says:—"I went to Kew Gardens the other day, and attempted to take a photograph in the palm house, but it was impossible to get definition on the focussing-screen, owing to the condensed vapour, which simply poured down the lens and camera. As I have seen photographs taken in such situations, how is it done?"——In the first place, we will explain the reason of the difficulty experienced by our correspondent. The atmosphere within the palm house is always highly charged with moisture—frequently almost to saturation. This moisture always has a tendency to condense on anything that is cold. Now our querist, no doubt, on a cold day, took his apparatus, which was of the temperature of the outside atmosphere, direct into the building; hence, as a natural consequence, the moisture at once condensed upon it, the same as moisture in a warm room condenses upon cold tumblers or wine glasses, and forms dew upon their surface. The remedy is to keep the apparatus for some time in an apartment where the temperature is somewhat higher than that in the palm house, so that if the apparatus is made somewhat warmer there will be no possibility of the moisture giving rise to trouble.

G. P. asks about the photographic uses of the salts of silver in which the fatty acids enter into the composition. This branch of investigation has not, we believe, been pursued to any great extent, although sometimes a film with a soapy surface has been treated with nitrate of silver for photographic purposes. Stearic acid is one of the most important of the fatty acids, and it forms a powdery salt with oxide of silver, which salt exhibits electrical properties. It darkens in the light when moist, and is unalterable when dry. It is usually made by adding an alcoholic solution of nitrate of silver to an alcoholic solution of stearate of soda.

Exchange Column.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

Photographs Registered.—

Miss Catherine Middleton, Anglesea-place, Southampton.—*Photograph of the Staubbach.*

William Pankhurst Marsh, Norfolk Cottage, Bognor.—*Two Photographs of Breaking Waves at Bognor.*

Erratum.—Our attention has been directed to an inaccuracy which crept into our list of the awards at the Dublin Exhibition. The "extra" medal awarded to Mr. George Mansfield was *not* given by the Amateur Photographic Society, as stated. No such Society exists.

Enamel.—Write to Mr. Berryman, photographer, Redhill.

J. B. O. G.—Yes; the City and Guilds of London Institute.

Optician.—Messrs. Nettlefold and Co., High Holborn, will no doubt supply what you require.

G. Kedgwin.—A burnisher will confer a greater gloss than a rolling press. To your second query, see reply to "L. T."

J. H.—1. Any stout, smooth paper will answer the purpose quite well. A thin cartridge paper will be very suitable.—2. Yes.

Amateur.—One or two minims of a saturated solution per ounce is the proportion generally employed. Better use up the emulsion at once.

T. C.—Your neighbour can certainly build upon his premises and stop out your light. From your short tenancy you cannot claim "ancient lights."

White Rose.—You do not say whether you wish to print on paper or glass. The blue tint may be obtained from one or other of the blue dyes sold in sixpenny bottles.

L. T.—Messrs. Marion and Co. supply such a paper. Consult our advertising columns for the apparatus. We cannot undertake to recommend any particular manufacturer.

Mary E. Evans.—The *Spiritualist* newspaper of that date first published the fact that some of the so-called spirit photographs were forgeries. You cannot do better than consult its pages for full details.

B. A. Davies.—No special knowledge is required, but much will depend upon skill and judgment. Until you have acquired a considerable amount of both you cannot hope for any great success in your new undertaking.

Sigma.—Shake up the albumen sensitising bath with a little kaolin, and filter before use. The sensitised albumen or collodio-albumen film should be very much thinner in appearance than the film on a gelatine plate. You are working correctly.

Alf. A. Bott.—You have proceeded wrongly. By waxing the glass upon which you have produced your carbon lantern slides you have facilitated their splitting off with the heat. The glass should never be waxed in the carbon process unless the film is to be transferred.

Priory.—1. Possibly the plates themselves are unsuitable for the production of that particular colour. Try another sample.—2. No; but you might try the effect of substituting hydrochloric for the citric acid.

J. S. B.—1. Better try the experiment and see for yourself. The only means we have of knowing if the lenses will cover the size you say would be to try them.—2. Probably the slides admit light. See to this.

H. J. Murray.—There is no "good recent work" on the subject published in this country. The best information to be had on the subject is that contained in the series of articles, by Mr. Thomas Bolas, F.C.S., which appeared in our columns a few years back. The albertype is a collotype process, and is not patented in England.

Coleswegen.—From your description we surmise that the iron bed plate you have substituted for the wooden one is not of the same thickness; hence the cog wheels do not gear so well as they did formerly. Possibly the iron bed is thinner than the wooden one, so that the cog wheels are brought close together, and the teeth of the one work too deep into those of the other.

Southendon.—1. Make the reduction in the camera.—2. Purchase stereoscopic-sized plates and cut them in half.—3. Ferrous oxalate.—4. There is no work published on the subject.—5. Of course you can make the transparencies by the wet collodion process. If you have never succeeded in getting a good negative on a dry plate, where does the fault lie—with you or the plates?

Wm. Potts complains that in transferring carbon prints from the flexible support to ivory he cannot get the picture free from "glistening spots," which he imagines are air-bubbles. He is quite correct in his surmise. His mode of procedure appears correct, so that the imprisonment of the air-bells must be due to something in the manipulation. A little more care will, doubtless, overcome the difficulty.

W. H. S.—The dimensions of the studio will do very well. It will not be a bit too large. Instead of making six feet at each end opaque, four feet six or five feet will be much better. The design is very good. With the landscape lens you certainly *may* take portraits in the studio, but for general purposes it will not prove an efficient instrument, as it will be too slow. You must bear in mind that yours is the slowest form of landscape lens, as it must be worked with a comparatively small aperture.

Received.—J. H.; W. Hudson; W. Jones; E. Grant; Friese Greene; W. J.; "Country Cousin;" W.; M. E. W.; W. H. H.; Photo. Artist; Herbert Seely. In our next.

Mr. Andrew Pringle.—We regret that, though we give our esteemed friend's portrait in the current number, we are unable to include the necessary notice which should accompany it. This we shall do in our next issue.

International Inventions Exhibition. — The applications for space have now all been examined by Sub-Committees of the Council, and a selection has been made of the most promising. The number of applications has been so great that it has been decided to limit very strictly the admissions in those classes which may be considered to have been fully represented in the exhibitions of the present and of the past year. The Council will, therefore, be obliged to refuse many valuable exhibits in such classes as those relating to food, clothing, and building construction. It will even be a difficult matter to accommodate those which have been selected, and it is feared that the list will have to be still further reduced. As soon as possible information will be sent to those who have applied for space; but the enormous number of applications—far in excess of what was expected—have made it impossible to do this up to the present. The guarantee fund now amounts to £48,280—a sum considerably in excess of that subscribed for the Health Exhibition, or for the Fisheries, the amount for the former being £26,518, and that for the latter £26,656. —*Journal of the Society of Arts.*

The Photographic Club.—The annual dinner of this Club was held at Anderton's Hotel, Fleet-street, on Wednesday last, the 10th instant, —Mr. W. Ackland, Trustee, in the chair, Mr. E. Charters White occupying the vice-chair. About sixty members were present. The toasts usual on such occasions were given and responded to. The proceedings were enlivened with songs and recitations by different members, and original compositions were rendered by Messrs. W. Cobb and C. Ray Woods. An important feature of the evening was a testimonial in the shape of a massive silver inkstand and gold pen, which was presented to the Hon. Secretary and Treasurer, Mr. E. Dunmore. In presenting this the Chairman highly eulogised the abilities of Mr. Dunmore, and said that much of the success of the Photographic Club was due to his indefatigable exertions.——At the forthcoming meeting of the Club, to be held on Wednesday next, the 17th instant, the subject for discussion will be on *Microscopic Photography*—demonstration by Mr. E. C. White.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1285. Vol. XXXI.—DECEMBER 19, 1884.

COLLODION EMULSION FOR TRANSPARENCIES.

Resuming the subject where we left it a fortnight ago, we may first of all say a word or two on our friend Mr. William Brooks's article in our last number. No one, probably, has had greater practical experience in the use of collodion emulsions—both unwashed and washed—than Mr. Brooks has, and his opinion is, therefore, worthy of every attention. But, if we may venture to make the suggestion, it is probably the very extent of his practical knowledge of washed emulsion-making, as well as of its use, that enables him to perform what others with less experience would fail to achieve successfully. We should be the last in the world to cry down the results obtainable with washed emulsion in the hands of such operators as Mr. Brooks; but we do not hesitate to say that the beginner in collodion emulsion work, if he make his own emulsion—as he will be almost compelled to do—will succeed better at first with an unwashed preparation.

The reason of this is not far to seek, and lies chiefly with the pyroxyline. This, though readily obtainable—or, rather, though formerly easily obtained—of a quality perfectly suited for unwashed emulsion, will not always bear the operation of washing in bulk, though when spread in a thin film upon glass it passes through the ordeal successfully. It is not necessary to discuss here why this should be so, but every collodion emulsion-worker knows that such is the case; the reason will be explained as we proceed with the details of the process. A few years ago, as we have said, it was easy to procure samples of pyroxyline commercially, which were quite suited for unwashed emulsion and less easily, and, at a higher price, to procure special samples for washed emulsion purposes. But, since the demand for collodion emulsion has disappeared before the wave of gelatino-bromide, it is doubtful whether such special brands are now obtainable at all.

However, for the benefit of those who may prefer to purchase rather than to make the pyroxyline we may mention Messrs. Rouch and Co., Messrs. Wratten and Wainwright, and Messrs. Hopkin and Williams as having in the past made a speciality of emulsion pyroxyline, and these firms may probably still make it at least to order. Another sample with which we produced very excellent results, both in washed and unwashed emulsion, was Anthony's No. 2—an American brand—formerly obtainable from Mr. J. J. Atkinson, of Liverpool. Schering's "celloidin," which may be had from any London dealer, is also very suitable for the purpose, and in consequence of its being perfectly soluble and not requiring filtering after solution is one of the best to employ. It, moreover, gives an exceedingly firm and structureless film—eminently suitable for transpariencies; but it presents some little inconvenience in use, unless a whole cake be dissolved at once, owing to its containing an uncertain and constantly changing proportion of alcohol.

Should any difficulty be experienced in obtaining a commercial supply of the article, we shall here append a few formulæ by which the photographer may prepare a home supply. The quantity required for a season's work on a private scale is not large, and the time and trouble involved are comparatively small; while, if the directions are closely followed, the operator may be sure of possessing a product suited to his requirements.

One of the best formulæ for pyroxyline for collodio-bromide—that is, for unwashed emulsion—is one given by the late Mr. Henry Cooper in the Almanac for 1871. With this formula we have produced some of the best dry collodion films it was ever our lot to use; and to save trouble we repeat it for the benefit of those who may not have the opportunity of reference. Take—

Sulphuric acid, s.g.	1·845	4 fluid ounces.
Nitric acid, „	1·45	2 „
Water		1 fluid ounce.
Cotton (dry)		100 grains.

The temperature should be 150° Fahr., and the cotton should be immersed for ten minutes.

Many amateurs of the present day have probably never tried their hands at pyroxyline making, so we may give them a few hints as to the mode of procedure. To prepare the cotton let it be pulled out into tufts and boiled in a rather weak solution of washing soda, then carefully washed until every trace of alkali is gone; or a weak solution of ammonia may be used, in which case the alkali is more easily got rid of. Squeeze out as much of the water as possible, pull into tufts, and dry thoroughly in an oven or otherwise.

The utmost importance attaches to the strength of the acids and their temperature, and the time of immersion must not be varied to any great extent. If the acids be weaker than the strengt given above, less water must be used. It must be borne in mind that weak acids and high temperature both tend to cause the cotton to dissolve, and also to render the product rotten and powdery.

Have ready an iron box or dish—an old saucepan will do—filled with sand; in this is bedded the basin or vessel in which the operation is to be performed. A water bath would be in some respects preferable, but the steam from it has a tendency to weaken the acids, owing to the strong affinity of sulphuric acid for moisture. Place the saucepan on the fire until the thermometer shows that the sand has reached nearly the required temperature, then pour into the basin the acids and the water. The temperature will probably rise above that given, in which case the mixture must be allowed to cool down to the proper point. Meanwhile, the cotton pulled into loose balls about the size of a walnut are spread upon a sheet of clean paper in a warm oven to become thoroughly dry and warm. The cotton, especially after treatment with alkali, is extremely hygroscopic and rapidly attracts moisture from the atmosphere, which, when it comes in contact with the mixed acids, raises the temperature, and probably causes the cotton to partially dissolve.

All being ready the tufts of cotton are taken one by one, and, with a couple of glass rods, pushed well below the surface of the acid, and, when the whole is in, allowed to stand for ten minutes. While this is going on, get ready a large basin or tub of cold water; when the time of immersion has elapsed, lift out the mass of cotton by means of the two glass rods or a couple of clean pieces of stick, and on a plate or in another basin squeeze out as much as possible of the acid. Then loosen its fibres by "teasing" it out with glass rods or sticks and pass it quickly into the water, moving it about rapidly and pulling it out as loosely as possible with the fingers in order that the cold water may get at it and remove the strong acid as rapidly as possible. If this be not attended to—if the cotton be thrown in in a solid mass—the water penetrates it slowly, and in mixing with the acid causes a great rise of temperature, partial solution of the cotton, and deterioration of the rest. A pair of rubber gloves will be useful in this part of the process, but if the operation be dexterously performed the acid will have no effect on the fingers. The earlier portion of the process should be carried out on the hob, or in such a position that the fumes may be carried up the flue.

Wash the product for some hours in running water, wringing it out thoroughly at intervals until it shows no trace of acidity. Upon the completeness of the washing will depend the keeping qualities both of the pyroxyline and of the resulting collodion or emulsion. If it be desired to work with washed emulsion, the following modification of the above formula will give superior results :—

Sulphuric acid, s.g. 1·845	6 fluid ounces.
Nitric acid, s.g. 1·45	2 „
Water	1 ounce.
Cotton	100 grains.

Temperature 140° Fahr., and time of immersion ten minutes. Here the larger proportion of sulphuric acid, the greater strength of the mixed acids (there being only one part of water in nine, instead of in seven, as in the other formulæ), and the lower temperature all combine to give qualities which enable the product when converted into collodion to bear the ordeal of washing in bulk. The various operations are the same as in the former case.

Very excellent emulsion, giving clear, structureless films especially suitable for transparencies, is obtained from papyroxyline—*i.e.*, pyroxyline made from paper. The following formulæ, published by us some years ago for washed emulsion, are equally suited for collodio-bromide :—

	No. 1.	No. 2.
Sulphuric acid, s.g. 1·843	3 fluid ounces	2 ounces.
Nitric acid, s.g. 1·42	2 „	1½ „
Water	......	½ ounce.
White blotting paper	145 grains	...... 120 grains.
Temperature	100° Fahr.	...... 90° Fahr.
Time of immersion	30 min.	...... 30 min.

It will be noticed that the temperature is much lower than in the case of cotton, and also that the time of immersion is longer. The various operations are in every way identical. Either of these formulæ will work well, whether washed or unwashed.

Our next article will deal with making the collodion.

THE CONDENSATION OF MOISTURE.—A SEASONABLE WARNING.

During the winter season photographers very frequently experience considerable inconvenience from the condensation of moisture, arising from a sudden elevation of the temperature (which is usually accompanied with great humidity of the atmosphere), and that, too, in many instances without the actual cause of the trouble being suspected.

Everyone knows the effect of taking a lens from a cold apartment into a warm studio. Moisture generally present in the air at once condenses upon the glasses. The same thing happens if the lenses have been left in the studio on a very cold night, and the temperature be suddenly raised by lighting a large fire. The effect of the condensation is often not noticed until it is attempted to focus, when it is found impossible to obtain a clear image. After the dew has been removed from the outer surfaces of the glasses the inner ones are usually found to be also obscured, which necessitates taking the combination asunder and thoroughly cleaning the lenses. Even after this treatment, if the glasses still remain cold, fresh moisture condenses, and it is only when the instrument attains the same temperature as the room that it can be employed. However, it is not with the condensation of moisture when it is palpably manifest that we propose to deal, as the trouble when once seen is easily remedied. It is rather with a view to point out what trouble may be, and often is, caused by condensation without the true cause being suspected.

Let us take the case of the printing department. During the winter months, when the weather is fine, the actual printing is usually conducted in open air ; consequently, if the temperature be very low, the frames and negatives become exceedingly cold. The frames are then brought into the room to change the prints. Here the atmosphere is warm and not unfrequently very moist ; therefore, when the frame is opened moisture at once condenses—not only upon the cold glass (if any) of the frame, but upon the surface of the negative as well. Hence the silver paper, as a rule, is put direct upon a damp surface. No very serious injury in practice results from this, if the negative be well protected with an impervious varnish. But it is the custom with many to get several proofs from gelatine negatives before they are varnished. Now, it is manifest that if the silver paper be placed on an unvarnished negative, with a layer of moisture upon its surface, stains in the film may easily be accounted for, particularly if, as is by no means unusual, the last trace of hyposulphite of soda has not been eliminated.

There is another example of the unseen action of moisture from condensation. It is well known in carbon printing that the presence of moisture in the tissue greatly enhances its sensitiveness, and also the so-called "continuating action of light." Now, if the tissue be put on a moist negative print, and after printing more moisture be allowed to condense upon it, then if it afterwards be kept several hours before development it will readily be conceived that the picture may turn out much darker than was anticipated. The effect thus produced is too often attributed to the imaginary "uncertainties" of the carbon process.

Everyone has noticed, when a sudden thaw sets in after a long spell of frosty weather, how the internal walls of houses, however dry they may be normally, teem with moisture. When this occurs photographers should at once direct attention to their stock of negatives. Glass being a bad conductor of heat, when it once becomes abnormally cold takes a long time to get warm again, during the whole of which period it continues to condense moisture upon its surface, should any be present in the atmosphere. The well-known map-like lines in some old collodion negatives caused by the cracking of the film is attributable to damp—frequently from the constant condensation of moisture upon them alone.

When a large number of negatives, as is often the case, are allowed to stand in close contact leaning against the wall they become equivalent to a solid block of glass. When such a mass becomes thoroughly cold throughout, and a sudden "rise" in the temperature occurs, it sometimes requires many days for the glass, owing to its bad conducting properties, to acquire the temperature of the surrounding atmosphere. During all this time the moisture present in the air continues to condense upon the edges of the negatives. The water so formed is then drawn between the plates by capillary attraction, and when the negatives are separated—perhaps not until weeks afterwards—they are found to be quite wet and utterly ruined. Thousands of negatives have been destroyed in this manner.

Here is another example of trouble that may be brought about by the unnoticed condensation of moisture. A packet of dry plates which have been kept in a cold place are brought suddenly into a warm and moist atmosphere and opened to fill the slides, or, may be, in the case of a professional photographer, to replenish the plate-box for the day's use. Moisture will, of course, condense upon them, and eventually be absorbed by the film. If the plates be used up quickly no practical harm will result, but if what are not used be packed up again, with the moisture still upon them, the case may be somewhat different. Sometimes, when a packet of plates have been opened, to save trouble they are repacked with pieces of blotting-paper between them. When this is done it is easy to account for stains or markings should any be present when the picture is developed.

Many other instances could be cited where the unnoticed condensation of moisture may, and often does, prove an undiscovered source of trouble in photography ; but sufficient has been said to direct attention to the subject, so that all may be put upon their guard at this season when sudden changes in the temperature may always be anticipated.

Condensation upon any particular substance or article can at all times be prevented by rendering it as warm or, better, slightly warmer than the surrounding atmosphere. Hence, if (say) a packet of dry-plates be kept for some hours in a warmer temperature than that of the apartment in which they are opened, there need be no fear of condensation of the moisture.

In the case of stock negatives, care should be taken during the winter months that they are never allowed to acquire an abnormally low temperature, and then all risk will be avoided.

POPULAR ERRORS REGARDING ILLUMINATION.

We recently observed in and otherwise interesting and excellent paper, read at a photographic society's meeting, the repetition of an error which, from its pseudo-scientific wording, long ago seized the popular fancy and has ever since been repeated from time to time as though it were a recognised and established canon of practice, notwithstanding our having called attention to its falsity on several occasions. We are alluding to the assertion that the light received from a window by any object diminishes as the square of the distance from that window. The belief in the truth of this dictum —which is obviously an imperfect attempt to apply a well-known and proved rule—is deeply rooted, and it is worth the expenditure of a little space to prove how misleading it is and to show how the actual theory which is thus travestied does not apply to the case at all.

"It will be seen that in proportion as he (the sitter) removes himself from the window the light diminishes according to the square of the distance." These are the words in the article to which we allude. Let us now take an example of the application of the rule. If the words imply anything they mean that an object situated at a given distance from a window and receiving a certain amount of light will, if removed two, three, or four times that distance, receive respectively, a fourth, a ninth, or a sixteenth of that amount of light. Thus, a picture placed for copying (say) two inches from the window would, if removed two feet away, receive only one hundred and forty-fourth as much light, and, in consequence, require more than two and a-quarter minutes' exposure if the first position needed one second only, and at a couple of yards away the one second would have to be increased to twenty minutes. It is sufficient, thus to place the application of the rule into plain figures, to show its ridiculous character, and we trust that after this exposition we may hear no more of the absurdity.

The error has arisen through treating a window as a light-emitting centre, under which conditions the rule would be sufficiently exact; for it is quite true that the amount of light received by an object does decrease according to the square of its distance from that object.

It may be said that the rule would apply in the case of "ground" or "obscured" glass, and the statement would be correct if this medium did so refract rays, which it received at any incidence, equally in all directions—a condition, however, which the most superficial observation would prove to be non-existent.

There, nevertheless, prevail some erroneous notions regarding the functions of obscured glass in the studio. Upon the fact that this glass may at times give an increase of light in a room owing to its scattering of incident light, it is too readily assumed that it does not on this account weaken the light entering into a room. The truth is that it may increase or it may weaken the light received by the sitter just according to the conditions of the case. If the sitter, posed for being photographed, can see through the window panes nothing but sky ground glass would have the effect of diminishing the light falling upon him, unless under very exceptional circumstances; while if, on the contrary, he should be able to see a red brick wall, for example, when looking out of the window, the interposition of the obscured glass over the window space till all such objects were hidden would augment the light he received to an appreciable extent. The reason is that in the former case some of the light which would otherwise reach the sitter is scattered or thrown into another direction, and in the latter, as there is no light he can receive through the particular portion of the windows described, the light that might have gone to illuminate the floor is made use of by a portion being refracted to the sitter's direction.

Closely connected with this branch of the question is the use of blue-coloured glass for studio lights. There cannot be a doubt that to some extent the glare of the light is mitigated by its use, and there is more relief to the eye under such a roof; but to suppose that no weakening of the light is brought about, or, as some maintain, that by being coloured blue it is caused to become quicker, is complete error. The part is less than the whole, and the light is only rendered blue by filtering out some of the other colours whose presence is never any opposition to the action of the quicker rays, and at the same time it is impossible to avoid robbing white light of some of its actinic qualities in causing it to become blue.

Another common fallacy is the idea that the size of the room governs the rapidity of working, the fact being that size has nothing whatever to do with the matter. The angle, vertical and horizontal, at which the light falls upon the sitter or object to be photographed is the only criterion as to its rapidity; and it clearly follows that the height of the solid walls, and not the proportion or area of glass, governs the working capabilities of a room. For light at a certain angle to be received, it follows that the smaller the room the lower the unglazed wall should be. If a room six feet wide need a wall four feet high, then a room eighteen feet wide would require a wall nine feet high for the light to arrive at the same angle at a point upon the floor in the middle of the room, which point would then be illuminated to precisely the same extent. The advantage of a large room lies in the fact that there is less inequality in the distribution of light over objects covering a large area, and also less variation in the amount of light received upon the various portions of a standing figure. In a small room with (say) a four-foot wall the feet would receive much less light than the head, while in a large one the inequality would be almost unnoticeable.

We may conclude by referring to the common views held about studios with a north aspect. In the first place, those who discuss this matter do not all attach the same meaning to the phrase. One man will say it means a studio running north and south, so that the sitter may face the north, while others suppose it to mean a room with the main skylight directed to the north. The latter we believe to be the best, as then the dominant light comes from the most equable quarter; but in the former the chief light will come from east or west, according to the mode of lighting, and in either case the illumination is more irregular, and the screening to be made for getting rid of the sun's direct light becomes more difficult. Unless the studio be short or it have a high wall at the south end it will be impossible to get rid of its rays without a series of screens more or less translucent.

We have now completed our survey of errors, but the greatest of all is that first named, and we trust that our words may have robbed even so long-existent a myth of the last trace of vitality.

Referring to the subject of astro-photography, which now has assumed such an important aspect, an interesting discussion took place at the last meeting of the Royal Dublin Society. Mr. Howard Grubb exhibited star maps photographed by the Rev. T. E. Espin, of the Liverpool Astronomical Society, and he elicited the opinion from Dr. Stoney, F.R.S., that the method was a revolution in one branch of photography. The photographs were taken with a camera mounted equatorially; and, as a strong proof of the value of the new mode of making star maps, the cluster pointed out by Mr. Grubb, wherein seventeen stars were shown while the best published maps only gave five, could not well be exceeded.

In a recently-published journal appears a paper, signed E. Vogel, San Francisco, California, of a very remarkable character as to the atomic weights of the elements. There has been for some time, as we have informed our readers, a strong undercurrent of opinion among scientific men that the atomic weights of the elements are not of the fixed and invariable value that, since Dalton's wonderful theory was first propounded, it has been the custom to consider

Strong proof has been brought forward to prove their variability, and in our own pages Mr. L. Warnerke and other experimentalists have brought to light discrepancies between practice and theory in regard to the combining proportions of cadmium, which are rather startling. We cannot give Herr Vogel's paper *in extenso*, but we may quote his words to show the conclusion which, in his eyes, the facts he marshals indicate:—"The evidence is such that no doubt seems to be admissible as to the reality of a variation in the atomic weights. This conclusion is independent of any value of the atomic weights; for the discrepancies exhibited in the results of Professor Clarke's recalculation from the same experimental data above quoted were inevitable if the variation of the atomic weights is not taken into account." The theories of chemical union have undergone great changes during the last twenty years, but complete proof of the variability of the atomic weights would be like removing a main pillar of the fabric of modern chemistry.

We have more than once heard a clergyman in his sermon introduce the terms employed in photography as a mental simile, but we have no recollection of having met with the word itself in the title of a work not connected with photography. Yet we learn that the title of the late Mr. Grenville Murray's work, the last chapters of which were completed only a few hours before his death, is to be *Under the Lens: Social Photography*.

Photographs of lightning are now quite common, but perhaps the most interesting yet published is one which appears in our contemporary *La Nature*—a reproduction by heliogravure of an instantaneous photograph taken by M. Desquesnes, of Billancourt, on the 13th of July last, but only presented to the Paris Academy of Science on the 21st ult. This remarkable photograph represents clouds and other *silhouettes* of trees, being in the latter respect different from other photographs of the same class. M. Desquesnes explains the presence of the trees by the illumination of the background of clouds through the repeated discharges which took place below the horizon while the camera was *in situ* with the lens uncovered. Having intended for some time to experiment in photographing lightning flashes he had marked his camera to focus for distance, and on the day in question, seeing that a storm was brewing, he placed the camera in a suitable place and waited for the lightning flash, the illumination of the sky by the unseen lightning flashes enabling him to discern the image on the ground glass, and so to point his camera without difficulty in the required direction. When the storm appeared at its height a flash of great brilliancy was seen, and he hastened to cover the lens and remove the plate before a second flash should be photographed. The effect is most remarkable, and as utterly unlike the conventional lightning-flash illustration as it is possible to conceive. The flash is seen to dart from a deep cloud, at once to split into two, and then to develope fresh departures till its course represents nothing so well as the roots of a plant spreading out in all directions, horizontally and downwards, with a few upward fibres, as we may call them to continue our simile. The photograph is likely to be of signal value in assisting to arrive at a true understanding of the track of lightning flash.

Mr. Edward Hart, of Lafayette College, U.S.A., is the author of a new method for the detection of iodine, bromine, and chlorine published in our contemporary the *Chemical News*. The process is very simple, and the apparatus to be employed equally so—consisting, as it does, of nothing but a flask, a bent tube, and a beaker. The tube ascends a short distance from the flask to which it is connected by a cork, then it is bent at right angles and ends, after a horizontal length suffices to clear the flask in a U-shaped prolongation, the U being furnished with three bulbs, and dipping into the beaker filled with cold water. The chemicals required are permanganate of potash, starch paste, chloroform, and solution of ferric sulphate. This latter is made by precipitating solution of ordinary sulphate of iron that has been boiled with nitric acid of ammonia, redissolving the precipitate to saturation in sulphuric acid diluted with its own volume of water, and then adding to the filtered solution a further quantity of dilute acid equal in bulk to that already used. It is recommended in the case of silver compounds of the haloids to fuse them first with carbonate of soda; but this is not an essential, though if nitrates, chlorates, bromates, or ioxates be present it is necessary to reduce them by fusion with carbonate of soda and charcoal. The substance is placed in the flask with some water, a few drops of the above iron solution, and a small quantity of starch paste placed in the bulbs (which are kept cold by immersion in the beaker of water). The contents of the flask are boiled. If iodine be present it will be given off and will colour the starch blue. Continued boiling will eliminate all the iodine, the absence of which may be shown by a fresh supply of starch, more iron being added if necessary. The bulbs are cleaned, and a few drops of chloroform and some water dropped into them. Bromine is liberated by adding a very small crystal of permanganate, and will be shown by colouring the chloroform in the usual manner. Boiling is continued till all the bromine is driven off, alcohol is added to decolourise the permanganate, and chlorine may then be shown after filtering the liquid by adding nitrate of silver. Mr. Hart states that the method is capable of showing the presence of ·0001 gramme of bromide of potassium, but that the presence of a large amount of bromine decreases the delicacy of the test for iodine. This method would seem to be very simple for ascertaining the composition of an unknown sample of gelatine plate if it be desired to ascertain which haloids are employed.

ANDREW PRINGLE.

Mr. Andrew Pringle, the well-known amateur photographer and writer, whose portrait we gave last week, was born in 1850. He was educated at Eton, Trinity College, Cambridge, and Royal Military Academy, Sandhurst, and entered the army as cornet in the 8th King's Royal Irish Hussars. He, however, did not remain long in the army, and, after travelling for some time, settled in Roxburghshire. Mr. Pringle commenced photography as an amusement about ten years ago, and with but a slight interval has continued to work enthusiastically at it ever since—with what succcess visitors to the various exhibitions can judge. Fond of travel, Mr. Pringle is invariably accompanied by his camera, and the readers of this Journal have had the benefit of his experiences on the continent as well as on the occasion of his trip round the world. We believe he has in prospect still another foreign trip of which we shall no doubt publish an account in due course. Mr. Pringle's writings are always practical and to the point, and carry with them the value that must attach to the opinions of a successful worker. Our picture, like the last one of Mr. Glaisher, is from a portrait by Mr. Mayall, of 164, New Bond-street, and shows how thoroughly under control is the electric light.

A METHOD OF MAKING TRANSPARENCIES AND REPRODUCING NEGATIVES.

Now that gelatino-bromide paper has become so general an article of commerce the following hints upon a new application may be useful to some of the readers of the Journal. Though I have not worked the process to any great extent I have succeeded in the few experimental trials I have made in producing perfectly satisfactory results; indeed, there is nothing in the whole method to be described which is not perfectly plain and straightforward.

The new application of gelatino-bromide paper to which I refer is the production of transparencies, or more particularly the reproduction of negatives. Whoever heard of paper transparencies? I fancy I heard somebody say. Well I have myself both heard of and seen them, but I am not going to describe anything of that sort, nor even paper negatives, as the readers will soon see. I need not here recapitulate the various processes of reproduction which have hitherto been put forward and used, but will just say that I think this one is new.

To plunge *in medias res:* the process consists in treating the gelatino-bromide paper as if it were ordinary "carbon" tissue, with bromide of silver as the pigment. It is sensitised in the usual way on a bath of potassium bichromate of such strength as may suit the particular purpose in hand, and exposed, when dry, in the printing-frame; then wetted, squeegeed on to glass or other support, and developed in the ordinary manner in hot water. The picture thus obtained is next submitted to the action of alkaline pyro., ferrous oxalate, or acid pyro. and silver, until an image of sufficient density is secured and all is finished.

The process differs from that published a few years ago, in which a gelatino-bromide plate was sensitised in bichromate, exposed, developed with ferrous oxalate, and fixed in the ordinary way, inasmuch as the latter produced a negative from a negative, and is entirely distinct in the principle of action. It differs also from Mr. Warnerke's patented process, because in that the combined action of exposure to light and of development bring about the state of insolubility of the film upon which the image depends; moreover, a comparatively thin layer of gelatino-bromide suffices in my method to produce any desired intensity, while in Mr. Warnerke's a considerable body of emulsion is required.

In the few trials I have made the following has been my *modus operandi*:—For transparencies from negatives of ordinary character the tissue (as I shall call the bromide paper) is sensitised on a five-per-cent. solution of bichromate, and if the best results are required squeegeed on to collodionised glass and allowed to dry. But it suffices on removing it from the sensitising bath to lay it face downwards on a sheet of clean plate glass, and, after squeegeeing out the superfluous solution, to remove it at once from the glass and hang it up to dry. The drying takes place much more rapidly than in the case of carbon tissue, owing to the thinner layer of gelatine the silver paper possesses.

When dry the tissue presents a strong, orange-yellow colour, and in this state is no more sensitive than carbon tissue—that is to say, the silver salt the film contains is practically insensitive to light owing to the presence of the bichromate. The printing is performed in the ordinary manner, but the operation may be watched as in the case of a silver print, for the brown image produced by light is plainly visible on the yellow ground and forms a perfect guide as to depth of printing. A "safe edge" must be used just as in carbon printing; in fact so far as concerns the "carbon" portion of the operations the procedure is just as usual.

When the development is complete the picture presents by reflected light a very delicate negative image of a bluish-white tinge, and, by looking through an equally-delicate positive image in various gradations of golden yellow. It consists, in fact, of a positive image in undeveloped bromide of silver. If in this state it be exposed to daylight the image will discolour more or less, some samples of paper, even by the same maker, showing more discolouration than others, while in the case of the paper supplied by one maker the image blackens by mere exposure to light sufficiently to give proper intensity. This is possibly due to the presence of chloride in the film, and it is very probable if such an article as gelatino-chloride paper be obtainable that the next stage of redevelopment might be dispensed with altogether, or by employing ferrous-citro-oxalate all the advantages of variety of tone that chloride gives might be gained.

The redevelopment is performed in the ordinary way after a short exposure to light. I prefer pyro. to ferrous oxalate on account of the better tone it gives, and also because there is *less liability to stains*. This latter may be deemed a somewhat extraordinary statement by those who are accustomed to the working of dry plates with both developers; but, if it be borne in mind that in the image produced as above described the high lights are clear glass with no film of gelatine to stain, it is obvious that what would be pyro. stain on an ordinary gelatino-bromide film will here be merely an alteration of tone. On the other hand, in using ferrous oxalate, the deposition of oxalate of lime upon the surface of the film takes place just as it does in the negative process.

It will be found that extraordinary density is obtainable with a very thin image; therefore care should be taken not to over-expose in the printing-frame, and so form too thick a layer of insoluble gelatine.

In reproducing negatives the only difference is that the operation is a double one—that is, a transparency must first be made. This intermediary step may be performed by any process, of course, but where the original is a very thin and unprintable negative *both* operations are better performed with the gelatino-silver tissue in consequence of the great power it gives in modifying the character of the gradations. In fact, whenever the printing qualities of the original require considerable modification, whether in the direction of greater vigour or increased softness, this process offers all the advantages that the carbon process presents. Thus, by altering the strength of the sensitising bath, by greater depth of printing, and adopting the method of "toning" so often described in connection with carbon, surprising results can be obtained.

With this process, however, the power is far in advance of that possessed with carbon; for, in addition to the capacity of the gelatine film to absorb colouring matters or "stains," the pigment itself is not only capable of reduction to metallic silver, but possesses the power of intensification by the piling-on methods just as an ordinary silver image in collodion.

I do not know that I need say any more on the subject at present. To those who are acquainted with the manipulations of the carbon process many possibilities and improvements will suggest themselves, and I have no doubt that before long some more competent pen than mine will take the matter up.

H. Y. E. Cotesworth.

THE STANDARD SYSTEM OF APERTURES FOR LENSES.

One of the most useful developments of scientific labour is the elaboration and settling of systems of standards. In all departments of modern science the want of definite standards upon which to base comparison has been felt, and the recognition of the want has been followed by a careful consideration of what should be the unit to be adopted. The decision upon which of several proposed units shall be taken has commonly been delegated to a comparatively small body of men, whose decision has been generally accepted; and, the standard having thus been fixed, a great convenience has resulted from its use.

When the difficulties in the way of arriving at a standard are considered, and the great confusion that would ensue from the setting up of rival standards or the changing of one that has already been accepted is borne in mind, it is much to be deprecated that an attempt should be made to supplant one standard by another, or to depreciate the utility of one that has already been discussed and accepted, unless some valid reason can be shown for making a change.

The Standard for Rapidity of Lenses.

Amongst the various standards that have been in late years fixed and accepted as aids to systematic working, and as helping to eliminate those failures which proceed from guesswork, one particularly interesting and useful to photographers is that which resulted from the labours of the Committee appointed by the Photographic Society of Great Britain for settling upon standards—the standard for rapidity of lenses, and the diaphragms or stops used therewith. Failures proceeding from incorrect exposures, due to mistaken judgment of the power and quality of the light upon the subject to be photographed, are no doubt sometimes inevitable; but that this cause of difficulty should be intensified and complicated by uncertainty as to the comparative rapidity of the various lenses, and diaphragms even of the same lens, is a quite unnecessary aggravation of the photographer's difficulties. It is, therefore, a matter for congratulation that opticians, having accepted the standard decided upon, should be engraving their lenses and diaphragms with numbers in accordance with that standard; and, on the other hand, it is to be regretted that an attempt should be made to unsettle the minds of photographers with regard to the usefulness or efficiency of such a standard, unless some solid ground can be taken for arguments against it.

It appears, from a paper recently read by Mr. C. W. Dean before a photographic society in New York, that in some quarters various objections are being raised to the already approved standard system. These objections, however, are not accompanied by a proposition for any standard more definite than that of marking the stops for each particular lens with a number showing its relation to the focal length, and its speed compared with other apertures for that particular lens.

Taking the objections to to the standard in detail, President Barnard, of Columbia College, is quoted as follows:—"The hypothesis upon which the Photographic Society of Great Britain has founded its law is that chemical changes affected by light are more rapid in proportion as the intensity of light is greater, and this with so severe mathematical accuracy that a double intensity will reduce the time necessary for exposure by one-half. But this is entirely an *à priori* assumption. It has been adopted because it seemed as if it ought to be so, and not because experiment has proved it to be so. Before attempting to construct a formula, which should express the relation of intensity of light to the duration of exposure required to produce a definite amount of chemical change, we should require to know more than we do about the laws which govern chemical changes during their progress; for the law which you find to fail takes it for granted that the resistance to change opposed by a chemical compound to the action of light is uniform from beginning to end—a thing which we have no right to affirm. I know of no better means of demonstrating this relation between area of lens and the proper duration of exposure than careful experiments systematically conducted with lenses of various areas and with similar illumination throughout. An empirical law might thus be ascertained, which for practical purposes would answer quite as well as a theoretical formula mathematically expressed."

The assumption of which Mr. Barnard complains—that double the intensity of light will work in half the time—is so natural a one that it might be supposed that when objecting to it he would have brought forward some arguments, based on experiments, to show that it is not true, and that some other relation does in fact exist. His statement, however, that "the assumption is entirely an *à priori* one, and not proved by experiment," can only be taken to mean that he does not happen to have made or to have read of experiments which have been made with a view to proving the trustworthiness of such an assumption in the very matter—the rapidity of working of various apertures of lenses—that is in question. Some long time since Mr. A. Cowan produced a series of negatives taken with lenses and diaphragms having apertures with a great difference of range. The time of exposure with each was strictly in accordance with calculations made upon the accepted standard system, and the resulting negatives were shown. No difference in the apparent exposure could be detected, showing that at all events the law which Mr. Barnard calls in question applies with sufficient strictness to the case to which it has been applied.

Mr. Dean objects to the Society's standard base of $\frac{f}{4}$, because he says many photographers—probably himself among the number—never use a lens with larger opening than $\frac{f}{4}$. The essential condition of a standard is that there should be some accepted unit, and to take $\frac{f}{4}$ because that happens to be the aperture of some particular lens or class of lenses, and thereby exclude or cause fractional numbers to be employed with such a large class of instruments as that which contains portrait lenses, is rather unreasonable. $\frac{f}{4}$ is about the aperture of many lenses of the rapid symmetrical or so-called aplanatic lenses, which have been so largely adopted by most opticians since their introduction some years since by Steinheil. There is, however, no finality in this particular proportion, and several makers have recently introduced lenses of this type with an aperture of about $\frac{f}{6}$. Steinheil's antiplanatic has a still larger aperture. $\frac{f}{4}$ includes almost all portrait lenses, and, after doubtless due consideration of other proposed units, is the one settled upon by the committee specially appointed to decide the matter. Some really valid reason should be given for attempting to alter a standard, as, in addition to the inconvenience attending a change, the uncertainty which would be generated might lead to the general abandonment of a standard altogether.

Other objections which have been raised against the standard may be briefly replied to as follows:—It is suggested that not aperture alone, but the colour of the lenses and the number of reflecting surfaces, will affect the rapidity of the instrument. As to the latter objection it may be mentioned that Mr. Cowan's experiments included lenses differing in this respect, without showing any difference that could be detected in speed due to the number of surfaces. The effect of colour in the glass of photographic lenses has, probably, been greatly over-estimated; but, if any particular lens be shown by actual experiment to have its rapidity affected in a marked degree by its colour, the stops for that lens should be so much larger or smaller as to compensate for the difference due to colour, and still work with the rapidity marked upon them in accordance with the standard or universal system. This last consideration, in fact, affords an additional argument in favour of the use of such a standard as has been adopted, rather than depending upon the marking of diaphragms with the fraction of focal length describing their aperture. In the latter case, after the calculation has been made to get at the speed according to aperture, a fresh allowance would have to be made for difference of colour or number of surfaces; that is, if such differences actually influence the time of exposure to the extent that has been assumed; whereas with the standard system the openings of stops for any particular instrument that was really found to differ from others in its speed, owing to colour or other cause, can be regulated according to the difference found to exist. W. E. Debenham.

STEARIC ACID FLAMES IN DEVELOPING ROOM ILLUMINATION.

The more immediately utilitarian demand for a standard light in photography is twofold; in the one case it is wanted for testing the sensitiveness of plates, and in the other for developing-room illumination. Captain Abney has recently pointed out the value of the acetate of amyl flame, burnt in the Siemens' lamp for the former purpose, but gave no experiments to show if it were better or worse than the phosphorescent screen already adopted by Mr L. Warnerke; and, as the latter is the cheapest and most readily applicable light for the purpose, the comparative value of the Siemens' lamp remains but speculative until this question is solved. Captain Abney could not trace any variation in the acetate of amyl light with barometric changes, but it does not follow that they were not there, or that the acetate of amyl flame is not subject to influences which govern other flames. The whole extent of the range of the barometer is about three inches, and the extremes of variation make a difference of about one candle in the illumination given by a sixteen-candle coal-gas flame. These extremes of atmospheric pressure occur very rarely; hence, with normal pressure and a flame of low illuminating power like that of the size used with acetate of amyl, Captain Abney would scarcely have been able to see the variation without great care in the photometric experiments. A temperature of eighty degrees Fahrenheit will lower the illumination of a sixteen-candle coal-gas flame by about one candle. The introduction to the Photographic Society of Mr. Siemens' cheap and simple, approximately standard light is good work done, but the value of the lamp as compared with Mr. Warnerke's standard light already in use is left without elucidation.

An approximately standard light is, however, wanted for developing-room illumination, and for this purpose Mr. Warnerke's light is not available—at least when used with the present area of the luminous source, and under present conditions.

Whether a developing room luminous all over, and with dangerous rays cut off, can be devised is a question for the future. At present nearly all photographers but dry-plate makers are using variable daylight as the initial source of light for development, whereby they are injuring their eyesight and groping constantly in semi-darkness; because, if the light in the room be safe when the daylight is strongest, at all other times the operator must be placed in an unnecessary amount of darkness, and in the climate of England he must be almost constantly working in these "other times" of reduced luminosity. In consequence of the perseverance, so characteristic of our race, with which the operator works in a light varying exceedingly in intensity from time to time, he is hardly likely to feel much interest in a scientifically-accurate standard source of light, supposing that he could obtain one short of platinum at the point of freezing, nor do I think that he would even go so far at present as to invest in acetate of amyl. If he adopted any common candle to be found in the house, and used a translucent yellow screen just intense enough to permit the use of the best powers of that candle, he would by this simple method obtain a comfortable degree of illumination in the developing room to which the red-screen daylight man is wholly unaccustomed. After a farther stretch of experience he might go so far in equality of illumination as always to buy candles of the same composition and make, and when he has reached this point the question remains whether, to get more equable illumination, it would be worth while to go to the moderate extra expense of burning acetate of amyl. Probably not. Gas or oils would not be likely to oust the candle except in the matter of cheapness, because these liquids would present greater difficulty in getting a flame always of the same size and luminosity. The Carcel standard lamp could be used for oils, but it is expensive in the first instance, and requires constant and scientific care in the management.

For all these reasons it seems probable that in improving developing-room illumination the more immediate sheet anchor of photographers in general will be the common candle, and some will go farther by using one kind of candle only, and by ascertaining in the first instance that it is specially good for the purpose. They will then find that there are three great classes of candles, namely, those made of paraffine, spermaceti, and stearic acid. Each of these has its special merits. Paraffine gives the greatest illuminating power, spermaceti is the most uniform in chemical composition, and stearic acid in candles does not bend or "gutter." The objection to paraffine is its tendency to bend when sufficient time is granted; in fact, it is not a solid in the true sense of the term, but, however hard it may be, it is classed by high-caste scientific men as a liquid. Spermaceti is expensive. Altogether a good practical candle to begin with, and one which is not liable to bend and "gutter" in the heat of a photographer's lamp, is one made of stearic acid, popularly but erroneously called "stearine." Stearine is a stearate of glycerine; the glycerine is removed in the manufacture of candles, and is made into soap or dynamite for Irish and other purposes.

For much information about the manufacture of stearic acid on a large scale I am indebted to Mr. Leopold Field, a clever experimental chemist, and the manufacturing partner of the great house of Messrs. J. C. and J. Field and Co., Lambeth Marsh, London. His family has manufactured candles for the British Government and the British public from time immemorial—the name of the founder of the establishment being lost in the dim mists of antiquity, the remains of at least six generations resting beneath the shadows of Lambeth Church. Kings and queens, bishops and archbishops, statesmen and commoners have used Field's candles as far back as records can be traced, and continue to do so to this day. Even the "fighting dips" used by the British tar are supplied to him now as they were in the days of Nelson and Drake. Who knows whether Guy Fawkes did not fail in an earlier pyrotechnical attempt because the founder of the house of Field, on the other side of the Thames from the Houses of Parliament, refused to supply him with a "farthing dip," remarking that he did not like his general appearance?

Few who have not inspected large works like those of Messrs. Field and Co. can have any idea of the amount of experience and science brought to bear in the manufacture of candles, and in the present development of the knowledge of the chemistry of the fatty acids, into which subject it is not now possible to enter at any length. Briefly stated, one method of making crude stearic acid is to mix the tallow as received from Australia and elsewhere with a cream of slaked lime; heat is then applied, stearate of lime is formed in chalky lumps, and the liberated crude glycerine is run off from the tanks. The stearate of lime is then treated with sulphuric acid, sulphate of lime is formed as a waste product, and stearic acid charged with oleine remains. This oleine is squeezed out by pressing the cakes between mats and iron plates, the heat and hydraulic pressure being gradually increased as the cakes become hard enough to bear them. The more of this treatment the cakes have received the harder is the stearic acid, and the higher is its price. A test of a stearine candle is to cut it and to notice its degree of hardness. When absolutely-pure stearic acid is required, which is never the case in candle-making, it is refined by successive crystallisations of the crude of acid from hot solutions of it in alcohol and ether, which finally yield it in pearly scales. The purer the acid the higher is its melting point, which in that crystallised from ether is 159° Fahr. It fuses into a colourless oil without taste or smell. It forms salts with certain alkalies and metals, and stearate of soda is the basis of ordinary hard soap.

The approximately standard light, when obtained from stearine or any other source, should always be placed at a fixed and invariable distance behind the yellow, translucent screen of the lamp. The uncertainty introduced by the too common neglect of this rule is remarkable. For instance: if in one experiment the flame be three inches behind the screen, and in another four inches, in the former case the illumination of the screen will be greater than in the latter in the proportion of sixteen to nine, or very nearly double. In fact, if a lamp flame were used, and chanced to be turned a little higher in the first experiment, the illumination of the screen in that case might be much more than twice as great as at the four-inch distance; yet this has often been done in public in what were supposed to be comparative experiments.

The employment of but a single candle implies the use of a screen which will not obstruct much light, such as two thicknesses of superimposed bright yellow—not orange—tissue paper, a foot square, six inches from the flame. The sheets of paper must not be gummed or pasted together at any place at which the light shines through them. The temptation to use three thicknesses of tissue paper will arise solely from the uneven texture of the fabric; hence the demand I have so often made for bright yellow oiled-silk to give good colour and feeble but even translucency. If a given plate should be found to fog somewhat when developed close to this lantern the operation should next be performed a few inches farther off, since the fogging power will diminish immensely with each small additional increment in distance.

In searching for standard candles larger than those used for gas testing, I introduced myself to Mr. Leopold Field, and was surprised to learn from him that some intelligent photographers had previously felt the want, so that for some time he has been manufacturing what are known on the premises as "photographic candles." Some of these are made of spermaceti, others of stearic acid, and others of ozokerit, all of "moon" size, which is the average size used in carriage lamps. The wicks in these candles are always of exactly the same make to promote uniformity. Extra hard hydrocarbons and fatty acids are used in the manufacture of these photographic candles; the stearic acid in them melts at 140° Fahr., the ozokerit (mineral paraffine) at 142° Fahr., and the spermaceti at 115° Fahr. The melting point of ordinary spermaceti is 111° Fahr. Reckoning the light of ozokerit at 1,000, the same weight of spermaceti will give a light of 750, and stearic acid a light of 700. The candles of each substance burn away in about the same time.

W. H. Harrison.

DEVELOPERS AND DEVELOPMENT.*

In all cases correct exposure will give the best results, but should there be, through any cause, much under- or over-exposure, this developer will afford as good if not better results than any other that I have yet tried. For some reason or other it does not seem to have been taken into popular favour in this country, though used so commonly on the continent. Many plates can be developed in the same developer, and if it be returned to a stock bottle and exposed to sunlight for a short time it will recover its power to a great extent, and is preferred to newly-mixed developer for giving softness of detail. Another developer, for which I have a soft side, is the potash developer. I saw it mentioned first in an American paper, and after I tried it and saw the bright-looking negatives resulting from its use, I was very much pleased with it and have since kept it in stock. It is an excellent developer for some plates which, with ordinary developer (pyro. and ammonia), give red or grey fog. What I mean by grey fog is the negative having the appearance, when looked at by reflected light, of not being properly fixed—having a grey or yellow appearance all over it. When looked at by transmitted light it only seems slightly filled up in the shadows; but in most cases this developer will be found to give absolute clearness in the shadows.

There are some makes of plates, however, which do not work up in a satisfactory manner, the negative being weak in contrast. When this is the result (not from over-exposure) one or two drops of a weak solution of ammonia will usually give it all the energy needed. Another very handy developer, and one which I usually keep beside me, is the ordinary pyro. sulphite of soda and ammonia. This I always use when copying anything, such as engravings from books. It is a very nice working developer, and though in most cases I prefer either of the developers I have named, yet this one is excellent. Either of these developers can be used over and over again till exhausted, and the results are equally good till the developer is exhausted—having no tendency to stain the film—and the colours of the resulting negatives are good for giving rich prints with plenty of contrast.

I have tried almost all the developers as they have appeared in the photographic journals from time to time (not that I was dissatisfied and intended to change, but just to see the effect), hydrokinone and hydroxylamine alone excepted. About these I know nothing. My feeling in the matter is that with a good plate properly exposed almost any of the published developers will give good results when carefully used, while with the same developer the good plate can be spoiled by careless treatment. Captain Abney says that any person can make a good plate by following the instructions, but to develope that plate is a science.

I shall now go over in a very short way some of the developers at present in use, and as far as I can the mode in which those developers should be employed. I have already alluded sufficiently to the ferrous oxalate, and will take the pyro. and potash developer. The formula is as follows:—

No. 1.—Pyro. Solution.

Warm water	2 ounces.
Sulphite of soda	2 ,,
When cold add—	
Sulphurous acid	2 ounces.
Pyrogallic ,,	½ ounce.

In all cases these weights are calculated at 437 grains to the ounce.

No. 2.—Potash Solution.

A.

Water	4 ounces.
Carbonate of potash	3 ,,

B.

Water	3 ounces.
Sulphite of soda	2 ,,

When dissolved mix A and B. These two stock solutions will keep a very long time. I have some made up last spring as good as when first mixed. In this developer purity of the ingredients is a *sine quâ non*. For instantaneous exposures take three ounces of water, and add three drachms of No. 1 and two drachms of No. 2. This, being a very strong solution, will usually bring out the image rapidly and with full density; but if more strength be necessary add No. 2. For ordinary exposures and very rapid plates (not drop shutter) less than half this strength of developer will be found ample; in fact, one drachm of No. 1 and half-a-drachm of No. 2 to three ounces of water will be found to give excellent results, with the shadows clear, and, at the same time, having all detail. Should the plate, however, not give sufficient density one or two drops of a solution of ammonia—one to ten of water—will be found to act very rapidly and give density to the image. Though I have given these proportions they are, of course, subject to considerable variation with the nature of subject and amount of exposure given. If over-exposed, less of No. 2 and weaker developer; if under-exposed, more of No. 2 and stronger developer—more of No. 1 for vigour, and more of No. 2 for detail. This developer does not stain or cause fog, though it is said by some to cause frilling. This, however, is not my experience.

Next, the washing soda developer:—Stock solution No. 1—Add clear crystals of soda till no more will dissolve.

No. 2.

Water	40 ounces.
Oxalic acid	96 grains.
Bromide of potassium	40 ,,

* Concluded from page 791

For use: to one ounce of water add a-quarter of an ounce of No. 1 and pour over the plate. Then take one ounce of No. 2, add one grain of dry pyro., pour the soda solution off the plate into this, mix, then pour on the plate, and you will get any amount of density and detail if you have exposed properly. Another formula gives—

No. 1.

Sulphite of soda	4 ounces.
Hot water	10 ,,

Add four ounces of sulphurous acid, and pour into one ounce of pyrogallic acid.

No. 2.

Washing soda	$3\frac{1}{2}$ ounces.
Sulphite of soda	$\frac{3}{4}$ ounce.
Water	64 ounces.

For use: take one drachm of No. 1 to each ounce of No. 2. This formula will also give plenty of density and detail where correct exposure has been given. If plates are over-exposed, twice the quantity of water must be used. The washing-soda developer seems to have very little power to force up an under-exposed plate, and an alum bath must always be used to remove the yellow colour given to the negative. Of the two formulæ above, the one mentioned first gave me the most satisfaction.

Sulphite of Soda.

There are several formulæ given in the photographic journals, but the one I like best is—

Sulphite of soda	4 ounces.
Hot water	56 ,,

Neutralise with citric acid, and then add one ounce of pyrogallic acid.

No. 1.

Ammonia	1 ounce.
Bromide	180 grains.
Water	40 ounces.

With equal parts of Nos. 1 and 2 for correct exposure. This is an excellent developer, and I prefer it in every case when copying. For under-exposure more of No. 2, and for over-exposure less. With this formula you can have thorough command over your plate, though there are some plates which give green fog and metallic stains when any attempt is made to force them with this developer; but the rule is a brilliant, bright negative. The ferrous oxalate, the potash, the washing-soda, and the sulphite-of-soda developers can be used over and over again till exhausted,

For a rapid developer the one I like best is Swan's :—

No. 1.

Pyrogallic acid	30 grains.
Water	10 ounces.

No. 2.

Ammonia	1 drachm.
Bromide of ammonium	1 ,,
Water	10 ounces.

With equal parts for correct exposure. This developer acts very rapidly, and, therefore, requires to be watched closely. For under-exposure more of No. 2, and for over-exposure less. The best way when using this developer is to add No. 2 a little at a time till sufficient strength is obtained. New developer must be mixed for each plate.

In the remarks I have made I have said nothing new, and I have only intended them for amateurs who know less than myself, and I have to ask the pardon of professional photographers and proficients for taking up their time, when they were better able to speak with authority on the subject. Alfred Guthrie.

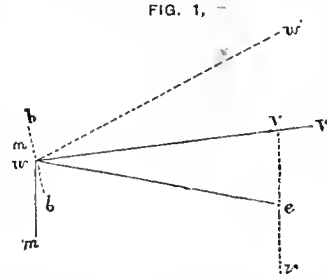
AVOIDING REFLECTIONS AND GRANULARITY IN COPYING.

[A communication to the London and Provincial Photographic Association.]

In copying photographs and other pictures by the camera, the two chief difficulties that occur to those otherwise skilled in photographic manipulations are the fogging or weakening of the shadows in parts, caused by reflections from the surface of the picture to be copied ; and the granular appearance caused by photographing not only the picture itself, but the grain or irregularities of surface of the paper or other material upon which the picture has been produced. I have known a skilful operator—perhaps the most capable all-round portrait photographer as poser and manipulator combined that I ever knew—copy a photograph from which an enlargement had to be made, in such a light that the irregularities of the paper of the original came out with so much strength and distinctness as to require at least an extra day's time of artist's work in finishing the enlargement. Even then, probably, the resemblance to the original would not be so good as might have been the case if the picture to be copied had been placed in favourable conditions of lighting. In this particular instance the original print was upon paper, the albumen surface of which had cracked all over, as was not unfrequently the case a few years ago, when very highly-glazed surfaces were sought for.

In order to get at the principles which govern the occurrence or avoidance of interfering reflections when copying, let us take a case of a typical kind, and suppose that a mirror has to be so photographed, that the glass shall be represented by blackness, and the frame and any tracery, drawn (say) with French chalk here and there upon the glass, shall be represented in their proper form and gradations in the copy. This supposition is not a fanciful one, but actually represents very closely the copying of a daguerreotype, and may be shown, though somewhat less obviously, to represent the copying of any picture where there are reflections to be avoided. It is assumed that the mirror is vertical to the direction of the camera. Well, an eye placed in the position of the lens will see itself reflected in the centre, and in the various other portions of the mirror will see those objects reflected whose images fall upon the mirror at the same angle as, but in the contrary direction to, lines drawn from the eye to each portion of the mirror. This fact is expressed in the well-known law of optics that the angle of reflection is equal to the angle of incidence. Perhaps a diagram may help to make matters more clear. Let *m m* be a mirror, and *e* the eye of the observer, then if a window exist in the direction W, the eye will see itself in the centre of the mirror (about the centre), the face of the observer, and at *w* an image of the window, together with the various other objects which fill up the intermediate space. All this in face of the blackness which the conditions assume as desirable and even necessary for the object required. The portion of the mirror where the image of the window is seen will appear so bright that the chalk marks on the mirror, which were to represent light on a black background, will be dark by comparison.

FIG. 1.



Now, let *v v* be a black velvet curtain, with a hole at *e* for the eye to look through : the pattern traced upon the mirror will show clearly against the black background of the velvet curtain. In order that this blackness may be more perfect, and not interfered with by reflections of the pile or folds of the velvet, or by the reflection of the eye looking through the hole, let there be no source of light in front of the curtain —that is, between the planes *m m* and *v v*, if both of them were extended infinitely—but let the light come from behind the plane of the curtain over its top and round its sides.

It will be noticed that the curtain *v v* must be of such dimensions that lines drawn from the eye to the extremities of the mirror, and returned at equal and opposite angles, shall fall within the surface of the curtain ; therefore, if the curtain be upon the same plane as the eye, it must be of at least double the dimensions of the mirror. In practice, the dark surface must be larger than this, and for the following reasons :—The mirror is assumed and may be considered to have a perfectly plane surface. The surfaces with which we have to deal are not perfectly plane ; and, although the deviations from flatness may be very small, they will be sufficient to require a certain allowance. These deviations are of two kinds—first, such as may be most strikingly illustrated in a daguerreotype, the plate of which is bent, if ever so slightly. Suppose the daguerreotype to be so much bent that that part of it which is at *w* lies in the direction of the dotted line *b b*, the angle of incidence would be in the direction of the dotted line *w w* ; and in order to prevent reflections from any light object being seen in the plate, and appearing as false light in what should be the shadows, the screen would have to be extended until it cut that dotted line. A picture to be copied is not likely to be as much out of truth of level as is shown in this diagram, but it is difficult to make slight variations from flatness evident in a sketch. Nevertheless, these variations occur, and must be provided for by a certain extension of the non-reflecting surface.

The second kind of irregularity of surface which requires the extension of the non-reflecting screen is that which arises from the nature of the surface of the picture to be copied ; that is, in the case of paper pictures, each elevation caused by the grain of the paper will have a surface on one side inclined towards, and on the other side from, the source of light. This inclination is very small, but unless it is taken into account, and if the non-reflecting screen be not large enough to include lines drawn from the lens to each part of such inclined surface and carried back at a similar angle, there will be reflections from one side of each elevation or prominence. This will produce an effect which I dare say many will remember to have seen on the top of a copy of a paper photograph—the effect of a blanket sort of texture.

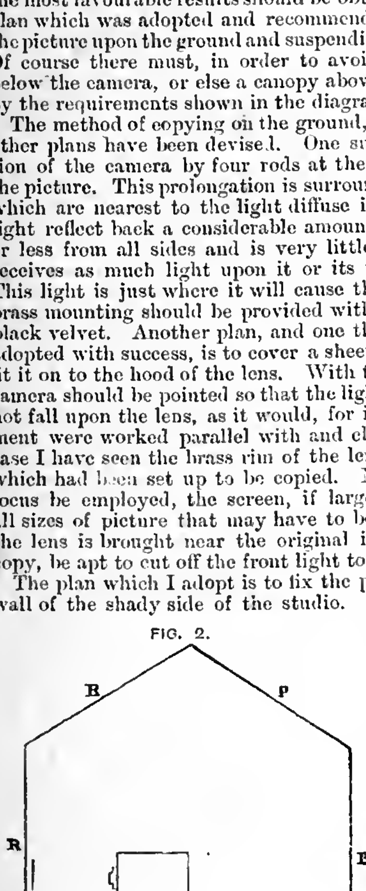
The blankety texture just referred to is not to be confounded with what is known as granularity, although both proceed from the roughness or grain of the original. The former is confined to the side or top of the picture on that edge which is nearest the source of light, whereas the latter effect is visible all over. The former effect, moreover, may be got rid off by employing light falling at an angle nearly parallel to the plane of the picture—that, is what is called strong side light—whereas the general texture or grain which proceeds from the irregularities or texture of the picture copied being lighted up more on one side than the other is aggravated by this side light (whichever side, top, or edge it comes from), and is ameliorated by the light being made to come as much from the front as possible. If a sheet of rough drawing paper be held so that the light falls upon it nearly sidewise the grain will be strongly visible; but if the light fall on its surface almost perpendicularly—say, over the shoulder of the observer who holds the paper square in front of him—the grain becomes almost invisible. If the paper be held so that two equal lights fall upon it from opposite directions the sides of the prominences that receive the least illumination from one source of light will receive the most from the other, and the surface will be greatly equalised. If, however, these lights be of the nature of what has been referred to as strongly side lights, there will be pits and prominences which receive more or less light, and some grain will still be apparent.

The question now arises—How is it best to carry out in practice the principles that have been discussed? First, the light must not come so much from the front as to cause reflection; second, the light must come as much from the front as possible, consistently with the first requirement, in order not to bring into strong relief the grain of the paper; third, there should be at least two sources of light proceeding from opposite directions. If a ring or circle of light could be secured coming from direction behind and around the observer (or the lens), and at just such an angular distance as to avoid being reflected from any shining or polished part of the surface of the picture to be copied, the most favourable results should be obtained. This is very nearly the plan which was adopted and recommended long since—that of laying the picture upon the ground and suspending the camera vertically over it. Of course there must, in order to avoid reflections, be a screen on or below the camera, or else a canopy above, of the dimensions indicated by the requirements shown in the diagram.

The method of copying on the ground, however, is inconvenient, and other plans have been devised. One such plan consists in a prolongation of the camera by four rods at the corners, as far as the plane of the picture. This prolongation is surrounded by tissue paper: the sides which are nearest to the light diffuse it, and those farthest from the light reflect back a considerable amount, so that the grain is lit more or less from all sides and is very little visible. The lens, however, receives as much light upon it or its mounting as the picture does. This light is just where it will cause the most reflection, so that the brass mounting should be provided with a tube or hood covered with black velvet. Another plan, and one that I have known to have been adopted with success, is to cover a sheet of millboard with velvet and fit it on to the hood of the lens. With this arrangement, however, the camera should be pointed so that the light from the window or sky does not fall upon the lens, as it would, for instance, if the whole arrangement were worked parallel with and close to the window. In such a case I have seen the brass rim of the lens reflected in a daguerreotype which had been set up to be copied. Moreover, unless a lens of long focus be employed, the screen, if large enough to be effective with all sizes of picture that may have to be copied, will, especially when the lens is brought near the original in order to make an enlarged copy, be apt to cut off the front light too much.

The plan which I adopt is to fix the picture upon the middle of the wall of the shady side of the studio. The studio is of the ordinary central ridge kind, and the south side of both ridge and upright wall is kept opaque. The light from the whole of the opposite ridge and glazed side fall upon the picture, but reflections are in the ordinary way avoided by using a large camera, the front being more than twice as long as the picture to be copied, with a lens of long focus, of course. If the picture be so large, or the surface so irregular, that the surface of the camera is not large enough to make sure against reflections, a background screen may be placed behind it. This, if so far removed from the picture as to receive light from the top or ridge light of the studio, should be tilted forward sufficiently to prevent that; or a simple plan may be adopted—that of placing something upon the camera just high enough to cut off reflection.

FIG. 2.



R, Opaque. P, Glazed. O, Mirror.

The light as arranged falls very much from the front, and from a considerable surface—twenty-four feet in length, and twelve on each side of the camera—so that the grain of the paper is not very evident. In order, however, to make it still less so, a mirror is placed horizontally below the picture between it and the camera. A sheet of white card may be substituted as more convenient than the mirror, but is not quite so good.

What has been said has reference principally to copying photographs upon paper, and for other subjects some modification may be necessary as desirable. Oil paintings and artistic designs generally are produced with the light coming over the artist's left shoulder, and the painting may show less grain when lit up from the same direction as that in which it has been painted than when equally lighted from all directions. In this case, while what has been said as to the avoidance of reflections will still apply, the direction of the light may be altered to what is required by blinding one-half (the right) of the studio, or by copying in the length of the studio instead of its breadth. With daguerreotypes, again, it will generally be desirable to place them upon their side, as the polishing of the plate (except those of the stereoscopic form) was in the direction of the lines across the picture. If anyone hold a daguerreotype under a vertical light, and change its position as indicated, he will observe a great difference of brightness.

Various plans for avoiding granularity in copying have been suggested, which are not based upon the considerations that have been referred to. One such plan is to copy with a lens somewhat out of focus; another is to move the lens during exposure. It is obvious, however, that with such methods the loss of sharpness of texture of the grain must be accompanied by loss of sharpness of the details of the photograph—at all events, of such details as are defined in lines not broader than the grain which has to be got rid of. Of course, cases may arise in which it is desirable to lose the sharpness of the original picture, but not when an exact reproduction of it is required. I once had occasion to make an enlargement from a pen-and-ink sketch portrait of a gentleman; the enlargement was to match and form a pair with one of a lady which had been made from a photograph in the usual way. I therefore copied the drawing with a lens possessing no sharp focus—the back of a portrait combination—and the softened edges thus given to the ink lines enabled the artist to paint the enlargement with a sufficient satisfactory resemblance to a photograph from life.

Naturally, the less grain there be upon the surface of paper photographs the less there will be to be copied; and an obvious preparation for copying is to roll the print well if the surface require it. I have known burnishing successfully adopted for the same purpose.

W. E. Debenham.

HOME PORTRAITURE.*

I have brought with me tonight some prints which I propose to enamel. They are here soaking in cold water. I have also beside me my glasses, upon which I shall place the prints later on. Now, the first thing to do is to thoroughly clean and polish these glass plates. You will see me clean them with the ordinary plate-cleaning powder. Next you will see me rub the plates with this little bag of talc; then you will see me take a camel's-hair brush and dust them, and then you will see me take this small brush dipped in albumen (white of egg) and go round the edges of the glass plates, and when done they are set aside for the albumen to dry. When this has taken place I take this bottle of collodion, coat each plate with the collodion, and again set aside to dry; while this is being done I get ready my gelatine. I take two ounces of it and soak in clean cold water. Here it is. The cold water is then drained off and hot water applied to melt it; the quantity necessary for the two ounces of gelatine will be about eighteen ounces. When the gelatine is melted I pass it through muslin into a flat dish. Here you will observe I have my gelatine ready so prepared, which I now place into this metal dish containing hot water to keep the gelatine warm.

When the plates are well set I place my prints into the warm gelatine, and make sure they are thoroughly saturated. I then take them out one by one, rapidly place them on the collodionised plate, and lightly squeegee them on. The plates are then placed aside for a short time, and, finally, I give the prints a backing by placing on them this cardboard, which is a very easy matter. I simply take the cardboard, soak it in water, and place between blotting-paper to absorb the spare moisture, and then, with a coating of gelatine, starch, glue, or paste, I press well into contact and the thing is done. Now, the only difficult part of the operation is the collodionising of the plate. Those of you who are familiar with the wet process will have no difficulty, while to those of you who have only worked dry plates I say—do it coolly and deliberately, and with a little practice you will be able to coat a plate without spilling a drop. Let me, however, give you this word of caution:—Take care not to go too near a light with your collodion, or you will have a "jolly fine" blaze all round. The plates with the prints attached are then placed away to dry. I find a very good way is to dry them at a reasonable distance from an ordinary fire (not too near). They may then be left on the mantel-shelf all night, and in the morning they will be dry and ready to be removed from the glasses.

To enable you to see the whole operation I have brought with me these plates, on which you will observe some prints. I enamelled them last night in exactly the same manner as above described. Later on you will see how they are removed from the glasses. I simply take a knife and cut round the edges of the cardboard just a little inside of where the glasses received the edging of albumen, and by gently inserting the knife the prints, with their backing of cardboard, and with their coating of collodion on the face of them, peel off the glass, with the result that they are beautifully enamelled.

I now come to the other subject which we have to consider—retouching. It is to my mind the most delightful occupation an amateur can give himself up to. It is cleanly, and can be done even in the most elegant drawing room. I should have preferred, had circumstances enabled me, to show you by daylight what little I knew of this delightful branch of our art. Still I must do the best I can with the aid of artificial light. I wish it to be distinctly understood, however, that I strongly recommend all those who are desirous of practising retouching to do so by daylight.

* Concluded from page 792.

It is now nearly fourteen years since retouching was first introduced, and for a long time there was a great outcry against it; but, like every other good thing, it has steadily advanced until it has now become a necessary branch of our art, and no gallery is complete without its staff of retouchers.

Doubtless, many of you understand this. Some members at our Association I know are quite as well able as I am to give a demonstration of it, but there are other members who have never touched a negative, and it is to those that I offer my services, in the hope that they may learn a little.

When I first made up my mind to practise portraiture I soon found out that retouching was a most necessary step to the success of my endeavours; so I set myself to study it. I read all the books and articles I could find. I was told it was very difficult, and that I had better give my negatives to a retoucher to have them properly done, as I would be sure to spoil any negative I tried my "prentice" hand upon. But I said to myself "I don't see if others can do it so easily what is to prevent me;" so I decided to take a few lessons from a competent teacher. I was given to understand from what I had read that quite a dreadful list of articles were necessary, such as powdered cuttle-fish, ground resin, powdered blacklead, Indian ink, black-lead pencils, stumps, sable brushes, &c. But I soon found out that in this, like other matters, the best thing was ocular demonstration. So I went to Mr. Horatio Paterson, who soon put me on the right road without the aid of anything but this little tool here, which is only a hard lead pencil—it is a 6 H. Faber. At first I had not a retouching desk, but I made a very good substitute for one by simply using a printing-frame. Try it, and you will be surprised how well you can get on with one. If you can obtain a proper desk, however, by all means get one. It is no doubt a much more complete and comfortable way to work with its aid.

To assist those of you who desire to learn retouching I propose to place on my desk two negatives. One of them will be a finished negative, so that I will be enabled to point out to you the difference between a retouched negative and one that has not been so treated. By this means you will more readily be able to see the inequalities. The first thing to learn is to find out the bad places in a negative. This you will soon come to understand. It is just like knowing the disease is half the cure, and the rest follows. In the first place, examine the high lights and see if there be any patches less opaque than their surroundings. If so they must be made of the same opacity. See if there be any little specks, such as freckles would make. If so they must be filled up, then blend the high lights into the shaded parts, soften down the shadows, and, having done this, you will have accomplished a deal.

I find a very prevalent notion among amateurs is that a negative requires some preparation before it is ready for retouching, such as the application of some retouching medium to cause the pencil to "bite," as the saying goes. Now it is only very seldom such is needed. If your negative has been varnished with the ordinary spirit negative varnish it will need no medium. The varnish when thoroughly hardened will take the pencil well enough, and this just brings me to another point that amateurs make an error in. They think that unless they can see the marks the pencil makes with each touch they give that the lead pencil is not doing its work, and that they must have recourse to some medium to enable them to see the work they are doing. This is just the very thing they must avoid doing.

I will just here tell you that I feel the mistakes most common to beginners are that they do not use hard enough pencils, and they do not keep them sharp enough, nor do they touch lightly enough. The negative being varnished and perfectly hardened, it is then set on the desk and the work begins, as you will see me operate presently. Let me say this before commencing: Touch as lightly as you can. Only let the lead just touch the varnish, and do not press it on. Most retouchers acquire a special touch of their own, just like learning a special style of writing. You will with practice acquire the best way of touching. Although you do not see the marks the pencil makes, you will find the flaws you are touching gradually disappear, and this is just what you require to do. Do not go too near the negative, but so far away that you can only see the patches the flaws make, and which have to be filled up.

Some of you may think it would be best to take a magnifying glass, and with its aid touch out all the imperfections. No more fatal mistake can be made; for, were you to do so after all your exertion when you come to examine the negative, and are prepared to look with pride upon your persevering efforts, you would be surprised and disappointed to find it showing nearly the same appearance as at the commencement. Yet this should not be astonishing, for it is an artistically-acknowledged fact that detail and effect are simultaneously unattainable, and this experience of retouching is further proof to the establishment of this fact. Do not use a magnifying glass. Never attempt to fill up a spot with one touch. The point of your pencil should be as sharp as a darning needle. This is obtained by rubbing it on a piece of fine sand paper. So soon as you sharpen your pencil just touch a piece of paper with it to take off the scratchy point, but do not blunt it.

At first I recommend you to practise on small heads; you will find large ones more difficult. I will show you a negative I first retouched and a print from the same. What I have done all of you are quite as well able to accomplish. Practice and patience are all that is needed. It sometimes happens that in lighting a sitter the catch-lights are not the same on both eyes. I will show you how to take out a false light and so save many a negative that would otherwise be almost worthless.

Do not be frightened to touch your negative. You will thus soon be quite at home at the work, and after a little practice you will find retouching a valuable aid to development, printing, &c. I know of nothing better that enables one to judge of proper density than the examination of a negative for retouching; it will assist you to say at once—this plate is too thin, or this too dense, or this under-exposed or over-exposed, or over- or under developed. You will find it a most valuable aid to the other branches of our art, and he who is an adept at it must be a long way ahead of his brother who is not. I strongly recommend you all to practise it.

I hope I have not detained you too long. I will now proceed to work, which will doubtless interest you more than listening to my paper.

T. N. Armstrong.

RECENT PATENTS.

PATENTS SEALED.

No. 175.—"The Production of Picture and other Like Mounts." William Morgan, Birmingham.—*Dated January* 1, 1884.

No. 12,727.—"New Process of Transferring Designs." H. J. Haddon.—*Dated July* 8, 1884.

APPLICATIONS FOR PATENTS.

No. 16,334.—"Photographic Cameras." S. D. McKellen.—*Dated December* 12, 1884.

No. 15,843.—"Sheets for Attaching Drawings, &c., to Scrap and Other Books." J. C. Morell.—*Dated December* 2, 1884.

An Improved Method of Transferring the Film of Photographs, or a Film of Colour Painted upon Photographs, to Canvas or other Surfaces.

John Mitchell Downing Worsnop, 154, Leeds-road, Bradford, Yorkshire.

My invention relates to an improved method of removing or transferring the thin film, upon which an object has been photographed, or a film of colour which has been painted upon such photograph, from the glass, paper, or other surface upon which it has been photographed, on to a surface of canvas or other suitable material.

In carrying out my invention I take the photograph upon glass or paper, or any other suitable surface which has been previously prepared by coating it with a thin layer of wax or other substance to which the film of the photograph will lightly adhere, but which will afterwards allow such film to be easily peeled off. To transfer or remove the film of the photograph: the canvas or other suitable surface on to which it is to be permanently transferred is covered with dissolved gelatine or strong waterproof cement, and then pressed against the film and held there until the cement becomes firmly fixed to the film, when, by separating the canvas from the glass or paper, the film will be detached from such glass or paper and securely cemented upon the surface of the canvas, where it is intended to remain permanently.

To transfer or remove a coloured photograph, or a film of colour which has been painted upon the surface of a photograph, the film is painted in the required colours before being transferred, and is then transferred temporarily to a surface prepared with wax as hereinbefore mentioned. The film is then finally transferred to the surface upon which it is intended to remain permanently fixed, and to which it is securely fixed by dissolved gelatine or strong waterproof cement, in the manner hereinbefore described.

The inventor's claim is:—Taking photographs, or painting such photographs or pictures, upon a surface covered with a slightly-adhesive material which will admit of the film of the photograph, or the film of colour painted upon such photograph or picture, being peeled off and attached permanently to a canvas or other durable material.

Exhibitions.

EXHIBITION OF THE GLASGOW AND WEST OF SCOTLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

The second annual Exhibition of the above Society was opened in the Art Institute Gallery, Sauchiehall-street, Glasgow, on Wednesday last, the 17th instant, and closes to-morrow (Saturday), the 20th instant.

The Society is but one year old. It held an exhibition of pictures at the end of the first season, which proved so successful that it tended to greatly increase the membership, and certainly the pictures at the present Exhibition show well for the energy and talent of the members. There will not be less than five hundred pictures shown, and the work all over bears favourable comparison with that of last year.

Sixteen medals are given to be competed for in the following classes:—Landscape, figure study, instantaneous, portrait, group, animal, transparencies, and enlargements. A silver and a bronze medal is to be awarded in each class, the vote of the members themselves deciding who are the successful competitors.

The larger proportion of the exhibits sent in are "not for competition" but for exhibition only. Next week we will give a short review of the pictures, with a list of the successful competitors.

THE NORTHAMPTON PHOTOGRAPHIC EXHIBITION.

Last Wednesday night the Photographic Exhibition at Northampton was inaugurated at the Guildhall in that town, and it will be open daily until January 10th, 1885. The Exhibition has been formed under the committee of the Northampton Museum, which committee consists of the following gentlemen:—Mr. M. P. Manfield, Mayor of Northampton; the Rev. S. J. W. Sanders, M.A., F.G.S., LL.M.; Mr. John Eunson, C.E., F.G.S. (President of the Museum Committee); Mr. J. B. Hensman (Hon. Sec. ditto); T. J. George, F.G.S.; Mr. T. P. Dorman; Mr. S. S. Campion;

Mr. S. J. Newman, A.R.I.B.A. (Hon. Sec. Natural History Society): Mr. R. G. Scriven (President Photographic Section, ditto); Mr. H. Manfield (Hon. Sec., ditto).

The Exhibition is a good one, and the arrangements are of an attractive description.

Mr. J. Eunson, C.E., welcomed the company present by saying that it was an admirable Exhibition, and that the photographers who acted as jurors and had awarded the prizes said, almost without exception, that it was one of the finest collections they had ever seen. One reason why it was better than the London Exhibition was that in that room they had several pictures which had been awarded medals in the metropolis at different times. The Exhibition emanated from the Museum Committee, and the original proposition came from the Rev. Mr. Sanders and Mr. H. Manfield. The Committee gave its moral support, and allowed the Exhibition on condition that if there were a loss the proposers were to meet it, but if there were a profit the same should go to the Museum. A sub-committee of four carried out the work. Most persons considered photography to be a new art, but sun pictures were by no means novel; they existed from the time when light first shone through a small hole into a dark room. In about the fifteenth century cameras became general, though the users were unable to fix the pictures. The cradle of photography was France; but, perhaps about 1780, Professor Charles showed a picture of a human bust taken upon nitrate of silver. He could not fix these photographs. Daguerre was the first who devoted his attention with anything like success to this subject. He was born about 1780, and became the pupil of a scene painter in the opera at Paris. He used the camera when drawing the scenery for the theatre, but he worked hard for twenty or thirty years to fix the camera images, and one day he announced his success. He laid his scheme before the Principal of the French Academy of Sciences, and the managers said that it was too great a thing for one man to retain, so they gave him a pension of £240 a-year to give the world the benefit of his discovery. The daguerreotypes were taken upon silver plates, subjected in the process to the vapour of mercury. It took fifteen minutes to impress them in the camera, and, if one were to see the portrait of even his greatest enemy taken after a sitting of that length of time, the anguish upon the face would produce an impression never to be forgotten. Fox Talbot took paper pictures about the year 1840, and in 1842 he (the speaker) saw one and had no difficulty in recognising the outline of a human head. Then came the collodion process in 1847. It produced the pictures now handed over to the public at seaside resorts—all finished in five minutes, and at a moderate charge. Then came the negative process—the origin of the pictures before them that evening. He was not himself a photographer, so could say little more. When Daguerre's pictures came out men said—"Painting is dead." But photography proves to be a great aid to the artist, and it has a high educational influence; it teaches persons to go about in the country without their eyes shut. If some of the pictures before them were paintings people would say—"No man ever saw a sky like that," thus tempting observers to watch whether nature is as wonderful as photography. It had, therefore, an educational influence and a tendency to produce the highest class of art. It does not injure painting, because the colour and the ideal of the artist come into his picture, which can only be appreciated by a cultivated mind. He had great pleasure in declaring the exhibition open to the public.

Sir H. Dryden remarked that an artist could falsify in any way. He could depart from the colour of the face before him, and could alter a thick-lipped negress into a woman of beautiful proportions. Photography, however, was true, and Ruskin had defined truth to be one of the lamps of architecture. In that room were many who were making a comfortable income at photography. He knew of a miniature painter who once lived in a garret in Edinburgh, but when he became a photographer he lived happily downstairs.

The company then adjourned for coffee, after which there was a lantern exhibition.

The following is a list of the prizes awarded by the jurors:—1. For landscape or series of landscapes, above $8\frac{1}{2} \times 6\frac{1}{2}$: silver medal (No. 315), *On the Wey*, T. M. Brownrigg; bronze medal (No. 433), T. A. Green. 2. For landscapes or series of landscapes, $8\frac{1}{2} \times 6\frac{1}{2}$, or under: silver medal (No. 567), H. B. Berkeley; bronze medal (No. 319), J. P. Gibson. 3. For portrait or series of portraits, above $8\frac{1}{2} \times 6\frac{1}{2}$: silver medal (No. 136), R. Faulkner; bronze medal (No. 140 and series), H. Mendelssohn. 4. For portrait or series of portraits, $8\frac{1}{2} \times 6\frac{1}{2}$ or under: silver medal (not awarded); bronze medal (No. 537), W. Gillard; bronze medal (Nos. 13 and 16), Friese Greene. 5. For instantaneous marine photograph (or series): silver medal (No. 328), G. West and Sons; bronze medal (No. 389), W. P. Marsh. 6. For instantaneous photograph (or series), of other than marine subjects: silver medal (No. 439), William Cobb; bronze medal (No. 425 and series), Thomas G. Whaite. 7. Interior or series of interiors: silver medal (No. 419), Ed. Dunmore; bronze medal (No. 295), Thomas Fall. 8. For the best *genre* picture: silver medal (Nos. 100-105 series), Adam Diston; bronze medal (No. 458), Geo. Hadley. 9. For the best enlargement, provided it was the work of the exhibitor: silver medal (No. 190 and series), Thomas J. Dixon; bronze medal (not awarded). 10. For transparencies: bronze medal (No. 514), P. H. Fincham. 11. For a series of views, irrespective of size, taken in the county of Northampton: silver medal (not awarded); bronze medal (No. 293), Charles Law. 12. A silver medal, offered by the proprietors of the *Amateur Photographer*, for the best land or seascape from an untouched negative, the work of an amateur (No. 339), H. A. Hood-Daniel. 13. An extra silver medal, for landscape with figures, to the series of H. P. Robinson. 14. One bronze medal extra to No. 317, J. Lafayette. 15. One bronze medal extra to No. 358, for marine views, Abel Lewis. 16. One bronze medal extra to No. 281, for marine views, F. M. Sutcliffe. 17. One bronze medal extra to No. 65, for still life picture, Mrs. S. G. Payne. 18. One bronze medal extra, for series of photoreproductions, to R. Schuster.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting	Name of Society	Place of Meeting
December 23	Bolton Club	The Studio, Chancery-lane.
" 24	Bristol Amateur	Studio, Portland-st., Kingsdown.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

The twenty-fifth annual dinner of the above Society was held on Tuesday last, the 16th instant, at the Holborn Restaurant. The new President, W. Ackland, Esq., occupied the chair. About twenty members were present. During the evening songs and recitations were ably rendered by Messrs. Bridge, Page, Cowan, Cobb, Debenham, Downes, and others. The toasts customary on such occasions were, as a matter of course, honoured. In responding to the toast of the President, Mr. Ackland after alluding to the great loss the Society had sustained by the death of their late President, the Rev. F. F. Statham, M.A., F.G.S. took the opportunity of reminding the members present that next year the Society might be said to enter a new life, and he asked those around him to exert themselves to make it as flourishing as it had been of old. He further remarked, now that it had been decided to carry on the Society with energy instead of breaking it up, that several influential members who had sent in their resignations had now withdraw them. It was also mentioned that already the Society had nearly sufficient papers promised to carry them up to the vacation.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society, held on Thursday, the 11th instant, the chair was occupied by Mr. C. H. Trinks.

Mr. Gordon showed a washing machine for paper prints, designed by Mr. Sturrock, of Dundee. The machine consisted of a box or tank of japanned tin, into which frames fitted, covered with open canvas or wire netting. These frames formed either simple trays to hold one large print each, or were furnished with dividing strips to hold several prints of cabinet or other size. In any case only one print was laid in each division, so that both surfaces of the paper were exposed to the flow of water unhindered by contact with another print. By an arrangement which worked automatically the water did not commence running away as soon as the tank was filled, but a syphon was brought into play at regular and adjustable intervals, by which the tank was entirely emptied. The water supply was cut off during the time that the tank was being emptied, and the water was entirely drained off before the supply was renewed. By these contrivances the top prints were kept covered for some length of time after each filling, and the bottom prints had time for sufficient draining before the renewal of the water supply.

Mr. W. E. Debenham had seen one of these machines at work at the house of a gentleman, who was highly pleased with its performance. The automatic filling and emptying of the tank was so perfectly regular that when set so as to work at intervals of an hour it had been found to perform with the regularity of a water clock.

The Chairman then called upon Mr. Debenham to deliver his lecture on *Avoiding Reflections and Granularity in Copying*. [See page 808].

At the conclusion of the lecture,

Mr. F. W. Hart said that during the early days of photography he had had many daguerreotypes and glass positives to copy. He met with the difficulties from reflection which had been referred to, so he had constructed a frame of four feet in diameter and somewhat of a saucer form. The inside of this frame was lined with mirrors—each placed at such an angle as to throw back light upon the picture to be copied—and the picture, of course, was some distance in front. The whole arrangement was pointed at the sun, the direct light from which was kept from the lens by the picture and the backboard against which it was fixed.

Mr. Debenham said that the arrangement spoken off by Mr. Hart as nearly as possible fulfilled the conditions mentioned as theoretically desirable for illuminating with a circle of light, in the centre of which was the lens.

Mr. A. L. Henderson said that a good plan for copying had been proposed by the late Mr. C. Jabez Hughes. This plan was to enclose the space between the lens and the object to be copied with white muslin. In order to get the picture copied, and easily and properly centered upon the plate, he had marked the wall against which he placed the picture to be copied with measures in inches, reckoning a certain distance from the ground. The rising portion of the camera stand was similarly marked, and to whatever number the picture was placed over upon the wall, the camera was raised to a similar figure upon its stand. The non-reflecting screen spoken of by Mr. Debenham would, if it were placed between the lens and the picture, be apt to shade the centre or lower portion of the latter too much, especially when enlarging if a short-focus lens were used. In order to avoid the evils of vibration he thought it desirable that the picture to be copied should be attached to a frame to which the camera was also affixed. The picture and camera would then vibrate together, if at all. He had recently in America seen an arrangement of this kind, in which the whole appliance was suspended from the roof. This was in order to secure as much immunity from vibration as possible. One plan, and he thought it a good one, for securing squareness of the camera with the original was to have a stick projecting at a right angle from the wall.

The Chairman said that the suspension from the roof of the copying arrangement was common in the phototypic establishments on the continent. He had seen it in use some years since in Vienna and Berlin.

Mr. W. K. Burton had listened with great pleasure to the lecture, chiefly because of the precise manner in which the subject had been dealt with.

There was one point—which was, however, only an incidental one—upon which he would like to ask a question. The lecturer had referred to the use of the back lens of a portrait combination in a case where he had wished to avoid sharp definition. Did he understand from this that the back lens was supposed to possess more spherical aberration, and consequently less definition, than the front one?

Mr. J. BARKER said that Mr. Debenham had mentioned almost everything in connection with the subject. There was just one point, however, that had not been referred to, and that was the use of a glass in front of the picture. This he found advantageous.

Mr. A. HADDON said that by laying a wet print against a glass, and so securing optical contact, greater freedom from granularity could be obtained.

Mr. W. M. ASHMAN, like Mr. Barker, copied under glass. He always covered up the lens in front of the camera to prevent reflections.

Mr. SALMON said that Mr. Henderson had spoken of the use of a stick to ensure parallelism of the plate with the picture to be copied. He thought that a better plan was that of having the camera to run in a tramway.

Mr. A. COWAN said that the method he used in copying was to have a board or frame with a vertical stand at one end to which the original was affixed. The camera was made to slide to any required distance along the base-board, remaining parallel all the time, and a mask or screen with a central hole in front of the lens kept off reflections. A sheet of white card under the original was used to reflect light. The whole arrangement could be placed in any part of the studio so as to secure the best light.

Mr. DEBENHAM, in replying to the various speakers, remarked that many of the observations and suggestions made did not bear reference to the subject of the lecture, which was the avoidance of reflection and granularity in copying, and did not include mechanical contrivances for ensuring steadiness or parallelism. With reference to what Mr. Henderson had said, he would remark that the method of employing muslin, attributed to Mr. Hughes, for diffusing light and preventing granularity, was one which he (the lecturer) had described in effect as the plan with rods acting as prolongation of the camera, and surrounded by tissue paper. Instead of marking wall and camera stand to get the latter of proper height for the picture to be copied, he preferred to use the camera in its lowest position on the stand (in which position it was steadiest) and to mark the wall on a level with the lens. A series of measures on the wall, one, two, three inches, &c., up and down from this zero point, would ensure that a picture which was placed so that an equal number showed at its top and bottom, should be central on the camera screen, and no movement of the camera stand was required. The question of the shading of the original by a non-reflecting screen was one that had been treated in the lecture. The screen referred to by Mr. Cowan would be especially apt to shade the original if a short-focus lens were used for the purpose of enlarging; and as to the advantage of being able to place the whole copying arrangement in any light that might be found most desirable he had endeavoured to show what position in the studio was the best for copying. In reply to Mr. Burton he said that he used the particular lens referred to, as, in addition to its absence of definition, it happened to be of the length of focus required. Further discussion on the optical question would not belong to the subject in hand. As to the use of glass in front of the print referred to by Mr. Barker, there was an advantage in the way in which the squareness and flatness of the original were preserved. If, as was probable, the glass referred to was that of a pressure-frame (Mr. Barker signified his assent), there was also the advantage that the pressure might somewhat flatten the irregularities of the surface. The plan of copying a wet print laid against the glass he did not recommend, for the following reason. He thought that the whites of the paper were somewhat lowered and the faint details in the lighter half-tones a little lost.

The usual votes of thanks were accorded to the lecturer and the Chairman, and it was announced that, on the 8th of January, Mr. W. W. Cobb would discourse on the difficulties attending instantaneous photography in the streets of London.

THE PHOTOGRAPHIC SOCIETY OF IRELAND.

THE usual monthly meeting of this Society was held in the Royal College of Science, Stephen's Green, Dublin,—Mr. Thomas A. Bewley in the chair.

The minutes of the previous meeting having been read and confirmed, Mr. Frederick H. Campbell was elected a member. Messrs. Haslam, Sherlock, Ree, and Adency were proposed for membership, and will be balloted for at the January meeting.

The CHAIRMAN then called on Mr. Geo. Mansfield for his communication on *Paper Negatives.*

In the course of his paper Mr. MANSFIELD drew attention to the old method of producing negatives on paper and then waxing the material to render it translucent, and gave a most interesting account of his recent experiments with various gelatino-bromide papers, both on what is known as "negative" as well as "positive" papers. Those produced on the "positive" paper yielded in his hands the best results, while the "negative" paper gave the most trouble in obtaining semi-transparency on account of its extra thickness. He also handed round several excellent negatives, and proofs from the same, of 10×12 and whole-plate size, the difference between the prints and those of ordinary plates being hardly distinguishable.

In the debate which followed Mr. J. V. ROBINSON ventured to predict that the future basis on which all negative films would be held would be the material now brought under the notice of the meeting, the great advantage to be gained being the lessening of the weight to be carried by doing away with the glasses, which at the present stage of photography are indispensable.

Mr. Robinson also exhibited an interesting collection of very old waxed negatives which, for brilliancy and delicacy of detail, were hardly to be beaten even by gelatino-bromide plates or the still older collodion films.

Dr. SCOTT, who also has been experimenting in the same direction as Mr. Mansfield, detailed the results he had obtained, and passed round several negatives and prints—also an instantaneous view of Kingstown harbour—taken on gelatino-bromide paper, which was highly creditable as instancing the results that paper is capable of yielding.

Mr. Woodworth also exhibited a collection of paper negatives enlarged from quarter-plate transparencies, and some platinum prints from same.

The next meeting is intended to be held on January 9th, 1885.

MANCHESTER PHOTOGRAPHIC SOCIETY.

THE usual monthly meeting of this Society was held at the Manchester Technical Schools, on Thursday, the 11th instant,—Mr. John S. Pollitt, President, in the chair.

The minutes of the previous meeting were read and confirmed, and the following gentlemen were elected members of the Society:—Messrs. B. Ellston, F. Barker, J. Rogers, and C. Estcourt, F.C.S.

Mr. J. W. LEIGH read a short paper, and gave practical illustration of several methods of effecting the printing of skies, &c., in landscape pictures. Mr. Leigh explained that where, as was often the case, the sky portion of a landscape negative was defective the first thing to be done was to screen the sky portion during printing so as to get a print with a white sky. This he effected by taking a sheet of cardboard and tearing it so as to follow roughly the sky line. This was then attached to the printing-frame by pins, and the whole exposed to diffused light. The sky mask being given a slight curl upwards did away with any mark or line at the junction. The print was then taken out of the frame, laid on a large sheet of glass, and the cloud negative laid upon it, the right position being easily determined by looking through negative and print together. To mask the landscape portion of the picture, Mr. Leigh placed over it one or more pieces of cloth—such as the pads from the printing-frame—and rolled these back at the sky line in order to soften the edges, again exposing to diffused light till the clouds were sufficiently printed. Mr. Leigh also showed a simple plan he made use of when any part of a negative was much thinner than the rest, and would necessarily give an uneven print. He commenced the print in the usual way, and as soon as the thin part was done enough he masked that portion by attaching a tuft of cotton wool by means of gum, &c., to the back of the negative, pulling out the edges to get the necessary softness. At the conclusion of his paper, Mr. Leigh referred to a question in the question-box at the last meeting as to the quantity of hypo. necessary for a given number of prints, and, quoting from Captain Abney's book, called attention to the necessity for using the hypo. solution strong to ensure perfect fixation and the complete removal of the hypo. during the final washing.

Mr. RISHTON agreed with Mr. Leigh on the hypo. question, and remarked that it was desirable to have the fixing bath in an alkaline condition. He was in the habit of adding ammonia for this purpose.

Mr. ATHERTON said common washing soda answered the purpose equally well, and suggested three ounces of hypo. to the pint of water as about the correct amount for fixing one sheet of paper.

The CHAIRMAN said he had found the use of tepid water in the final washing a great advantage. Referring to Mr. Leigh's plan of masking with cotton wool, he had for some years made use of Prussian blue painted on the back of the negative, and softened by dabbing in the usual way. In the printing-frame he had also found it desirable to lay a sheet of thin cardboard next to the sensitive paper, and he found that by this method he obtained complete immunity from cockling of the print in damp weather.

Mr. CHILTON asked the Chairman if warm water for washing prints affected the surface and brilliancy of the prints.

The CHAIRMAN replied that if the water were used tepid he had never found any ill effects, but if the water were made hot the prints would certainly suffer.

Mr. GREATOREX asked for information as to the best method of masking a sky in which there was a church steeple, tower, &c.

Mr. LEIGH said he should block the sky out with black varnish or other medium.

Mr. M'KELLEN recommended taking a print, cutting out the image of the steeple, &c., and laying the mask so formed on the negative with the smallest quantity of paste.

Mr. ALAN GARNETT showed two very charming prints on alpha paper, which were much admired. He also exhibited an ingenious contrivance for the gas jet in an amateur's dark room, by which the gas could be turned apparently out, and on turning the tap up again the flame at the burner was rekindled by the small spark kept in, it being concealed by a metal cup round the jet.

The HON. SECRETARY (Mr. W. J. Chadwick) exhibited a simple contrivance which he made use of when mounting prints on plain boards, remarking that he had frequently seen amateurs fail in getting the print in the centre of the mount or square with it. His plan consisted in using a guide or mask made from one of the mounts in use, in the centre of which an opening was cut one-eighth of an inch each way larger than the print to be mounted. This mask was laid on the mounting board and attached thereto by a pair of American clips. The print coated with the mounting medium was then placed in the opening of the mask, which latter being removed the print was rubbed down on its board, when its central position could be relied upon.

The members now adjourned to the basement of the building, and inspected a magnificent collection of large photographs of the Yosemite Valley, California, exhibited by Mr. Charles Harris, F.R.G.S., and collected by him during his tour round the world. He (Mr. Harris) spent several weeks in the Yosemite district, and while there made the acquaintance of the celebrated photographer, Mr. Watkins. Aided by a number of lantern slides exhibited on the screen, he gave a most interesting recital of his experiences and a graphic description of the magnificent scenery of this remarkable valley.

The CHAIRMAN, in thanking Messrs. Leigh and Harris for their interesting contributions to the meeting, hoped that their example would stimulate other members to bring before the meetings any subjects of interest.

Mr. LEIGH remarked that he always found the effort to impart help or instruction to his fellow-members, in addition to being a pleasure to him, resulted in extending his own knowledge of the subject, and he was glad to say that he had learnt a lesson from the Chairman's remarks that evening which would be of value to him in his own work.

Mr. HARRIS, in responding, said that it would afford him pleasure at some future meeting to give the members a further account of his travels in other parts of the world.

The meeting was then adjourned to the 8th January, 1885.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

THE above Association held a popular meeting in the Christian Institute, on Wednesday evening, the 10th instant,—Mr. John Urie in the chair.

A very fine series of transparencies were shown by Messrs. Geo. Mason and Co., which were much appreciated by a large audience.

A vote of thanks to the lecturer, Mr. Geo. Bell, brought the meeting to a close.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.

THE ordinary meeting of the above Association was held on Tuesday, the 9th inst., in the College of Physical Science, Newcastle, at half-past seven o'clock p.m.,—Mr. P. M. Laws in the chair. The minutes were read and passed.

The CHAIRMAN announced that the Council had decided to join with the Tyneside Student's Association and three or four other societies in a *conversazione* to be held on the 8th January, and asked members to contribute pictures.

Mr. H. G. TEMPLETON, of Gateshead, read a paper on *The Platinotype Process*, and gave a very successful practical demonstration.

At its conclusion Mr. Templeton was awarded a hearty vote of thanks.

Mr. LAWS gave notice of a motion to alter Rule 14.

The nominations for President, Vice-Presidents, Officers, and Council for next year were proceeded with.

On the request of Mr. Pae,

Mr. PROCTOR gave some interesting details of the method he had adopted in taking his "view without a lens," shown at the Society's recent exhibition. The pictures, taken late in October, had fifteen minutes' exposure, the distance between the plate and aperture being about twelve inches.

A vote of thanks to the Chairman concluded the meeting.

CHELTENHAM PHOTOGRAPHIC SOCIETY.

A MEETING of this Society (until recently known as the Cheltenham Amateur Photographic Society) was held on Thursday, the 11th instant,—Colonel Dawson, C.B., in the chair. The following gentlemen were elected members of the Society:—Messrs. White, R. Dighton, W. L. Ferguson, and Joyner.

Mr. BAYNHAM JONES, exhibited one of McKellen's new patent cameras, half-plate size, square, with reversing frame. This camera possesses many distinctive features, and appeared to give general satisfaction to the members present. The rapidity with which it could be erected and closed, and the simplicity with which both front and back could be set at any desired angle, as well as the perfect rigidity of the camera in any position, called forth expressions of high praise. The stand, folding in three parts, and affixed in a very simple way to a rotating disc let into the base of the camera, appeared in every way suitable for its work.

The CHAIRMAN then read a short account of a potash and soda developer used by himself for some time with great success, his formula being—

Carbonate of potash (London pharm.)	480 grains,
Washing soda	480 ,,
Potass. bromide	20 ,,
Dissolved in water to make	20 ounces.

This solution contains three grains of each alkali in every drachm. In each ounce of developer one drachm of the above is used with two grains of pyro.

Prints were exhibited by several members, those of Mr. Beetham from negatives taken in the neighbourhood of Torquay, being very much admired.

Some transparencies on Fry's special lantern slide-plates were also shown, and the meeting was adjourned.

COVENTRY AND MIDLAND PHOTOGRAPHIC SOCIETY.

THE annual meeting of the above Society was held at the residence of the Hon. Secretary, Hill House, Hill-street, Coventry, on December 4th, 1884,—the President in the chair.

The minutes of the previous meeting having been read, the officers were elected as follows:—*President:* Mr. Andrews.—*Vice-Presidents:* Messrs. Danks, Ambrose, Seymour, and Jones.—*Treasurer:* Mr. Danks.—*Secretary:* Mr. J. I. Weatheritt.—*Auditors:* Messrs. Walker and Winstanley.—*Committee:* Messrs. Baynton, Lloyd, Walker, and Winstanley.

The Treasurer's account was then read, showing a balance in hand of £1 13s. 9d., against a loss of 9s. 7½d. last year.

The meeting then adjourned to a large room, where the lantern and screen had been set up for the exhibition of members' slides, as was arranged at last meeting. A blow-through jet made by the Hon. Secretary was used, the light from which was thought to be above the average of this form of burner. Mr. Ambrose showed some slides made on Hill Norris's dry plates, which were very good. Mr. Lloyd's slides on the gelatino-chloride plates made by Mr. T. Baynton (the formula for which was given at the last meeting), and developed with ferrous oxalate, were exceptionally good, one subject in particular being especially admired.

After an interesting discussion the meeting broke up at a late hour.

VIENNA PHOTOGRAPHIC SOCIETY.

THIS Society met for the first time for this season on the 7th October, when the chair was taken by Dr. E. Hornig, President. The minutes of the previous meeting having been approved, several new members were admitted.

The CHAIRMAN then intimated that the Society had lost three members by death since they last met before the autumn vacation. The memory of the deceased was honoured in the usual way.

Dr. EDER then rose, and spoke of the successful experiments made in Herr Löwy's studio with Professor Vogel's azaline plates, which showed great sensitiveness to green, yellow, and above all to red rays. Dr. Eder also showed photographs of oil paintings, water-colour drawings, and embroideries in colours, which he had taken—using an interposed sheet of yellow glass—upon gelatino-bromide of silver plates stained by himself. He (Dr. Eder) proposed that, as the name "isochromatic" had been adopted by the patentees of the French process, viz., Clayton and Tailfer, and since in optics the term "isochromatic" is used in a special sense not applicable to plates which represent the colours of objects in their true values, the latter should preferably be called "orthochromatic" plates. The photographs shown were taken upon bromide of silver emulsion prepared by Herr Plener and stained by Dr. Eder, and the exposures took place in Herr Löwy's studio as the former ones did. Of the many dyestuffs examined by Dr. Eder the following were found to be sensitisers for gelatino-bromide of silver emulsion, and most of them showed bands of increased sensitiveness to colour corresponding to the spectrum of absorption of dry gelatine stained with the same. Amongst them are sensitisers as far as the extreme red (for example, iodine green and acid green). These dyes are eosine blue and eosine yellow, erythrosin, pyrosin, aureosin, æthyleosin, methyleosin, phloxin, Bengal rose, cyanosin, muriatic aniline rose, acetic anilino rose, Coupier's toluidin red, solid green (bitter almond-oil green), brilliant green, acid green, iodine green, methyl green, picrate of methyl green, Aldehyde green, Hoffmann's violet, dahlia, methyl violet, Paris violet, benzyl-rose aniline violet, gentiana violet, resorcin blue, fluorescine, cyanide of iodine, cyanide of chlorine, nitrate of cyanogen, sulphate of cyanogen, Coupier's blue, coralline red, naphthaline red, acid violet, chlorophyll. Small—though often difficult to recognise—bands indicating sensitiveness to red are furnished, especially along with ammonia, by carthamine, turmeric, soluble Berlin blue and menophenyl-rose-aniline chloro-hydrate, and hämatoxyline (to the last of which Dr. Eder's attention was directed by Dr. Albert). Dr. Eder also showed an instantaneous photograph of a flash of lightning taken by Dr. Kayser, an instantaneous shutter by Herren Thury and Amey, Geneva, an academy camera by Messrs. Marion and Co., London, a travelling camera by Herr Wanaus, Vienna, and some samples by Herr Obernetter, Munich, of his new process of heliogravure in half-tones after pictures from nature. The half-tones were transferred with great delicacy to the copper plate.

Herr SCOLIK called attention to a collection of studies from nature by an amateur, Herr Hamsen, the negatives of which were developed by Scolik's modification of Monckhoven's developer. He also showed a collection of seascapes and views of shipping by an amateur, Herr Riemer, and street scenes by Herr Rupprecht.

The CHAIRMAN showed a number of artists' studies and photographs from celebrated masterpieces of sculpture (as the *Laocoon*).

A great variety of other objects were exhibited, and after some conversation the meeting was adjourned.

THE same Society met again on the 4th November,—Dr. E. Hornig in the chair. The minutes of the previous meeting were approved, and Baron Stillfried and Herr Konkoly were admitted as members.

The CHAIRMAN then acknowledged the receipt of fifty marks from the Danish Photographic Society, and of a second subscription from the Parisian Society towards the monument to Dr. Martin.

The members of the judging committee of the Voigtländer prize fund were appointed, and, after some minor matters had been dealt with,

Major VOLKMER gave a long and interesting lecture on the value and application of electrolysis to the graphic arts. The lecture was listened to with great interest and heartily applauded.

The SECRETARY then read an essay on artificial lighting for taking photographs.

Herr SCOLIK reported on his work with orthochromatic plates (azaline, cyanide, and eosin plates) and also his analysis of a commercial sensitisor.

The question-box on being opened was found to contain only one question, which related to a point of law affecting photographers and settled by a recent decision of a magistrate.

This concluded the business, and the meeting was adjourned.

BERLIN ASSOCIATION FOR THE CULTIVATION OF PHOTOGRAPHY.

THIS Association met on the 17th October, when the chair was occupied by the President, Professor H. W. Vogel. Two new members were admitted, one of whom, Herr Markl, a provincial member, sent his portrait—an example which the meeting expressed a wish to see followed by all future new members.

The CHAIRMAN laid on the table a specimen number of the *Electro-Technical Anzeiger*, the programme of the winter course of study at the Humboldt Academy, and the seventh number of Professor Eder's *Lehrbuch der Photographie*, being the number which deals with the wet collodion process, ferrotypie, and allied processes. He (the Chairman) remarked that, though gelatine was gradually pushing collodion out of the field, the latter was preferable to the former for copying oil paintings, &c.

A discussion of this question followed, in which Herren Quidde, Roloff, Haberlandt, and others took part.

Herr QUIDDE then called attention to Herr Fuhrmann's large collection of stereoscopic slides, mostly transparencies on glass, which are being exhibited at the Passage Kaiser Panorama. The pictures are arranged in sets of fifty, so that twenty-five persons at a time may see them, and about every half-minute they are automatically changed. The Swiss views are from Paris; the Scotch ones from G. W. Wilson, of Aberdeen. Herr Fuhrmann has as yet been unable to get good views of the Berlin streets, but Herr Quidde thinks he may now be able to obtain what he requires from Mr. Kilburn (of New Hampshire, U.S.A.), who has recently been "doing" Berlin.

Captain KISS showed a travelling apparatus. It is an apparatus for amateurs arranged for plates rather less than cabinet size. The camera was generally admired.

The CHAIRMAN then showed a number of photogravures by the Photographie Company, intended to be added to the permanent exhibition in the photographic section of the Technical High School at Charlottenburg.

The results of Professor Eder's experiments with orthochromatic plates were then discussed, but these need not be gone into here, as the same subject came up at a recent meeting of the Vienna Photographic Society on 7th October.

Herr SCOLIK, who has been experimenting with plates stained with azaline, found that he got a portrait representing the colours of the sitters' faces and dress in their true values, with an exposure of three times the length of the usual one. Some of the sitters were officers dressed in very bright uniforms.

The meeting was shortly afterwards adjourned.

Correspondence.

[*All communications for the* EDITORIAL *department of the Journal should be addressed to the "Editors, 2, York-street, Covent-garden, London, W.C."*]

THE CARBONATE OF SODA DEVELOPER.

To the EDITORS.

GENTLEMEN,—I was much surprised to read in the last issue of the Journal that Mr. Wainwright's experiments with the washing-soda developer resulted in "absolute failure." I have used it for years, commencing at the time when Mr. H. J. Newton recommended it as a developer for collodion emulsion plates. Ever since 1880 it has served me well with gelatine, and many of your readers will remember that I devoted an article to it in the ALMANAC for 1883, the formula then given being substantially the same as the one now advocated. Lately I have substituted for it the carbonate of potash *simply for convenience*, a solution of this salt taking up far less space. But I only use potash to develope negatives; for transparencies soda is *par excellence*. If it have any fault at all it will be found in the direction of density and harshness, both of which, however, may be obviated by employing a minimum of bromide. For this reason I have preferred to add the bromide with a dropping tube instead of introducing it into the stock solution. I can fully endorse all that Mr. Macdona has said concerning it, and, what is more, several who have adopted it on my recommendation can tell the same tale.—I am, yours, &c., B. HOLLAND.

Stanwick, Higham Ferrers, December 15, 1884.

To the EDITORS.

GENTLEMEN,—Perhaps Mr. W. Wainwright, Jun., has been using the soda developer with pyro., mixed with sulphite of soda or citric acid. If so, I think this may account for his failing to produce a transparency. I failed entirely upon first trying Mr. Macdona's recommendation, owing to the retarding effect of the pyro. thus mixed when used with washing soda; but upon using dry crystals of pyro. I produced immediately a most beautiful transparency.

Since then I have tried with plates—common commercial plates—by several makers, exposing both by contact and with the camera, and always with the same satisfactory result. If Mr. Wainwright will try with dry pyro. I feel certain he will succeed.—I am, yours, &c.,

Arley Parsonage, Northwich, December 17, 1884. HALCOTT ASH.

To the EDITORS.

GENTLEMEN,—If Mr. W. Wainwright, Jun., who complains of the soda developer being slow and not giving density, will try the following formula, using *no* bromide, he will be pleased with it:—

Sulphite of soda	1 ounce.
Citrate of soda	1 drachm.
Water	1 pint.

To one ounce of the above add two grains of pyro. *(dry)* and about a drachm of carbonate of soda solution (saturated).

This works very cleanly. Give a dip in the alum bath after fixing.—I am, yours, &c., G. V. J. POIRIN.

2, Eardley Villas, Eardley-road, Streatham, December 16, 1884.

To the EDITORS.

GENTLEMEN,—In reference to the letter of Mr. Wainwright regarding the carbonate of soda developer: after many trials I have come to the conclusion that this developer will not work unless the plate be made by some of the ammonia processes.

I usually prepare my own plates, boiling with carbonate of ammonia, and with such plates the soda developer works perfectly. Some time ago I tried a "batch" of simply-boiled emulsion, and although the plates worked very well with an ammonia developer they could not be developed by soda at all—at least not satisfactorily. I believe that this accounts for the differences of opinion as to the merits of the soda developer.

The quality of a "soda"-developed negative, both as to vigour and gradation, is so great an improvement on an "ammonia"-developed plate that, rather than go back to an "ammonia developer," should my plates refuse to work with "soda," I should have no hesitation in reversing the usual order of things, and in place of selecting a developer to suit my plates I should select a plate to suit my developer.—I am, yours, &c.,

Dundee, December 12, 1884. J. K. TULLOCH, M.B.

LANTERN TRANSPARENCIES AT THE RECENT EXHIBITION.

To the EDITORS.

GENTLEMEN,—I read with much interest the letters of Messrs. Brooks and Smith respecting the award of the medal for lantern slides at the Photographic Exhibition, and I waited with some little impatience for the official reply, by which it appears Mr. Gale's slides were in possession of the Secretary for exhibition. Now, although this is satisfactory to a certain extent, it is extremely unsatisfactory from another point of view. Whatever may be the object for which the Exhibition is held it is certainly looked upon by amateur photographers from the provinces as an exhibition of the best work produced during the year, and the medal pictures are by them eagerly scanned and criticised as the standard to which they have to attain It is also distinctly understood in connection with all other exhibitions that exhibits must be as the very word indicates—"on view;" and I hold that not only has a serious injustice been done to Mr. Gale by not exhibiting his slides, but that the visitors have been deprived of their right to examine them by the action of the executive in keeping them out of the catalogue and away from the other exhibits. That this was done I can personally vouch; for, taking as I do a great interest in lantern matters, on my visit to the Exhibition the lantern slides were most carefully examined by me. Having seen some of Mr. Gale's work on a previous occasion, I specially looked to see if he had any in the Exhibition, and, not seeing his name in the catalogue or his slides on the table, I naturally concluded he was not exhibiting; thus not only I but all other visitors were deprived of the opportunity of seeing wherein his slides were superior to those on exhibition. This view may appear to the Council of the Exhibition not worth considering, but I can assure them the Exhibition will soon loose its high position if medal pictures are to be kept in the possession of the Secretary, and not exhibited in the room.—I am, yours, &c., T. W. T.

December 16, 1884.

THE SOIRÉE OF THE ASSOCIATED SCIENTIFIC SOCIETIES OF LIVERPOOL.

To the EDITORS.

GENTLEMEN,—In the report of the Photographic Exhibition of the Liverpool Association at the recent *soirée* there is an accidental omission of the name of Mr. J. A. Forrest from the list of gentlemen who formed the hanging committee on that occasion. Mr. Forrest's co-operation was so valuable then as ever that I shall be glad if you will allow me to acknowledge it gratefully now.—I am, yours, &c., H. J. PALMER, *Hon Sec.*

December 17, 1884.

MERCURY INTENSIFIER.

To the EDITORS.

GENTLEMEN,—In answer to the request of "H. B. H." I send the formula required, and also a developer suitable to work with it:—

Intensifier.—Stock Solution A.

Bichloride of mercury	2 drachms.
Bromide of potassium	2 „
Water	5 ounces.

B.

Sulphite of soda, $1\frac{1}{2}$ ounce in 6 ounces of water.

In wide-necked bottles, used over again till exhausted and then strengthened. The negative must be soaked in water half an hour before intensifying; then flooded with A till sufficiently dense, next washed five minutes and placed in B till the negative is blackened through and becomes transparent in the shadows. Afterwards soak half-an hour, and then dry.

Developer for quarter-plate.

A. Sulphite of soda, thirty grains in half-an-ounce of water.
B. Pyro. (dry), three grains.
C. Washing soda, thirty grains in half-an-ounce of water.

Stock solutions of A and C can be made in quantity for use. Place A in a measure; add B, and immediately before developing add C. No restrainer is required. If preferred add one-quarter of a grain of bromide of potassium. The negative will appear as an over-exposed one, but will gradually grow to full density if the exposure have been correct.

I am of opinion that the negative ought to be left short of full density and afterwards intensified, as a better print is obtained by so doing.—I yours, &c., J. C.

December 13, 1884.

PHOTOGRAPHIC NOMENCLATURE.

To the EDITORS.

GENTLEMEN,—I have just taken up the *Journal* and *Transactions* of the Photographic Society of Great Britain for November 28. In the report of the meeting of Tuesday, 22nd July, I find the following:—"Mr. ——— remarked that lately he had been experimenting with bromide added to excess, and although it prolonged," &c. The remark is made in connection with alkaline development. Were this an isolated case of the misuse of the word "excess" I should not think it worth while to trouble you or your readers in the matter, but I find the same mistake occurring continually, and often in works laying claim to great scientific precision.

The terms "in excess," "to excess," "excess of," when used in connection with chemistry or chemicals, as I understand them, always refer to a chemical combination, and indicate that of the two substances which go to make up the combination there is more of the one than will combine with the other to form the compound—the quantity which is over remaining in its original form and being "excess." The substance of which there was, to begin with, an unnecessarily large quantity to exactly combine with the other was "in excess." It did not, however, follow that there was more of it than of the other substance. In an emulsion made with one part of ammonium-chloride and three parts of silver nitrate there would be excess of the former chemical. It is, however, absurd to talk of "excess" of bromide or bromide used "to excess" in the alkaline developer when we do not know the function or the manner of action of the bromide at all, and may only be pretty sure that it makes no chemical combination with anything either in the developer or in the plate. In the particular case alluded to it would have been incorrect even to talk of an *excessive quantity* of bromide, since the results apparently showed not that an excessive quantity had been employed, but that just the right quantity had been used. All that was meant was that there was a large—or an unusually large—quantity of bromide in the developer.

Such, gentlemen, is my protest against the use of a word which has a most precise scientific meaning, but which is continually misused.—I am, yours, &c., W. K. Burton.

Notes and Queries.

E. C. wishes to know how to account for the periodical emptying of his water tank. He starts work with his tank full, yet sometimes, although he feels sure he cannot have drawn off one-half the water it contains, he suddenly finds it empty—a *contretemps* which, of course, usually happens at an awkward time, such, for instance, as when the pipes are empty. This nuisance he is occasionally subjected to through a neighbour having an engine supplied from the same branch, which passes up a private court. He further states that the noise produced when the water ran dry through this cause, combined with the splashing noise of the tank in refilling, was so irritating that he could only get rid of it by attaching a piece of rubber tube to the exit pipe of the ball-cock, so that the water was led to the bottom, and, having no fall, produced no noise.——In reply: we may inform E. C. that this remedy against the noise is doubtless the cause of the water running dry in his tank. The pipes are full, we will say, at a certain moment and his neighbour begins to draw water, thus relieving the pressure; the pipes to his tank begin to empty themselves, and, acting as a syphon, draw off all the water stored in his tank—a method which, though useful to his neighbour in assisting to feed his boiler more quickly, is naturally annoying to E. C. If, therefore, he remove the india-rubber tube, the stored water cannot be drawn off again, and if he place a sloping board for the water to drop upon he will avoid the irritating noise of its splashing. We can only suggest as a remedy against the other noise complained of that he obtain a new water service direct from the main.

"Can you inform me what to do under the following circumstances? Determined to collect my hypo. residues, I gradually filled two petroleum-oil casks, and then placed in each of them half-a-pound of sulphide of potassium which I had already purchased for the purpose. After stirring well up I allowed the precipitate to settle, and, after pouring the liquid away, collected the deposit, dried it, and sent it to the refiners. They refuse to allow me anything for it, stating that it does not contain more than a trace of silver.—Anxious."——In reply: if you had preserved a small quantity of your precipitate it would have been an easy matter to make an assay of it; but, seeing that this is now impossible, we may say we are strongly of opinion that the refiner must be right, for it is extremely unlikely that any attempt at a fraud like this would be made by anyone in the trade. We should explain the loss by supposing that the sulphide of potassium was completely decomposed, and that it had entirely lost its precipitating powers. The freshly-made salt should, when broken in pieces, show a rich, liver-coloured fracture contrasting strongly with the opaque, dirty-yellow appearance which quickly forms upon the cake when exposed to air. The sulphide, after keeping, gradually decomposes from the outer surface inwards, till, at last, its whole composition is altered, and the changed mass rendered unable to thrown down silver at all. It was probably this almost insoluble product, mixed with dust and dirt fallen into the vats, which you sent to the refiner. If so, you need not wonder at his declining to allow you anything for it.

W. J. (Camberwell) disputes the correctness of our advice about "lights" in a late issue, and he calls our attention to a contrary view given in a quotation from a well-known popular book on the law between landlord and tenant, which we may here repeat:—"If an occupier alters ancient windows, or constructs new ones, in such a way as to vary his prescriptive right to the prejudice of his neighbour, and such neighbour from the position of circumstances cannot obstruct or stop up such altered or new windows without indirectly infringing upon other prescriptive rights which have not been altered or varied, then such latter unaltered rights may become legally impaired or extinguished in the lawful effort to extinguish the altered ones." A further illustrative paragraph shows that these "other" rights may refer to windows.——We would, in reply, say that our advice was not given to initiate a controversy on the matter, and we should recommend anyone having any such contention in hand to take no important action in reference to it without legal advice. "The man who is his own lawyer has a fool for his client." At the same time, we recommend our correspondent to look to the date of the work from which he quotes. We admit his quotation represents the rulings once in vogue; but modern cases have established a positive precedent entirely to the contrary of the law quoted, and quite in keeping with our advice, which was founded upon them. These latter rulings have been on the presumption that a man does no wrong in putting windows in his walls, and that, therefore, he cannot be punished for that which is not a crime.

"A photographer of my acquaintance, who I have reasons for knowing makes use entirely of "pyro." in his development, never has his negatives of such a yellow colour as my own. Can you tell me the cause? It is not any treatment after fixing, for I have seen him take them out of the fixing bath, and they have just that beautiful clean appearance which oxalate of iron gives.—M. E. W."——In reply: the mode of attaining such results is simple enough, and has been described by us in these pages more than once. It consists simply in putting the prints in acidulated water before fixing, the precaution to wash well after this bath and before fixing being necessary. It is also advisable to add alum to the acidulated water to prevent the frilling tendency which otherwise might be induced with some makes of plates. The following formula has been communicated to us as that in constant employment by a well-known photographer:—

Citric acid	½ ounce.
Chrome alum	1 "
Water	1 gallon.

The plates are placed in this mixture directly after developing without more washing than a mere rinse, the acid neutralising what little ammonia is present, and so arresting development at the same time that it prevents the formation of the yellow stain, or destroys it when already produced.

A Country Photo. writes that an enlargement he has just received from the artist, who finished it in monochrome, has got injured in transit. By some means oil or other greasy matter has come in contact with it. He says the grease has penetrated the mount as well as the picture, and asks if there be any means by which it can be removed; also, whether he is entitled to any compensation from the railway company.——In reply to the first query: the only method we know by which the grease can be removed is by treating the soiled part with benzole. If the benzole be applied lavishly, and after soaking for a short time be blotted off with clean blotting paper, then a fresh quantity applied and again blotted off, we have no doubt the grease will be extracted without injury to the picture. At least, we have successfully removed oil from a coloured photograph in this manner, so that it could not be detected. With regard to the second query: the injury should have been pointed out when the railway company delivered the picture and a claim made at once, which we imagine could be sustained if the picture had been carefully packed, and labelled as a picture to be treated "with care."

W. wishes to know what light is best for photographing open landscapes.——The best negatives are not usually obtained in strong sunlight, but when there are clouds about. Hence the best pictures are likely to be obtained only by watching and waiting sometimes even for a fortnight, perhaps, which fact gives the tourist an advantage over photographers more pressed for time. Mr. M. Carey Lea long since pointed out that a very good negative is always valuable, whilst one of average character is not so, whether it be required for exchange or any other purpose. Therefore, the best principle to be adopted by those who can spare the time is to take a few super-excellent negatives rather than many of but average quality. England is especially favoured with a general run of fine cloud scenery, in which perhaps it is surpassed by no other country. In drier climates fine scenery in the mountains is often photographically spoilt for a week or two by lack of clouds, when first-class results are desired. The best alternative, if the operator cannot wait, is to take the view when the sun is low.

A "Country Cousin" wishes to know if we can inform him how to get tones of great richness such as he has lately seen in a number of photographs, the deep shadows being so much richer than he obtains, though professional photographers have told him his negatives are of first-rate printing quality. "The prints look as though they were varnished," he says.——Our correspondent evidently has not had much experience, or he would be aware that the effect he describes is owing to the prints having been passed through a "burnisher" [see our advertising columns] made hot before use. The effect is to give a polish or gloss (which we dislike very much) and to alter the tone to a redder hue, at the same time materially adding to the richness and transparency of the shadows.

R. S. is troubled about the continual marking of his *cartes* in the post by the stamping violence, and wishes to know a remedy.——This is an everyday experience, and surely it must have occurred to him that it could be remedied by efficient packing. Perhaps the simplest mode of doing this is to enclose the *carte* between two plain cards before placing it in the envelope. Any professional friend would show him the method he employs, and very likely be willing to sell him a few of his own book-post card wrappers, which are made in immense quantities for the purpose.

Exchange Column.

I will exchange a 10 × 10 double swing-back mahogany camera, one dark slide and rackwork for focussing, by Ross; seven and a-half-inch burnisher, French; two half-plate bellows cameras, two dark slides to each, and focussing glass; two 10 × 8 glass baths, in deal cases; two whole-plate glass baths; stereo. glass bath, in mahogany air-tight case; pedestal, four different sides; patent lever open-faced, gold-plated watch, jewelled in thirteen holes; silver hunting watch; silver watch, open face. Wanted, mansion house set, backgrounds, boat, rocks, or anything useful in photography.—Address, G. S., 4, Bernard-street, Southampton.

I will exchange The British Journal of Photography for the years 1881-82-83-84, all in good and clean condition, unbound, for a half- or whole-plate light tourist's camera of modern make, with dark slides;

difference in cash, or a good gem camera and four splendid lenses, to take four, eight, or twelve on a quarter-plate.—Address, PHOTO. ARTIST, Callington, Cornwall.

I will exchange a Lancaster's quarter-plate instantograph, quite new, for any useful studio accessory to value.—Address, PHOTOGRAPHER, 19, Beckenham-road, Penge.

I will exchange 100 carbon slides and sixty Woodbury slides for Ross' rapid symmetrical lens, $8\frac{1}{2} \times 6\frac{1}{2}$, or offers.—Address, J. MALINS, Crosswood, Aberystwyth.

Wanted, the *Photographic News* for 1882 and 1883, clean and perfect. Good exchange offered.—Address, J. H., 365, Lodge-road, Hockley, Birmingham.

Wanted, a half-plate bellows camera with double backs. Will exchange a good dark room on wheels.—Address, PHOTOGRAPHER, Withernsea, near Hull.

I will exchange a folding retouching-desk for a fourteen-inch Gladstone bag; would give a little cash if good.—Address, W. H. H., 180, Villiers-road, Willesden Green, London.

I will exchange model vertical engine, will drive sewing machine or small lathe, for good whole-plate view lens. Particulars sent.—Address, W. HUDSON, Ripon street, Preston, Lancashire.

I will exchange a new bellows-body camera, eleven inches square by two feet six inches long (no fitting), for a 15×12 glass bath.—Address, GEO. ATKINSON, 40, Cambrian-view, Chester.

I will exchange an autograph letter of H.R.H. The Prince of Wales, and Edward's combination printing-frames, ditto for printing opals, for a camera and burnisher; difference in cash.—Address, HERBERT SEELY, 108, Albany-road, Old Kent-road, London.

I have twelve ounces of re-crystallised nitrate of silver, also a four-lens gem camera, takes twelve on a quarter-plate. What offers in exchange? 5×4 or half-plate group or view lens wanted, good maker.—Address, PHOTO., 21, Bartholomew-street, Exeter.

I will exchange the full numbers of THE BRITISH JOURNAL OF PHOTOGRAPHY for 1883 and 1884, up to the present, December 5th, for a double dry-plate slide, $6\frac{1}{2} \times 4\frac{3}{4}$, or anything useful in photography.—Address, W. JONES, 272, Uxbridge-street, Burton-on-Trent, Staffordshire.

I will exchange, for anything useful, three backgrounds, quarter-plate repeating-back camera and lens, two whole-plate lenses by Lerebours, an orthographic lens by Ross, rolling press, plate 21 inches × 15 inches, and burnisher, 10-inch roller.—Address, FRIESE GREENE, 34, Gay-st., Bath.

I will exchange THE BRITISH JOURNAL PHOTOGRAPHIC ALMANACS and *The Year-Book of Photography*, in 10 vols., cloth, for the last 15 years, for lantern slides and electrical apparatus.—Address, E. FIELD, 16, Hills-road, Cambridge.

I will exchange an instantaneous shutter and changing-box, to carry twenty-four half-plates, also a large dark room, fitted with shelves, sink, and tap, in perfect working order, suitable for a gentleman, for anything useful.—Address, C. GRAYSON, Naylor's-yard, Iregate, Bradford, Yorks.

I will exchange an eight-feet gas bag, twenty-feet screen, pressure-board (nearly new), various slides, chromotropes, &c., for Ross's portable symmetrical lens, any size. Difference, if any, adjusted.—Address, J. H., 10, Victoria-road, Penrith, Cumberland.

For exchange, Seavey's boat; cameo press for cabinets and *cartes*, by Marion, cost £5 5s.; three patent spring blind rollers for studio, cost £1 5s. each; *carte* rolling press; large square, rigid camera, by Meagher, for plates 20×24 and under, cost £13. Wanted, portable dry-plate camera by a good maker, with two or more dark slides, for plates 10×12 and under; also, effect and other slides for lantern.—Address, E. GRANT, Swindon, Wilts.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

NOTICE.—*Each Correspondent is required to enclose his name and address, although not necessarily for publication. Communications may, when thought desirable, appear under a* NOM DE PLUME *as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.*

J. F. RUNCIMAN.—The index when issued will indicate the article referring to the subject. It is now in the hands of the printer.

S. not having complied with our rule by sending name and address, of course his query is unanswered.

PERPLEXED.—Dab the silver plate over with a piece of glazier's putty. This will dull the surface and prevent reflections.

J. W. H.—1. Any fancy boxmaker will make them to your order.—2. Apply to Messrs. Sands and Hunter.—3. No.

THE correspondent who inquires about grooved paper boxes, and whose signature we cannot decipher, had better apply to Mr. E. J. Edwards.

A. B. We regret we are unable to give you the desired information. The only source from which you can obtain it, we imagine, will be from some manufacturer of gelatine. Better write to Messrs. Nelson, Dale and Co.

KING LUD.—You have proceeded wrongly. The salts should be dissolved separately in water, and mixed at the time of using. The solution will not keep after mixing.

A. H. S.—You will find what you require by referring to some of the old volumes of the Journal. We cannot spare space to describe an obsolete process in which our readers take no interest whatever.

CAMBRIAN.—No. 4 will be the most useful lens to you, as, with a small stop, you can very possibly utilise it as a wide-angle lens on the larger size plate.

TINTO.—The best work on the subject is Wake's *Photographic Colouring*, but it is now out of print. The "flash" is caused by light gaining access to the plate—probably through some defect in the dark slide in the camera.

A. J. GRIFFITHS.—1. Mr. G. F. Williams, 36, St. Martin's-lane, W.C.—2. Yes.—3. The paper is not usually cemented to the glass.—4. Yes. The gentleman named will supply the right kind.—5. We believe not at present.

AN ASPIRANT.—Unless any of the processes are protected by a patent you can, of course, work them without hindrance. If you let us know which particular one you wish to employ we will inform you if it be patented. Very few of the processes are protected by patent.

ANGLER.—No. 2 on your list will include a much larger angle than the lens you now have, but No. 1 will include a larger still. We fear No. 3 will not cover the size of plate you require with sufficiently-even illumination. There is no satisfactory method of reducing the intensity of mercury-intensified negatives.

A. H. S.—If you dilute the strong liquor ammonia ·880 with an equal bulk of water as soon as you obtain it, the strength of the diluted solution, if kept with ordinary care, will for all practical purposes remain constant. If you do this you need not go to the trouble of chemically testing the strength of the ammonia every time before using, as you propose.

G. W. AUSTEN.—There has been such a process described, but for the moment we cannot recollect the working details. The carbon process is largely utilised for the purpose. You will find full working details of zinc-etching processes in the articles on photo-mechanical printing which appeared in our volumes for 1878-9.

R. S.—Treat the suspected sulphite of soda with chloride of barium, which will throw down a precipitate of sulphite of barium. This is soluble in either hydrochloric or nitric acid, while the sulphate is not. Consequently if the whole of the precipitate is not dissolved by the acid, you may know that the sulphite of soda contains sulphate. All sulphite of soda is liable to decomposition by keeping.

CHRISTMAS DAY.

NOTICE.—THE BRITISH JOURNAL OF PHOTOGRAPHY for the week ending December 26th will be published at nine o'clock a.m. on WEDNESDAY next, the 24th December. Advertisements intended for insertion in that issue should therefore reach the Office by MONDAY EVENING next, the 22nd December. Small Advertisements will be received up to Nine o'clock on Tuesday Morning next, the 23rd December. Orders for Advertisements of the same class, addressed to the "Printing Department," 32, Castle Street, Liverpool, will be received up to Two o'clock p.m. on Tuesday next, the 23rd December.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—The next monthly technical meeting of this Society will take place on Tuesday next, December 23rd, at 8 p.m., at 5A, Pall Mall East.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. STEWARD, Optician,
For two Weeks ending December 17, 1884.
THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

Dec.	Barometer.	Wind.	Dry Bulb.	Wet Bulb	Max. Solar Rad.	Max Shade Tem.	Min. Tem.	Remarks.
4	29·24	W	50	48	—	51	44	Raining.
5	29·78	W	41	39	—	54	39	Bright & Clear.
6	29·71	W	54	52	—	55	40	Raining.
8	29·81	W	50	49	—	51	49	Overcast.
9	29·95	SW	42	41	—	43	41	Raining.
10	30·15	W	43	41	—	47	35	Bright & Clear.
11	29·65	W	49	46	—	52	41	Cloudy.
12	30·14	W	46	43	—	53	43	Overcast.
13	30·18	W	53	50	—	56	43	Overcast.
15	29·78	W	49	47	—	50	41	Overcast.
16	30·07	W	35	34	—	45	33	Hazy.
17	29·60	W	40	39	—		34	Cloudy.

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1286. Vol. XXXI.—DECEMBER 26, 1884.

THE PAST YEAR.

Once more it becomes our duty to record the events of the passing year, and once again we feel the difficulty of the task. Not that there is nothing to record, for there is a plethora of matter; but simply or chiefly because there is difficulty in laying emphasis on any particular items of novelty with which the year 1885 can be identified.

The chief portion of the really practical work of the year has been of course devoted to dry-plate work, but scarcely in the same direction or to the same extent as in the past few years. The important discussion of the question of lighting the developing room has attracted a considerable amount of attention, and Mr. W. E. Debenham's recommendation to substitute a combination of green and yellow for the previously-employed ruby media has found favour in many quarters. At the same time a pure yellow light is perferred by many, and the real fact seems now to be that any light may be employed, if it be employed with sense.

Another point in connection with dry plates that has received its full share of attention during the year is the substitution of one or other of the fixed alkalies for ammonia, in conjunction with pyrogallol, in development. This is a matter important not only from the point of view of convenience and excellence of result, but also as a matter of hygiene. The constant respiration of the fumes of ammonia—however dilute—has been shown to exercise a more or less injurious action upon the system, the extent and the character of the injury being dependent on the constitution. Anything, therefore, that tends to the suppression of this evil, without necessarily involving any falling-off in the quality of work done, must be hailed by all photographers as a step in advance. At present there appears to be a growing feeling in favour of soda and potash as the adjuncts to pyro., but we are not alone in the opinion that ammonia is still able to hold its own.

One other branch of negative work with gelatine plates to which much attention has been given during the last year or two, but more especially during the last few months, has been the colouration of the film with the view of rendering it more sensitive to certain of the less refrangible rays of the spectrum, and so enabling the photographer to render in monochrome the various colours of nature in their due gradations as seen by the eye. The late Dr. Draper, some thirty and forty years ago, was the first to call attention to the fact that certain sensitive films which absorbed particular rays of the spectrum were proportionately more sensitive to those rays than to others. Since Dr. Draper's observations the matter has been taken up by others, and Dr. H. W. Vogel, some twelve or fourteen years ago, showed that collodion films stained with various dyes became sensitive to the colours which the stained films absorbed. Mr. M. Carey Lea and Major—then Captain—Waterhouse took up the same line of investigation, the latter being the first, we believe, to recommend eosine for the purpose. But from collodion films, for various reasons, no very profitable results were attained, and it remained for MM. Attout-Tailfer and Clayton, of Paris, to revive with success the old idea in connection with gelatine plates. Since the introduction of their "isochromatic plates" Dr. Vogel and others in Germany have experimented with stained films, and it is now beyond question that for special purposes, particularly for copying oil paintings, the coloured films are invaluable.

Gelatine emulsion also promises to play an important part in the future of printing. It is now two or three years since gelatino-bromide paper took a hold on the public, chiefly for enlarging purposes; but just within the last months of the year it has become possible to use a similar paper for even the smallest work, the exposure extending to seconds only by artificial light, while the tones obtained will rival albumenised paper in variety and in quality. There is little doubt that this process will be greatly developed during the coming year.

In connection with other printing methods there is little alteration to record. Silver, despite its numerous detractors, still holds its own. Carbon in its various forms remains in the hands of the few; and platinotype, with the exception of the production of some new tones, is scarcely in a different position from that occupied by it last year. Photo-engraving has, however, been brought to a higher degree of perfection than before—not merely in line work and reproductions, but in the rendering also of the most delicate gradations of a photograph from nature. It is to be regretted, however, that the process by which the particular specimens we have in view were produced is a secret one, and as such not likely to forward photography to any extent.

In photolithography and kindred methods there has been great activity, and it is scarcely going beyond the bounds of truth if we venture to say that there is not an illustrated paper or publication in the country which does not now utilise photography in some manner.

The hand of death has fallen heavily upon us during the year, and several well-known names and faces have disappeared from amongst us. Mr. J. H. Dallmeyer, the famous optician, whose death was reported early in January, was the first on the list, followed with painful rapidity by the announcements of the deaths of the Rev. F. F. Statham—for five and twenty years President of the South London Photographic Society—of Mr. H. Baden Pritchard and Mr. Jabez Hughes, both old and well-known representatives of English photography. In America, too, there have been several losses amongst them—Dr. J. J. Woodward, whose work in connection with photomicrography has gained him a world-wide reputation; Mr. F. A. Wenderoth, of Philadelphia, one of the leading portrait photographers in the United States; and, finally, Mr. Henry T. Anthony, of the firm of E. and H. T. Anthony. Mr. John Hubbard's death brings up particularly sad thoughts of the uncertainty of life, for he was an exhibitor at the last Exhibition of the Photographic Society, and was awarded a medal for his clever composition picture, *Mother's Love*, but did not live to receive it from the hands of the President. Other less familiar forms will be seen no more in the ranks of practical photography, and as we write these lines the grave has scarcely closed over the remains of Mr. Henry Greenwood—the printer and publisher of this Journal since its commencement, and its proprietor for nearly thirty years. After a personal intercourse of over twenty years it is needless to say that we feel the loss keenly, and it is with more than ordinary sadness we close the present volume.

In consequence of the lamented decease of Mr. Greenwood, certain changes in the conduct of the Journal are absolutely necessary, and will be commenced with the New Year. It is impossible, and indeed unnecessary, to specify them in detail, but it may be stated that the printing office will be removed from Liverpool, and in future The British Journal of Photography will be printed as well as published in London.

THE DIRECTION OF THE WIND AND ACTINISM.

Does the direction of the wind influence the exposure in the camera? If so, from what quarter does the highest actinic effect occur? In the early days of photography—even so far back as the time of the Daguerreotype process—it was considered that when the wind blew from certain directions there was always an increase in the actinic power of the light, and when it came from other quarters the reverse occurred. In some of the earlier works on photography it is mentioned that, if the wind be in the east, a much longer exposure is always necessary. Not only was this asserted, but some writers have given a theory why this should be the case. However, it is not with the theoretical part of the question it is our intention to deal in this article, but to treat the subject from an entirely practical point of view.

There can be no question that, in the neighbourhood of large towns at least, the direction of the wind may, under certain conditions, very materially affect the quality of the light. This topic, it may be mentioned, is no new one, as it has before been dealt with in our columns; yet, evidently, it is one that is not thoroughly understood by many.

We were forcibly reminded of this fact quite recently, when at the close of a meeting of one of the photographic societies the conversation of a number of photographers turned upon this subject. One gentleman remarked that with a south wind his exposures were always longer than with a north, while another asserted that with an east wind his exposures, as a rule, had to be at least fifty per cent. longer than when it was west, however good the light might appear to the eye. This gentleman also said that not only did the east wind increase the exposure in the camera, but the printing operations were correspondingly retarded. Others present gave their experiences also, which differed very materially from those already mentioned, but no one offered any explanation as to the actual cause of this discrepancy. It may at once be mentioned that the gentlemen who gave such diverse opinions resided in different parts of the metropolis.

After a little consideration it will be easy to conceive why a photographer located (say) in a northern suburb of London will find a material diminution in the actinic value of the light when a gentle breeze is blowing from the south, simply because the wind wafts the fog and smoke from the town in that direction. When the wind is in the north it, of course, blows from the country, and if by chance the atmosphere be at all foggy the fog or vapour partakes of the character of a light mist, which in some instances enhances the active quality of the light rather than otherwise.

The fog or vapour constantly present, more or less, in all large towns where coal is the staple article for fuel, particularly during the winter months, is always of a highly non-actinic character. As an example of the total absence of actinism in a London fog, we have known instances of prints being exposed for an entire day in the open air without the slightest outline of the negative being impressed on the paper—a fact that can hardly be realized by our continental friends. Although such a fog may cut off the whole of the actinic action of the light, it frequently happens that it is comparatively only a thin layer, sometimes not extending to the top of moderately-high buildings. It is no very unusual circumstance for persons, out of curiosity, to ascend to the top of St. Paul's Cathedral during a London fog, for the express purpose of looking down upon it, while the sun is to be seen brightly shining overhead.

Some curious phenomena are frequently observed during a dense fog, which will illustrate how this yellow-brown vapour, when once formed, holds together and may be blown about in a comparatively compact mass. On one occasion we happened to be in the city and witnessed one of those dense, yellow, smoky fogs approach slowly up the street, almost like a wall. At one end of the street for a short time the sun could be seen shining brilliantly, while the other end was in a dense fog. In a few minutes the whole thoroughfare was enveloped in darkness, which for a time was sufficient to put a stop to all vehicular traffic. This fog did not remain long, and it cleared off nearly as suddenly as it made its appearance. Now, when a fog of this description is dispersed by the wind it, of course, becomes attenuated, and its highly non-actinic character is, so to speak, diluted, but it is not destroyed.

In the presence of a brisk wind fogs are never formed, as the smoky or other vapour is carried away and becomes diffused. Still in whatever direction it may be carried it is generally sufficient when the wind is slight to materially affect the actinic power of the light, although this may not be manifest to the eye. Hence it is in the vicinity of large towns that one photographer may find the wind from a given quarter to retard the chemical action of the light, while another, on the contrary, will find it considerably accelerated. The same will necessarily follow from every point of the compass from which the wind may come according to the location of the studio. This brings us to the practical part of the question.

It is very clear that in the neighbourhood of large cities a material advantage may be gained by judiciously selecting a situation for working. Unfortunately the most suitable locality for the studio in the case of portraiture has to be considered from a commercial point of view alone, namely, where the best business can be commanded. Not so, however, with establishments which confine their operations more particularly to copying and enlarging, or such like work. These are usually situated in the suburbs, in order to be as much as possible free from the town fogs and haze; so also are the printing establishments of most of the leading London portrait photographers. In these cases the selection of a locality is less restricted.

The preponderance of wind during the maximum period of late years appears to be from south through west to north-west. Hence, a south, west, or north-western suburb would appear to be the best to select, in order to secure a position where the prevailing wind for the greatest period in the year blows from the open country instead of from the town. We know that several of the largest London houses have their printing establishments in the north and western districts, these districts being chosen, we believe, for the reason just indicated.

What has been said in reference to the fogs and haze from the metropolis applies equally well, though in a larger degree, to all large towns, at least in this country, where coal is the principal fuel consumed.

PHOTOGRAPHY: THE REDUPLICATION OF MANUSCRIPT RECORDS.

Attention has often been drawn in these pages to the important aid which photography is capable of rendering in the multiplication or reduplication of valuable documents, whether in the possession of the state or of individuals; and yet what has been done, so far, to utilise the aid of which it is capable? We hear of a few isolated instances of private enterprise in bringing before the public photographic copies of manuscripts of great interest and extreme value. Now and then one of the societies treats its subscribers to an occasional photographic reproduction of some old work; while others, whose value depends entirely upon the reading to be given to a particular passage only half legible, are printed in modern type, without chance of individual criticism or conclusions being formed from personal inspection. But what steps does the Government take to guard from destruction the priceless treasures of records and manuscripts committed to its charge, beyond providing a grand warehouse for their storage? Within certain limited restrictions these documents of untold value are within everyone's power to examine, criticise, and of necessity to wear away by the mere process of handling, be it ever so tenderly done.

It is stated by those who are well fitted to judge that already a distinct depreciation may be discerned in some of these collections of ancient writings, and as population multiplies, and that scrutiny of old evidence now so much the fashion increases, it needs no prophet to point out what will be the ultimate fate of these concrete and tangible messages of times gone by—messages, it must be said, that we hold in trust only for our successors.

The last quarter of a century has seen vast strides taken in the critical exegisis of their antique scrolls. What may be done in its succession can only be guessed; but one thing is certain—a heavy accusation will be against us if we let these things perish, or even be injured, for want of a little expense, a little care, a little forethought.

Comparatively few years ago it might have been objected that there was no practical process of reproduction by any permanent method, and that it would be absurd to incur the expense of making copies of these things that would not last a generation out. Now, however, as our readers know—for some time past it has been so—there are numbers of accurate modes of photographic duplication by which copies may be made as durable as anything on the shelves of the British Museum, and at a price little above what would be entailed by setting up the words in type, and printing in the press in the usual fashion.

We are glad to find that the subject is being earnestly taken up by many who view with something like dismay the possible annihilation of these only witnesses we possess of the doings of past ages, and a decision has been arrived at to petition Parliament upon the subject.

At the annual meeting of the Library Association, held the month before last, the following resolution was passed:—"That a memorial be presented to Her Majesty's Government, urging the great necessity of making, by means of photography, copies of parish registers and other important documents, whether printed or manuscript, books, pamphlets, &c., in public libraries, in order that the public may be secured from the serious consequences of the loss of such documents, &c., and, further, may be supplied with copies of the same at a reasonable price. That this Council prepare, and the President be requested to sign, such memorial on behalf of the present meeting, and that members of the Association be requested to use their influence with Members of Parliament in its support."

Our remarks, so far, refer mainly to manuscripts of great age, the number of which in the world can never be increased, and is, indeed, decreasing by the remorseless hand of fire or decay, although it is possible, by the properly regulated expenditure of an annual sum of no great moment, so perfectly to reproduce them that the world would, in effect, be no loser if every one of the originals was destroyed by fire. But it will be seen that the framers of the resolution we quote have gone much further than this, by recommending the copying of records to be extended over a very wide field, and this, it is evident, means the expenditure of sums of money which in the aggregate would be immense. Still it is a query whether it would not merely be a transference of payments from her Majesty's Stationery Office to the pockets of photographers and their *employés*. Indeed, we do not hesitate to say that a process of photographic reproduction could be devised which would not necessarily result in any increase of total expenditure. The same thing in another form has been said before; hence there is no novelty in our suggestion that such records could be copied on a greatly reduced scale instead of one simile in size as well as structure. Expense would be saved, and the work of reference actually simplified.

It is suggested that every parish be compelled by law to have its register so reproduced in *facsimile*, a copy deposited in the nearest local library, and one at Somerset House. The expense of carrying out such a plan for past registers would, no doubt, be very great, though if spread over a number of years it would not be felt. As to future registers: it is evident that they might be arranged in such a form as to enable the many pages to be copied at a time on, as we say, a reduced scale, and at a cost which need not exceed what would be paid to an expert trustworthy copyist. As to the older records, it is likewise evident that the actual cost of photographic *facsimiles* might amount to a smaller sum than would be charged by a writer skilful and trained enough to be able to decipher the old and crabbed handwriting that so often characterises records dating back a century or two ago. The vastly-increased accuracy which would follow the adoption of such a course no one would presume to question.

In the paper by Dr. R. Garnett, which gave rise to the discussion of this topic and the final adoption of the above resolution, it is recommended that a photographic department be established at the British Museum, with the view of facilitating the cheap reproduction of important manuscripts and records. This is treading on delicate ground. There is no doubt that a department of this kind, under the control of Government, would be of great value; but the British taxpayer would very probably insist upon its being self-supporting, as indeed it well might be. Then, however, would at once arise trade jealousy. We all remember how the stationers rebelled at the idea of the Government interfering with trade by making a present of the then so-called "post-card" to the purchasers of the halfpenny stamp thereto attached, and how, in consequence, the price of post-card message was increased by more than ten per cent. Similary we are afraid the mechanical photographers might complain of the Government taking their trade out of their fingers, if they undertook on a large scale the photographing of registers and the selling of copies either at a profit or at cost price.

This, however, is a difficulty which would follow all state manufacture, and we apprehend it would not be difficult to surmount it. Therefore, we feel no hesitation in giving our cordial support to the resolution based upon Dr. Garnett's recommendation, and it would, we feel assured, be a subject of congratulation not only to the profession but to the public at large to see it acted upon in one shape or another with zeal and energy.

The season of the year has approached when, in some districts especially, the photographer is at his wit's end how to get rid of the effects of smoke. If his studio be cold he can heat it; if warm, he can ventilate it (or try to); but if a good rich, thick sample of fog, which is mainly trapped smoke, gain entry he may ventilate and he may heat his room without getting rid of this monster, for such, indeed, the invasion becomes. It has been stated that electricity will dissipate this smoke-fog; but we are afraid that the largest of electrical machines grinding by the whole force of the establishment would have little effect upon some of the peliginously-protected spherules of water that, at this period of the year, come between the photographer and his client to the detriment of all transparency of shadow, not to say serenity of mind.

There is, however, hope of better things in the future for the photographer. Modes of bringing about the abatement of smoke occupied considerable attention at the Healtheries, and no doubt will be still more to the front at the Inventories. Meanwhile we may direct attention to a very interesting correspondence which has lately been carried on in the *Journal of the Society of Arts* upon this subject, some very remarkable results in the direction of smoke-abatement having been described by Mr. Fletcher, well-known for his gas apparatus, as having been brought about in furnaces, &c., under his own supervision by means of a very simple character. It must be remembered that studio fog—during the prevalence of which the taking of good photographs is next to impossible—does not always owe the whole of its intensity to the thickness of the external air. It is too frequently aided and abetted by the clumsy furnaceman or the untidy housemaid, and any hints that may be gained from Mr. Fletcher's experience in avoiding this additional cause of the optical impurity of the atmosphere will be of real and substantial benefit to the photographer in the damp and cold seasons, though it may be years before their effect upon the atmosphere in general will be seen.

The very instructive letter upon the care of the eyes, and the effect of civilization upon eyesight, by Dr. Brudenell Carter, which appeared in *The Times* a month or two ago, has been issued in a separate form, with a few explanatory diagrams by the author. This is one of those useful small publications which everyone—particularly the photographer, whose occupation borders, or is liable to border, so closely upon the injurious—should carefully read.

"They manage those things better in France," and so they would have had us to believe when the wonderful balloon ascents were made from Meudon. In the first case, no spectators were present, and the balloon was steered against the wind in a dead calm; and, in the second, it was brought home in a cart after a successful battle with the wind blowing in the direction it was steering. Consequently the successful and skilful aëronautic experimentalists are reaping the reward of their exertions. One of them is named in the list for the distinction of a Chef de Bataillon, another made a Knight of the Légion d'Honneur, and a third, who received a wound in preparing the gas, is similarly distinguished. At the same time it is interesting to learn that the bubble, we should say "balloon," is metaphorically burst, seeing that it is put on the shelf *sine die*, for its resuscitation; and strange not to learn that the commission appointed by the Academy to report has reported upon its powers.

The wonderful sky-glows have been, if possible, more beautiful than ever at intervals during the last month or two; yet we have seen no other photograph of any phase of phenomena than the one engraved in *La Nature* last year. Our esteemed contributor, Professor Piazzi Smyth, writing from Edinburgh to *Nature* describes an effect—still stranger than any yet observed—in the form of a series of clouds all brilliantly iridescent, glowing masses of beautiful colours quite distinct from any of the ordinary sunset hues which gild the sky so beautifully. In the same paper an effect almost similar is described by Mr. J. E. Clarke as having been witnessed by himself on the same night, the 11th instant, and, in a still more brilliant form, by a large number of spectators a couple of days later.

In photomicrography with a good light, a low-power objective and a fairly-transparent object, considerations of steadiness of stand do not occupy an important position; but when the amplification is great with a high power and a diminished radiant area for light, and a consequently long exposure, it is of the greatest importance that the stand be thoroughly rigid, on account not only of tremor of the whole arrangement, but of the slightest difference of rates vibration between object and objective causing blurring. At the Royal Microscopical Society's meeting on the 10th instant, Mr. Mayall described a new instrument made on the general principles of Mr. Wenham's radial microscope, but modified in certain directions. The particular instrument (belonging to Mr. J. D. Cox) was said to have the perfection of balance of the Wale form, and to be so steady as to lead Mr. Mayall to expect it to be eminently suited for photomicrography.

We described last week the photograph of electricity (illustrated in *La Nature*) in the form of lightning as exemplified in the effects of a single flash of lightning. Now we have to chronicle the presentation to the French Academy of electric prints in another form, M. Jannin having exhibited photographs of the electric spark obtained direct on the film by M. Ducretel, by passing the spark through the film on the glass plate.

We have before now expressed our opinion of the real work done by the Liverpool Astronomical Society, and we learn that they are again showing the spirit of the true love of science that animates them. They are now establishing an educational branch for the purpose of delivering lectures upon the more popular sections of the fascinating science. It is proposed by them to hold, during the winter, fortnightly classes for instruction, and to deliver lectures upon the more popular branches. The skill with which photographic astronomical work has been conducted by the Society will, no doubt, render those classes very popular with photographers and others who wish to learn the practical details of that class of work.

Dr. Phipson writes to the *Moniteur de la Photographie*, Paris, that a Greenwich photographer advertises:—"To-day being the anniversary of the death of my mother-in-law, photographic portraits will be taken at reduced price."

In the recent International Copyright Congress, held at Berne, the question of proprietary rights in photographs was omitted. The project of the Berne Conference has been submitted by the French Minister of Foreign Affairs to the Syndical Chamber of Photography at Paris, and M. Sauvel, supported by M. Davanne, proposed that the following clause should be inserted in the Berne scheme:—"The photographic works of the subjects of each nation in the Union shall enjoy in other countries in the Union the protection which the respective laws now give, or may hereafter give by international arrangement, to works of this nature." The Syndicate approved and forwarded this suggestion.

MISCELLANEOUS USES OF GELATINE.

Gelatine being now in ordinary use in the photographic laboratory, it may not be out of place to point out some of the purposes to which it may be applied, otherwise than in the manufacture of sensitive dry plates.

Mr. Woodbury has already published that a thin five-per-cent. solution of gelatine coloured a strong yellow by a sufficiency of bichromate of potash makes a good cement for uniting pieces of broken glass. The glass must be warmed, wiped dry, the cement then applied, and the mended glass article be then exposed to light for several days. He has also published that a strong solution of gelatine to which a little glycerine and red colouring matter, such as carmine, have been added makes a substitute for wax for covering the corks and upper part of the necks of bottles.

In the form of capsules gelatine is used by druggists to hold many liquids of a greasy nature—such, for instance, as castor oil—so that they may be swallowed without the unpleasantness arising from their nauseous taste. The capsules are made by the aid of a small egg-shaped, highly-polished little knob of iron, having a pointed iron stem by which it is held. The knob is rubbed with a slightly oily cloth, then dipped in the warm gelatinous mixture, after which the pointed stem is put into a hole in a board, while the gelatine on the knob is cooling and hardening. The gelatinous mixture usually consists of six parts of gelatine, twelve parts water, and one part sugar. In a short time after dipping the capsule is cold enough to be removed from the mould, which is done by cutting the gelatine round the upper part of the stem with a knife, then pulling off the capsule dexterously with the fingers. At this stage it should be elastic enough to pull off without tearing, and to shrink nearly to its moulded shape directly afterwards. A syringe with a nozzle bent at right angles to the axis of its cylinder is used to fill it to about three-fourths its capacity; if more were forced in, the gelatinous envelope might possibly break afterwards with changes of temperature. The hole is closed with a touch of a strong solution of gelatine, and the same end of the capsule is then dipped in a weak solution of gelatine to give greater security by the thin cap thus applied. The gelatinous solution used for sealing the capsules always contains a small proportion of gum. The capsules having been allowed to dry, a polished appearance is given to them by rubbing them with a slightly oiled cloth.

Gelatine is one of the many substances sometimes used for the coating of pills, in order that they may not stick together in the box and may not be tasted in the act of swallowing them. The solution used for covering them consists of one part of gelatine to two parts of water. The pills are cleared from any dust or powder which may be on their surfaces; then each pill is stuck upon the end of a piece of wire four or five inches long, and the lower end of the wire is thrust into a basin of sand, which acts as a kind of pincushion. The pills are next dipped one at a time into the warm solution of gelatine; then the other ends of the wires carrying them are replaced in the sand, where they look like an assemblage of large pins standing while their gelatine-coated knobs are setting and drying in the air. Sometimes on removing the pills from the wires a little tube of gelatine from the outside of the wire comes off with it; this tube is carefully cut off with scissors. The hole in the gelatine where the wire pierced the pill is then closed with a little warm solution of gelatine, applied by means of a small brush of camel's hair.

One fact about gelatine does not seem to have received that attention in photography which it deserves, namely, its curious power of dissolving phosphate of lime—the chief constituent of bones. Furthermore, it always contains a little phosphate of lime, which may or may not by double decomposition introduce a trace of phosphate of silver into all gelatine argento-bromide emulsions. The late Dr. William Gregory, Professor of Chemistry at Edinburgh University, says: "The property of gelatinising depends on the presence of phosphates; for when gelatine is long boiled with water alone, or with a little alkali, phosphate of lime is deposited, and the solution no longer forms a jelly on cooling." If this be so, the functions of phosphate of lime in gelatine and in photographic emulsions deserve more attention than they have hitherto received.

W. H. Harrison.

HEAD-RESTS.

A QUARTER of a century's photographic experience allows a retrospect that includes vast alterations in the practice of our art, and in few things has more change been shown than in the head-rest and the mode of its employment. Time was when the head-rest was indeed a nuisance, its cold hard claws being equally and remorselessly applied to the bare cranium of the octogenarian or the curly locks of "sweet sixteen." It was part of the sacred paraphernalia of the studio—"gallery," it was oftenest called then—and as much a portion of the place as the camera and stand. When the sitter entered the room, whatever his experience as a sitter might be, he never missed the one nor ceased to anathematise the other. There was no mistake about the matter. Let him assume ever so graceful an air, and behave with the utmost nonchalance, feeling steady as a rock and not betraying a trace of nervousness, he had to submit to the cold steel wielded by the photographer, and in frosty weather taking his chance of its freezing to his head.

The dentist will dip his instruments in warm water, or otherwise take the chill off, but who has ever heard of a photographer taking the chill off his apparatus, although it were applied for more minutes than the former was used for seconds? It was an uncomfortable affair altogether in its rigid straightness and its jerky adjustment. When Mr. Sarony introduced his patent rest he initiated a revolution; but its high price, and the fact that it was, practically, only able to be used in one spot in the studio, rendered it only an occasional accompaniment of even first-class studios. Its charm, however, was broken. Comfort in connection with a head-rest—comfort of a modified sort, it is true—was spoken of, and from that time we may date not only the introduction of vastly-improved forms of the instrument, but, strange to say, notwithstanding these improvements, a growing and powerful objection to the instrument at all. The resignation with which sitters in the early days submitted to its employment—a state of mind too often reflected in their features—gave way to decided objections to its use under the most improved system; and the odious comparison between photographer and dentist, so often made, became intensified by the occasional sarcastic offer to allow the rest to be used if the sitter might be taken under the "influence of gas," after the manner of the former gentlemen.

In fact, there was ever after this period a smouldering rebellion against the "instrument of torture," as ran the slang designation of this most useful adjunct. The photographer sometimes had to give way to avoid a scene, and when in other cases he had convinced his sitter of the actual necessity for its employment the latter generally yielded with so bad a grace that the result was visible in the finished portrait.

That the rest is, and has been, of great utility cannot be gainsaid, and if judgment in "fixing" it had always been shown I have a strong impression that we should never—or "hardly ever"—have had it objected to; but it has been, as a rule, persistently and ruthlessly employed in every instance, often without care and with entire disregard of the sitter's comfort, till at last he has metaphorically kicked against it, and with such effect as to have sent it clean out of the studio in some cases. This state of affairs is in many respects most unfortunate. The professional portraitists' first aim should be to put his sitter at ease, and, if possible, introduce interesting topics of conversation, so that his mind is led away from the work in hand; but this is impossible when, in the first case, a heated discussion has to take place about the rest, and, in the next, the half-convinced sitter has to submit to an experience which he dreads and dislikes, and is only half persuaded, or half coaxed, into permitting. We have all read of the photographer who, in reply to the old lady's speech, when "fixed" with the "rest," that "she did not feel at all comfortable," remarked—"we don't photograrf feelin's here, marm," but, I take it, we do photograph feelings; in too many cases the face is seen to be an index of the feelings. It is an unfortunate thing that so bad a name has attached to the head-rest, for, in some instances, it materially facilitates the production of good work.

My object, however, in writing at the present time is to give some idea of my own experiences, and not to complain of the inevitable. Numbers—perhaps the majority—of professional photographers have been working as I have; but, as they have put nothing on record upon the matter, I feel sure that a knowledge of how I have fared in discharging the head-rest from active service will be useful. I may at once say that for some time previous to the introduction of gelatine plates I began to take portraits without the rest whenever possible, and since the introduction of gelatine I have gradually discarded the instrument, till at last for two years past it has been kept in an out-of-the-way corner in the studio, and only occasionally brought out for use, and when brought out it mainly applied to the body rather than the head. I have thus found a saving of time, a comfort in working, and, altogether, a vast improvement over the old style of things to which, indeed, it would now with me be next to impossible to revert.

It may be asked—"How about the sitter moving?" Well, in reply, I can only say that not only do I use no rest, but, further, I rarely tell my sitter when the moment of exposure has arrived; indeed, he is usually secured with two exposures, when I am able to inform him it is all over before he imagines the operation has begun. Yet, notwithstanding all this risk, the proportion of plates spoiled through the sitters moving is by no means large, and whatever the loss may be it is well repaid by the increased comfort and the pleasure the sitter experiences at the comparatively new sensation. If a sitter move I say nothing and expose afresh; for, of course, the whole effect would be lost if he were made aware that he had spoiled a plate, the main object being to put him and keep him at his ease. I must say there are cases where the method is not a success, and I will conclude with an example.

A lady came to my studio one day and, in a stronger manner than usual, made the ordinary complaint, exclaiming, "if I could only be taken without knowing it!" I took her portrait—a very nice one it was—without her knowing it; but what can my readers guess was the verdict? She brought the proof back and wanted to be retaken, for, said she to my secretary, "Mr. Webster did not tell me when he was taking me or I should never have put on that expression." What a piece of rank ingratitude!

G. WATMOUGH WEBSTER, F.C.S.

MODERN "DARK ROOM" IMPROVEMENTS.

No. III.

Now that the wet collodion process is so little used, few establishments keep the old dipping bath in employment, even when, for special purposes, the silver solution is resorted to occasionally. Flat dishes are much more convenient for such limited use, and when enlarging forms a considerable feature in the business they become a necessity; so it is rather strange that the dealers have not paid more attention to this photographic requisite. Of course I am not now speaking of the small developing dishes, which leave little to desire, but of large sizes—say, those accommodating plates from twelve inches to three or four feet. Porcelain ware is so uncomfortable in use and so breakable that it may be left out of consideration. Dishes with glass bottoms seem to have been the favourite, but they have the disadvantage of being very slippery, and you can seldom divest yourself of the feeling that a plate might slip and go through. A large swing-bath of the Burton pattern I had cased with boarding below the glass bottom and the intervening space run full of plaster of Paris. This was some security against breakage, but it did not get rid of the one other disadvantage of this form of holder—that is, the wooden sides—which, however well coated with shellac solution or black varnish, have inevitably a bad effect on the bath if the solution be left long in contact with them. This may not be of much consequence where the use of it is infrequent and the solution is decanted as soon as done with, but it is better to use a dish that is beyond all suspicion, both as to chemical action and as to security from breakage or leakage. Such a dish is a simple wooden tray lined with *pure* rubber. It is far more pleasant to use than glass or any hard substance, the soft cushion-like material breaking any fall or jarring of the plate against it. Joints are easily made, and above all, with a fairly close-fitting lid, the solution may be left in it with as much confidence as would be felt if it were in a glass bottle. After the lapse of any number of months it will be in just as pure a condition, as regards any reaction from the rubber, as on the first day it was put in. Years ago these rubber-lined, flat dishes were to be purchased from some of the dealers, but of late inquiry for them has proved in vain. I have, therefore, taken the direct course of making them for myself, and the matter is surprisingly easy. All the difficulty lies in screwing the courage up to what *looks* a rather formidable undertaking. The tray of wood is first formed, but not put together; it is made ready in five separate pieces, comprising the four sides and bottom. No dovetailing being required, the most amateur carpentry suffices. A tin of rubber solution furnishes the compound to rub over the inside of all the pieces rather freely, but taking care that it is smoothly distributed on the planed wood. Leave these to dry whilst the rubber is cut to proper sizes to cover each piece of board on one side; of course, *pure black* rubber is the kind. Unfortunately it is not very easy to get, but Charles Macintosh and Co., of Manchester, make it in pieces about eleven inches wide and thirty-six long, with a thickness of about a-sixteenth of an inch and upwards. This rubber may be treated very slightly with the solution on one side, for if too freely done it would soften and become unmanageable. The two surfaces thus treated with solution—the wood freely, the rubber slightly—and both having dried, are laid face to face and the rubber rubbed down. Thorough adhesion is easily ensured, and where joins are needed to make up the requisite width the rubber edges only require just pressing together to make all quite water-tight. All that is necessary after the wood pieces are thus coated is to put them together with ordinary screws and screw up tightly. The faces of the rubber which come into contact may as well be smeared a little with solution before screwing up. The result is a dish surpassing any other for silver or other chemical solutions. In the most delicate operations with collodion and bath, as, for instance, in opal enlarging, it is simply impossible to retain a bath in working condition if it be held in a dish having what is usually accounted sufficiently-protected wood in contact with the liquid, even though the latter be decanted after use; whereas, the solution left standing in an innocuous dish of this kind is workable with the best results month after month. The cover or lid should have a hole in which the funnel can be set whilst filtering the solution into its place, and this hole closeable with a moving shutter.

A silver hook is a handy thing for raising plates from the sensitising bath and other solutions. Most studios will have old carriers with silver wire corners laid away. One of these corners as strong as can be got, after straightening out, should next have about a-quarter of an inch turned at right angles, and the end of the turn sharpened off, chisel shape, to catch easily under the glass. A little bit of the other end is turned on the opposite side so that it can "let in" to the narrowed end of a wooden arm, about twelve or fifteen inches long, to which the little wire hook is firmly bound, and the whole then coated with shellac solution. For raising plates from the developer in dry-plate work this is, perhaps, better than any other contrivance, and something should be *used* if the appearance of the finger nails be cared for at all.

A rubbing pad of narrow calico rolled up tight and tied fast should be handy, with a box of common salt, for cleaning plates, backs of negatives, and washing off waste plates.

I have already referred to enlarging in the dark room by the aid of daylight through a second window or a supplementary portion of the one in use, but there remains the necessity not infrequently for some means of making a hurried enlargement in an emergency by means of artificial light. This indicates the possession of some form of optical lantern, and it is entirely a question for the individual photographer whether he will adopt one of the highly-finished articles in the market, or whether he will fit it up for himself. Supposing him to possess the usual amount of amateur mechanical ability that so largely characterises our profession, he need have no difficulty in making a useful enlarging lantern. Like the man who had found honesty the best policy, I have tried both the home-made and the bought; and whilst, of course, a neat thing is almost a *sine quâ non* if the lantern be used for entertainments, for home use a less elaborate get-up is quite as efficient. Without exactly coming to the "biscuit-tin" standard advocated by some, a capital instrument may be constructed with a little care. Wood well seasoned is as a rule better than metal, except for the neighbourhood of the chimney. One special point to be observed is plenty of room inside. The condenser is purchasable at any wholesale optician's, a three and a-half inch double combination costing about thirteen shillings. The lens may be the ordinary *carte* lens, or the secondary one retired from active service that most establishments possess.

Sometimes one sees statements to the effect that any French quarter-lens, even of doubtful quality, will do for this purpose. This must be taken *cum grano*, and a large grain too, for the better the lens the better the picture. It is true enough that a bad lens is of less consequence for lantern entertainments than in the production of enlargements, just as ephemeral images are of less consequence altogether than transfixed pictures which carry with them the producer's reputation; but for any purpose as regards the lens for the lantern I have always found "the best as good as any." A good definition cannot be given by the "lens" having no real focus, whilst the increase of light with an objective of wide-angular aperture is such an advantage that the mere matter of size if for exhibition only is comparatively of much less importance.

A further use for the optical lantern is in showing a customer the effect of a portrait enlarged on the screen. This idea in doing business was introduced, I believe, and largely used by the late Oliver Sarony, who was able to use daylight for the purpose. This employment of the lantern may be mentioned here, although the subject hardly comes under the head of the contents of the dark room proper. It is rather suited to some spare passage or space that is either dark or can be darkened at will, and is at the same time easily accessible by the customer to be enlightened in the possibilities of enlarging, and, of course, of ordering. The most suitable kind of light is a matter of individual convenience. Unquestionably the ordinary oil lantern will serve a very useful turn. One would suppose from the double and triple wicks and all sorts of lights advertised for the lantern that it is a difficult thing to secure a good light. Personally I have found nothing better than a *large* flat wick, the burner being purchased and mounted on a flat-bodied receptacle fitted up by the local tinman. A lamp of this kind in a home-made lantern has served me better than more pretentious instruments at much greater cost. The image should be thrown on a sheet of ground glass, mounted at a suitable height on a sort of rigid easel; this should run backwards and forwards with ease. A simple little tram can be laid down of thin iron rod, drilled at intervals and screwed down to the floor. Little pulleys which are sold by ironmongers fixed on the screen easel and standing on the rods will enable it to travel readily with the slightest touch.

Two or three words as to the general conditions of the dark room may be permitted. Order is absolutely necessary if systematic success is to be achieved. Things to be found quickly must be in their places; the penalty has a right to be paid when it is too much trouble to put things back in their own place. The same consideration applies to the labelling of bottles. How many solutions have to be thrown away through neglect of this precaution? A packet of blank labels should be readily available when wanted. Labels, however, will not be long legible on acid bottles, or near fuming acids; these should be treated with a little sizing and then varnished, or the glass itself may be painted on with two or three bold letters of black varnish. Speaking of black varnish: the common Brunswick black of the oil shops may be made a most useful servant to the photographer for coating woodwork, protecting metal, and the hundred and one little purposes continually cropping up. As bought it is a rather nasty, gummy, viscid article, and not a very good drier, which is an important point; but it is wonderfully altered and improved by the addition of a couple of ounces of methylated spirit and the same of turpentine to each pint. It will then dry in a few minutes.

Cleanliness it should not be necessary at this time of day to say much about, but like most things this good quality works in different ways. The operator will not be much the better for the fussy sort of cleanliness which involves continually moving things about to "dust" under them. Disturbing the "photographer's *un*settled enemy," when he might fairly have let it alone, converts its sort of armed truce into active hostilities on his plates, or in some position where he is pretty certain to get the worst of it. The kind of cleanliness required is to be very cautious about "kicking up a dust," and to have one eye at least wide awake to the chemistry of the subject. For instance: a glass funnel which has just been used for albumen solution may look nice and clean, and is so to use for that same purpose again; but for filtering a sunned bath it is nothing less than abominably dirty with organic matter, and so on through the range of chemicals. One man, by keeping things for special uses, will have everything right with a minimum of trouble, where another, taking more pains apparently but forgetting his chemistry, will find himself tripped up. Shelves and counters should be spread with white blotting paper; it shows things up and makes them easy to grasp. For the sake of certainty it is also as well to enlist the services of the sense of feeling as well as that of sight by having bottles of different shapes. Take the case of two developer bottles—the pyro. and ammonia; they may be well enough labelled, but if the bottles are just alike, the operator is sure, in spite of labels, to get hold of one when he wants the other now and then. Let the bottles be different in size or shape, then the labels become almost superfluous.

Lastly, and perhaps one might say firstly, there remains one important requisite for good dark-room work—*thought*. The best of helps is the growing intelligence of the worker. The "animating soul" will convert the most unlikely means into steps towards success. The same weapons in diverse hands ensure victory or court defeat. BENJAMIN WYLES.

ISOCHROMATIC PLATES.

IN Mr. W. Goodman's interesting communication to the Glasgow and West of England Photographic Association on the above subject, he raised several questions which, if explained, would probably lead to an earlier solution of the problem "how to obtain relative tone values on a sensitive film to the luminosity of the various colours," or, in other words, to be able to make plates most sensitive to the yellow rays of the spectrum instead of to the blue, as at present.

He says—"The method used to obtain such plates is the addition of some substance to the film capable of absorbing and converting into chemical energy those rays which are inactive on an ordinary plate." If the addition, however, slows the plates, what we require to know is—Does such addition increase the sensitiveness of the film to the red and yellow rays, compared with the power of such rays on an undyed film, or does it only cause a decrease of sensitiveness of the film to the violet, blue, and green rays, leaving the power of the yellow rays the same?

Perhaps some of your readers can tell me if Dr. Vogel claims that the new substance "azaline," which he has discovered, renders a film dyed with that substance as sensitive to the yellow rays as an undyed film is to the blue rays. Both films are made of the same emulsion; the only difference is that one is dyed and the other not. If, on placing a film dyed with azaline behind a glass of the colour to which the film is most sensitive, it do not give a higher sensitometer number than an undyed film behind a blue glass, I do not think we can say that with the addition of that substance the sensitiveness of the plate is actually increased.

I hope I have clearly shown that this is the keynote of the whole matter; because, if the addition of azaline increase the sensitiveness of the plate to the yellow rays, we have a substance which, like ammonia or the boiling process, decomposes the gelatine and makes the plate more sensitive to light. I showed in an article on this subject about a month ago how, when silver bromide is held in suspension in gelatine, the latter protects the silver haloid from the alkaline developer, except when the action of light has destroyed that protecting power. After decomposing the gelatine by either the ammonia or boiling process, on exposure to light the vibration of the particles is more quickly able to destroy that protecting power, and if the boiling be continued so as to decompose the gelatine beyond a certain point it loses the power to such an extent that we get fog all over the plate directly the developer is poured on. We get the same effect by over-exposure, because the action of the light on the particles has so burst the protecting cells of the gelatine that the developer is able to reduce them to a metallic state at once all over the plate, instead of only those particles which would have been acted upon by the more rapid vibrations of light if a proper exposure had been given.

As I said before, if the addition of azaline increase the sensitiveness of the films we have a new power for obtaining more rapid plates; but if its use be only to decrease the power of the blue and violet rays its action would simply be the same as a coloured screen. What we want will be a substance that will cut off the actinic power of the blue to one-twentieth the force of the yellow rays, and our experiments will require to be made in that direction with the aid of the spectroscope.

To my mind there are three points which throw a doubt as to whether Captain Abney's theory is a correct one. He holds that the dye in absorbing oxygen acts as a developer similarly to pyrogallic acid in the alkaline developer, this slight reduction serving as a nucleus for a further deposit of silver during development of the plate:—

1. If the bleaching of the colour be sufficient (in the few seconds' exposure that is given) to oxidise the dye so as to form a nucleus for further development, the greater the amount of dye used the larger would be the nucleus formed, and, in consequence, the more sensitive the plate would be; but, so far, our experiments do not show that it is so.

2. If the dye act as a developer similar to pyrogallic acid in the alkaline developer, it would commence to reduce the silver haloid to a metallic state in the dark, because we know that the alkaline developer will reduce silver bromide to a metallic state without any nucleus or sub-bromide being formed by light; and, as the dye is in the gelatine, it would be in contact with the silver particles.

3. If we photograph through yellow glass we obtain the same restraining power over the blue and violet rays as we do with the dyed films, and in that case there is no absorption of oxygen to act as a developer or a nucleus for further development or reduction.

Dr. Vogel's theory is that the energy absorbed in bleaching the dye is transmitted to the silver haloid, upsetting its equilibrium, and rendering it capable of development. If it be so, we have rays of a slow rate of vibration, *first* bleaching—that is, oxidising—the dye, and *then* acting on the silver haloid; whereas the energy of the rapid vibrations of the blue and violet rays must be annihilated (because they neither oxidise the dye nor act on the silver haloid)—that is, if the absorption theory of light be correct. Have we any proof that such a short exposure produces a bleaching action at all?

With all due respect to such scientific observers as Captain Abney and Professor Vogel it seems to me that they have accidentally overlooked a well-known action of coloured light when thrown on surfaces of another colour, which, I think, perfectly explains the matter. It also explains the experiment quoted by Mr. Goodwin in support of Professor Vogel's theory, namely, that a dyed collodion film exposed to the spectrum will, if coated with collodio-bromide emulsion and developed without further exposure, give an image of those parts of the spectrum to which the dye is sensitive.

If we throw the colours of the spectrum on to a screen, and then take a red flower or ribbon and hold it in the red rays, the colour will shine out bright; but if we put it in the green rays the colour will be invisible. The thermopile shows that the power of the green rays has not been absorbed or annihilated; their rate of vibration has simply been made slower than that of the red rays, and they have been converted into the slow vibration of the heat rays.

Now, if we put a dyed collodion film coated with collodio-bromide emulsion in the place of the screen and expose to the spectrum, the red rays would pass nearly unchanged in rate of vibration through the dyed collodion film, and would produce the invisible image on the collodio-bromide film ready for development. But where the green rays fall they would be lengthened by the dyed film to the slow vibrations of the invisible heat rays, and would have no action on the silver haloid. Of course the same law will hold good in the case of the yellow rays being more rapid on a film dyed yellow than the blue rays thrown on the same film.

Herbert S. Starnes.

THE OPTICAL LANTERN AND ITS MANIPULATION.

No. II.

The next thing to a good luminant is some method of concentrating or condensing the light on the transparency, and about this there seems to be some uncertainty with the public as to size and requirements. If the luminant is transparent, such as the flame of an oil lamp, a reflector behind collects the rays and directs them on the first lens, A, of the *optical system*. This lens should be of such a size and focus as to take in as many as possible of the rays coming from the light, and when combined with another, B (for double condensers give the best result), should concentrate the rays so that the transparency be fully illuminated. The size of the condenser will be governed by the size of the transparency to be illuminated, and it is now generally accepted that the best for commercial photographic-lantern transparencies is four inches or four and a-quarter diameter; for, if larger, the light is wasted, and if smaller—at least for the lens next the picture—the area of illumination would not be sufficiently large for the cushion or square-shaped picture. For enlargement from negatives then four and a-quarter or six inches diameter should be employed.

As regards the focal length of these condensing lenses, that must be regulated by the objective or front lens employed, and varies from three to five inches combined focus. The one I like best for lime-light lanterns and general use is three and a-half inches focus.

It will be seen in *fig.* 1 that the condensing lenses (A B) are more

FIG. 1.

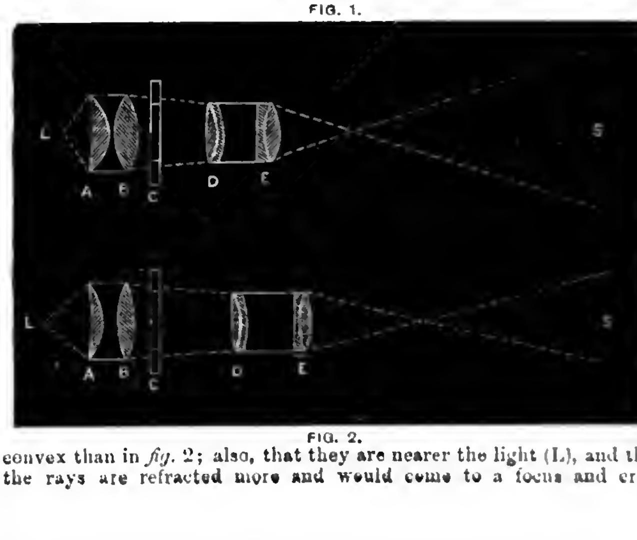


FIG. 2.

convex than in *fig.* 2; also, that they are nearer the light (L), and that the rays are refracted more and would come to a focus and cross quicker than in *fig.* 2. It is necessary that the objective should be fully illuminated, and if the light is kept in its best position in relation to the condenser, and a long-focus front lens is required to be used, a satisfactory result could not be obtained with a short focus condenser; for instead of a clear disc being projected on the screen (S), one with dark edges or centre will be the result. For instance: the front lenses of *fig.* 2 system, if used with a condenser, as shown at *fig.* 1, would not be fully illuminated.

I have known several instances of apparatus being unsuitably fitted with condensers, and the owners not knowing the cause of failure have attributed it to the objectives. A condenser of the correct focus for the average focus objectives (six inches) can generally be made to answer for one of four and a-half or eight inches equivalent focus by a slight adjustment of the light nearer too or further from the condenser respectively; but if the condensers are the shortest possible focus to work with a short-focus (four and a-half inches) objective, they cannot be used satisfactorily with one of eight inches focus. Theoretically, then, the optical lantern should be fitted with condensers to suit each particular focal length front lens or objective, and in the higher class of apparatus, such as Mr. Malden's triple lantern, three sets of condensers are often supplied for various-sized slides and focal length front lenses.

The position of the slide or transparency must be governed by its size in comparison with the condensing lens; but, if other than a circle, the greatest diagonal measurement must be taken. If this be one inch less than the diameter of the lens, half-an-inch from the condenser will be the best position, and, if only half-an-inch less, then as close to the lens as practicable for drawing in and out without scratching the face of the condenser. If more than one inch, then further away, so as to get in the smaller part of the cone of rays. There is, of course, a limit to this, as, otherwise, such a very great adjustment would have to be provided in the front lens to remove the slide-holder and focussing lens bodily away from the condenser; and it is better now and then, when using a small picture among a number of large ones, to sacrifice a little light on it rather than disturb the general adjustment.

It will be fair to sum up, for shewing commercial lantern slides, that an adjustment of half-an-inch is all that is required. It can be done by moving the stage away from the front; or, what is more rigid, let the stage remain fixed and move the condenser in a bayonet catch groove or by a coarse screw. Mr. J. H. Steward is now having made a double stage, so that a tinter or alum trough to stop the heat, when showing valuable slides or delicate objects for a long time, can be put in one stage and the slide in the other. The first stage will be best for square pictures, and the second, or that farthest from the condenser, for three-inch circles. The dividing plate being removable, a large stage is available for chemical and optical experiments.

Another point to be regarded is the cutting off of marginal rays after passing through the condenser; and, as all pictures are not circular, and the old shape of diaphragm in the stage plate is not suitable for all pictures alike, I would suggest that runners or grooves should be made just in front of the condensers, so as to insert the shape most suitable to obtain a clear disc with the particular form of picture employed. This is done in some of the photographic carriers; but, as they would not be available when using effect slides, I have had the other arrangement fitted to lanterns, made under my superintendence, for different customers of Mr. Steward.

As shown in *figs.* 1 and 2, the shorter the focus of the front lens the larger the disc; hence, if the apparatus be required to be near the screen, a short-focus lens must be employed. The limit, however, under any circumstances is a distance equal to the diameter of the disc. This, on account of the great difference between the length of rays at the margin and the centre, is difficult to obtain without distortion. Therefore, the most suitable is an objective which will give a disc at double the distance of its diameter—that is to say, a disc of nine feet at eighteen feet distance from the screen—and one of about six inches equivalent focus will do this. In some rooms it is necessary to have a considerable distance between the apparatus and the screen, and then the front lens must be of very long focus (about twelve inches equivalent) to produce a nine-feet disc at thirty-six feet. Long-focus lenses cannot be worked satisfactorily with oil light, and their use is recommended for the lime light, only under exceptional circumstances, the maximum light and definition combined being obtained by the medium-focus front lenses.

G. R. BAKER.

THE PLATINOTYPE PROCESS.

[A communication to the Newcastle-on-Tyne and Northern Counties' Photographic Association.]

I HAVE no doubt the platinotype process is already familiar to many of the members of this Association, and in bringing it before you this evening my apology would be the earnest request of our indefatigable Secretary for a paper to fill in a gap in his programme for the session.

Although this process has not yet become so popular as it ought to be, yet I think if its merits were better known it would be more appreciated by the public than it now is. Allow me, then, briefly to point out what I would claim as the peculiar merits of the platinotype process before I proceed to explain and demonstrate it to you.

First, I would claim for it the permanency of its prints—a point on which so much discussion has arisen of late with regard to silver prints, which have been a source of anxiety and vexation to photographers so far, and I am afraid will continue to be until we have more light thrown on what is the precise nature of a silver print. In the platinotype print, as its title denotes, the image is formed by the deposition of metallic platinum, so, if the cause of fading in silver prints is due to complex silver salts, this difficulty is entirely removed. Again: no sulphur compounds are employed in the development and fixing, and if hypo. be the scapegoat in silver prints we have nothing to fear from that source.

Next, I would claim for it the greater rapidity in printing, namely, from one-half to one-third the time required to print from the same negative on silver paper, especially in dull weather, when the platino paper has the decided advantage. This has been accounted for by supposing the blue rays of the spectrum are equally as active on the platino paper as the violet, whereas the violet rays are necessary to impress the image on silver paper.

In the next place, I would claim the artistic softness and delicacy of the prints, which, when properly printed from a suitable negative, more resemble a fine engraving or well-executed pencil drawing.

And last, but not least, I must not omit to mention the simplicity of the process, which renders it so admirably adopted to the requirements of amateurs who have not the time or convenience for the more troublesome washing processes necessary in silver printing, as the prints by this process can easily be finished off in half-an-hour, and when done they offer an excellent medium for the artist to colour upon without any fear of defects showing themselves afterwards. One of the chief objections raised against platinotypes is the coldness of the tone, but this has to a great extent been overcome by the introduction of specially-prepared paper and toning solutions, which give a sepia tint.

Another field has recently been opened for the phototype process, namely, enlargements for the artist which can be readily executed by means of the solar camera or electric light and form an excellent basis to receive the colours. Neither is this process confined to paper, as equally good results can be obtained on linen or silk fabrics, and even on wood.

Having now put forth the merits of the process, allow me to explain the *modus operandi*. The paper, of which I have here a sample, is coated with a solution of ferric oxalate and potassic-chloro-platnite, and if I expose it to the action of light the ferric oxalate will become converted into ferrous oxalate, and if exposed behind a negative will give a faint, brown image, such as you see on this piece. All that now remains to be done is to cause this image to throw down the metallic platinum it contains, and this is readily done by floating it on a hot solution of neutral oxalate of potash, 130 grains to the ounce, and which I have raised to a temperature of 170° Fahr. in this enamelled iron dish, when you will see the iron salts are dissolved out and the metallic platinum thrown down *in situ*, forming a black image; or, if I use the special paper and add some of this toning solution to the bath, it will give a sepia-tinted picture. It only remains now to dissolve out any traces of iron salts which may remain in the paper by passing it through a two-per-cent. solution of hydrochloric acid, changing the solution when any trace of redness appears in it, and then washing them in frequent changes of fresh water for about thirty minutes, when they may be hung up across a string to dry.

Simple as the process may appear, there are, nevertheless, some precautions which must be observed:—First, the paper must be kept absolutely dry by being placed in a canister with calcium chloride, seeing that the printing-frames and pads are dry, and, especially in damp weather like the present, placing a piece of rubber cloth or oiled silk behind the paper in the printing-frame. By taking these precautions there is little fear of the paper keeping; indeed, some I am using tonight I have had in my possession nearly two years. Second, not to continue the printing longer than is necessary to have a faint but distinct image on the paper. Third, to regulate the temperature of the bath to the amount of exposure the prints have received, under-printed ones requiring a higher temperature and over-printed ones a lower temperature, always bearing in mind that the prints will appear darker when they are dry. Fourth, to see that the last acid bath is not in the least discoloured if you want to have pure whites. And, lastly, to obtain a license from the Platinotype Company to work this process, which is a patent one, but which is not a serious obstacle, as for the payment of five shillings you can obtain a license for the rest of your natural life on condition that you buy all your materials from them, which they supply at market prices.

I trust I have now made the platinotype process not only clear but interesting to you, and that before long we may see more workers of it, more examples, not only in our albums but also in our exhibitions, and possibly a special medal given for platino prints.

HENRY G. TEMPLETON.

ON THINGS IN GENERAL.

A KIND friend, sagacious, far-seeing, and reading men like a book, a lover of our art-science, who was ever anxious to further its interests and uphold its dignity, the father of photographic journalism, the proprietor of this paper, has gone from among us. The well-remembered face will be seen no more. On Saturday I formed a humble unit in a large assemblage, drawn not only from Liverpool but from London and places more or less distant, to pay the last mark of respect to our dead friend at the Liverpool Necropolis. He was always ready to encourage rising talent, and the pages of THE BRITISH JOURNAL OF PHOTOGRAPHY have been the stepping stones made use of by more than one of those who have made for themselves a niche in the temple of fame. He had gathered round him a band of earnest, talented workers to whom, under his pilotage, aided by the skilful pen and brain of the editor in chief, the great success of this Journal is due, and will, doubtless, carry it forward to further successes. I am sure I echo the sentiments of all my fellow contributors in avowing my intention to carry out Mr. Bolton's plans.

I was glad to see last week that the Editors had set their foot firmly down on that everlasting bit of pseudo-science as they justly term it—the diminution of the light according to the square of the distance from the window. Of all the preposterous rubbish that does at times find its way into print nothing is so utterly misleading and incorrect as this piece of ignorance upon stilts.

Good photographers who read their *Times* would be rather startled the other day, not only to find it chronicling a real photographic novelty but at the subject matter itself of an article on a new photographic process describing Messrs. Marion and Co's. new photographic paper for printing by development in lieu of the time-honoured albumenised paper. They deserve the thanks of the community for working to a practical end a process of undoubted value which, if I mistake not, will in the future take a far more important place than it is likely to do for a while. Messrs. Morgan and Kidd were first in the field with a gelatine paper for the development of enlargements, and they have, I notice, quickly adapted their formula for a like purpose to Messrs. Marion's. These papers will be a real boon in many cases.

I notice that in a lecture on photography for those engaged in industrial pursuits, at Burlington House, by Professor J. M. Thomson, he said of the swing-back that its only use in portraiture was when it was necessary to reduce the size of a portion of the image—as, for instance, the feet of a sitting figure. If the sitter were a professional model gaining his half-a-crown an hour he would have no objections to such a course; but an ordinary sitter so posed as to require a swing-back to keep the feet from becoming enlarged, would require such a lengthened exposure from the small diaphragm necessary to be used under such conditions that he would decidedly object. My idea of the use of swing-backs is that it is for objects in focus, not out. Perhaps, however, the professor was slyly poking fun at one of the English photographers who, we read, accompanied the British Association excursion to America, the story about whom goes that he was riding upon an elephant with his leg hanging out of the howdah, when a native called out, "Take in that foot, we can't see the elephant!" I do not know, either, why Professor Thomson recommended beginners to use the single lens, for many single lenses—cheap and dear—that I have seen sent out, have needed the diaphragm to be adjusted before anything could be done with the lens worth looking at, while the compound lenses now made need no such skill to be bestowed upon them.

Mr. W. K. Burton's remarks upon the improper use of words borrowed from a scientific terminology came not a moment too soon. It is positively exasperating to see the calm way in which some photographers have used expressions such as these he quotes. Photography is long past its babyhood, and jargon such as this—for it is jargon, and nothing else—should not be allowed to pass unnoticed.

The idea of the Edinburgh Society to improve the art-training of its members by criticising works brought before them, including the productions of artists of well-known merit, is excellent and deserves to be followed; but I humbly venture to suggest that it should be done *in camera*. I have every respect for the array of talented names given in the account of the proceedings on this day of the critics, but I think they cannot but bear an unfriendly aspect when printed in unfeeling printers' ink, without power of conveying the excitement of the discussion and the tones and expressions of the speakers.

The discussion in *re Gas Bags* v. *Bottles* is one of the most interesting that has appeared in the Journal for some time: conducted, too, as it has been, in perfect good humour, it has been quite a pleasure to read what both sides had to say. I think there will be very few who have closely perused what has been written without being instructed and seeing the subject in many new lights. I think the bags have the "ayes" at present.

But if the question of bags *versus* bottles be not new what will be thought of the last meeting of the London and Provincial Photographic Association, were the question was "freezing or heating" to prevent frilling. It is quite true that though any one can make a plate, it needs a man of skill to develope it; the fact is the art of development is like that of making a salad—it needs genius.

What mournful reading was the report of the last meeting of the South London Photographic Society—the society that for so many years was a very model of a society, well attended and with plenty of first-class papers read, lively discussions, in fact, a real honest, hard-working, useful society, the most popular in the kingdom. And now to read that a proposition has actually been put to the vote as to whether the Society should cease to exist or not. There was a large majority against the proposition when put to the meeting, and it is to be hoped that this unpleasant affair may be only an episode, and that the Society may prosper and do as much good in the future as it has done in the past.

FREE LANCE.

RECENT PATENTS.

PATENT SEALED.

No. 383.—"Improvements in Printing Transfers for Application to Pottery and other Surfaces." T. B. SHAW AND OTHERS.—*Dated January* 2, 1884.

APPLICATIONS FOR PATENTS.

No. 16,277.—"Ornamenting Picture Frames by a Contrivance for Branding same by a Rotary Mechanism." J. MANLOND.—*Dated December* 11, 1884.

No. 16,694.—"Production of Half-tones or 'Grain' in Plates or Surfaces for Photomechanical Printing." E. FALK.—*Dated December* 19, 1884.

No. 16,727.—"Double Dark Slides for Use in Cameras for Photographic Purposes." J. TODD.—*Dated December* 20, 1884.

IMPROVEMENTS IN GLASS AND OTHER ROOFING.
CHARLES FOWLER, Architect, Leeds.

THE object of my invention is to construct a simple, cheap, and perfectly waterproof roof. It is also arranged to conduct away the water caused by condensation on the under or inner side of the roof.

The longitudinal ribs or rails may be of wood or metal. These are stepped or rebated at the top side sufficiently deep to receive the sheets of glass, metal, or slates. A tongue is formed along the centre of the rib separating such sheets of glass, metal, or slates from each other. The sheets of glass, metal, or slates are laid in the rebate between the ribs or rails; and I cover over the joints outside with strips of wood or metal—such strips being preferably about the width of the rib. These strips of wood or metal are secured to the ribs through the tongue by means of ordinary screws.

Between the sheets of glass, metal, or slates, the rib or rail, and also the strips of wood or metal, felt, asbestos, or other suitable packing is applied. Such combined arrangements render the joints perfectly waterproof, at the same time firmly fixing the sheets of glass, metal, or slates in position.

In order to catch the water that condenses on the under or inner side of the roof I provide longitudinal grooves in the sides of the ribs to form gutters for carrying off the water to some convenient outlet.

[The specification is accompanied by drawings.]

AN INSTRUMENT TO BE CALLED THE "MICROPHOTOSCOPE."
ROBERT GALLAND-MASON, of Hambleton House, Promenade, Douglas, Isle of Man.

THE microphotoscope consists of a pair of spectacles, eye-glasses, or an eye-glass with one or a number of minute photographs arranged in or along the rim of the spectacles, eye-glasses, or eye-glass.

The minute photographs are placed behind suitable minute magnifying glasses, and are so arranged in or along the rims of the spectacles or eye-glasses that the eyes of the wearer may see either one or all of the photographs without moving the spectacles.

The rim, in or along which the minute photographs are placed, may be either the rim of the spectacles themselves or a detachable rim, which may be applied to any spectacles, eye-glasses, or eye-glass.

The minute photographs may be photographs of written or printed matter, maps, charts, views, landscapes, or any object or group of objects from which a photograph may be taken.

Some of the uses to which the "microphotoscope" could be applied are the following:—

For a Student.—The series of microphotographs in the rims of the spectacles might consist of copies of an epitomised grammar, history, geography, or any subject the student wished to study. Thus, the subject he was studying would be constantly before his eyes for reference in his spare moments without the trouble of carrying books about with him.

The rims containing the microphotographs being detachable he could at any time change the subjects.

A lecturer might have the heads of his lectures photographed and placed in the rims of his spectacles; a lawyer—his briefs; a clergyman—his sermons; a bicyclist, tricyclist, or other tourist—maps, views, and plans of the country through which he travelled; a shopkeeper—a calendar ready-reckoner and so forth; a timber merchant or builder—cubes, measurements, and rules; travellers on the Continent—list of foreign terms, names of articles, foreign money, tables, and so on; a correspondent—an abridged dictionary of technical or difficult words; a member of Parliament—facts and figures relating to the subject of his speech; a doctor—formulæ; a public entertainer—recitations, songs, *bon-mots*, &c.; a musician—whole pieces of music; a detective—criminals wanted.

The inventor says:—"It will also be evident that the microphotoscope may be applied to a variety of other uses too numerous to mention."

It will be understood that the spectacle or eye-glass frames may have in them ordinary reading glasses when worn by those who need them, and when worn by those who do not, they may have either plain glasses or no glasses at all.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
December 30 ..	Bolton Club	The Studio, Chancery-lane.
„ 31 ..	Photographic Club	Anderton's Hotel, Fleet-st., E.C.
January 1 ..	South London	Society of Arts, John-st., Adelphi.
„ 4 ..	London and Provincial	Mason's Hall, Basinghall-street.
„ 4 ..	Glasgow	Institution Rooms, Buchanan-st.
„ 4 ..	Bolton	Studio, Chancery-lane, Bolton.
„ 4 ..	Dundee	Lamb's Hotel, Reform-street.
„ 4 ..	Leeds	Philosophical Hall.
„ 4 ..	Coventry	Coventry Dispensary.
„ 4 ..	Bradford	Free Library.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society, held on the 19th inst., the chair was taken by Mr. W. H. Prestwich.

Mr. W. E. Debenham referred to the loss which the Society, photography generally, and himself as a friend particularly, had sustained in the death of Mr. Henry Greenwood, bearing testimony to the worth of the deceased gentleman.

Mr. W. M. Ashman moved that a vote of condolence with the family be passed, and that the Secretary be instructed to write a letter in accordance therewith.

Mr. W. K. Burton seconded this proposal, which was carried unanimously.

A gentleman from the firm of Messrs. Marion and Co. then proceeded to demonstrate the printing and development of the "Alpha" paper recently introduced by that house. Papers were exposed under negatives for periods of from ten seconds to half-a-minute to the light from an albo-carbon gas burner. It was explained that this light being about three times more actinic than ordinary gas-light the exposure to the latter would have to be, if at the same distance, about three times as long. After being exposed the prints were immersed in a weak ferrous oxalate developer compounded as follows:—

No. 1.

Oxalate of potash	1 pound.
Bromide of ammonium	320 grains.
Warm water	64 ounces.

No. 2.

Sulphate of iron	4 ounces 250 grains,
Water	80 ounces.

Equal parts of these solutions were used. It was stated that after a print had been put into the solution the latter would lose its power if kept for more than a-quarter of an hour. Many prints might be developed in the same solution so long as they could safely be turned and watched, provided that this was done within the time mentioned. It was best to put the prints in one at a time at short intervals. They would then finish developing one at a time; for if many were put in at once it would be difficult to hit the right moment. After development the prints were immersed in a dish of clean water and then rapidly changed into a second dish. This quick removal of the developing solution from the print was necessary in order to prevent the action from going on and the print becoming too dark.

Mr. A. L. Henderson suggested the addition of bromide to the first washing water in order to stop development.

Mr. Debenham said that common salt might answer the same purpose, and would be much cheaper.

After being washed the prints were immersed for ten minutes or a-quarter of an hour in a dish of alum water; this served to remove the last trace of iron solution. If any of the latter were left in the print the gold which was used in the next part of the process would be reduced all over the print and spoil it. The prints after toning were fixed in hypo., and washed as usual. The exposure might be greatly varied without spoiling the print. The characteristic of a print under-exposed and fully developed was that the tones were very black, whilst by very long exposure and short development very warm tones were obtained.

Specimens of the prints which had been previously produced were handed round. Most of them had a glossy or enamelled surface, which it was explained was obtained by laying wet prints upon glass and allowing them to dry there. In order to prevent the prints from sticking to the glass, the latter was rubbed over with powdered talc (French chalk) previous to placing the prints upon it.

The Chairman inquired whether any of the members had had any experience with the paper which had been the subject of demonstration.

In reply to this question, Mr. W. K. Burton said it was, perhaps, not quite fair to speak after only one evening's work, but as the result of that meeting was favourable he would do so. His view was that it was better to expose fully and develope but slightly. He thought that in order to stop development it would be well to use bromide or chloride in the first washing water. As to latitude of exposure, he found that he could, after printing for twenty seconds or a-quarter of an hour, get prints that appeared equally exposed. He would have brought his results with him, but having laid them upon glass which had not previously been rubbed with talc he could not get the prints to strip. From weak negatives better prints could certainly be obtained upon this paper than upon albumen.

Mr. J. Barker inquired whether the washing necessary to remove spots would not show very much upon the glazed surface.

Mr. Henderson thought that the paper, being very absorbent, should show touching but little.

The Chairman said that the plan he adopted for prints which had to be burnished was to mix albumen with the touching colour, and, when dry, coagulate this with alcohol.

Mr. Henderson believed that alcohol would not coagulate dried albumen.

Mr. Archer Clarke thought that the method which had been demonstrated that evening was undoubtedly the printing process of the future. As to the use of powdered talc, he could not get a print from the glass unless it was used. He had brought with him a press containing a negative and a piece of the alpha paper. This negative he had exposed to the various lights he met with—for instance, the lamp in the railway carriage—on his way to the meeting. The negative was a very intense one, and at this time of the year required several days' exposure to daylight to get an albumen print. He would ask the demonstrator to develope it. [This was done, and the print proved to have been rightly timed as to exposure.]

The Chairman noticed that the surface had blistered from the paper in one of the prints, and inquired the reason.

It was replied that a warm hand had been in contact with the print during development.

Mr. Henderson showed a gelatino-bromide made some years since by Mr. Burgess. He had toned it successfully after fixing by immersion in an acid solution of gold mixed with alum. At first the print was all right, but now had become pink in the lights. He believed that if it had been immersed in hypo. after the toning this would not have occurred.

Mr. Debenham said that no doubt this would have prevented the subsequent discolouration. Silver and gold solutions acted upon gelatine, and formed compounds with it which could not be washed away by mere water, but required to be dissolved by a fixing agent such as hypo.

Mr. Leon Warnerke said that as the Chairman had asked for experience he would mention that he had experimented with paper of his own preparation, presumably similar to that now under discussion. He found that if the negative were clear the printing was very quick, but if slightly stained with pyro. so as to be yellow, the exposure must be ten or twenty times as long.

Mr. Archer Clarke said that a toning action went on in the hypo. with those prints. If left in the solution for an hour they became perfectly blue.

A Member inquired how long the paper would keep.

It was answered that it was believed to keep indefinitely.

After a vote of thanks to Messrs. Marion for their demonstration, a discussion took place as to the desirability of having a union amongst the various photographic societies in London, so as to engage permanent premises which might be fitted with a dark room and other conveniences. Several members were strongly of opinion that the other societies should be communicated with in order to see whether anything could be done, and it was pointed out that by using such premises on different evenings each society could carry on its own work independently.

Mr. Warnerke said that Mr. Glaisher had gone further than that, and suggested such a union amongst all the scientific societies in London for the purpose of obtaining the best accommodation in the way of premises.

The question next entered upon referred to the disposal of the five-pound prize offered by Mr. H. Trinks, and after some discussion it was decided, upon the motion of Mr. Burton, "That the prize offered by Mr. Trinks be given not to a specific article, process, or such-like proposed as matter for competition, but be given for whatever article, improvement, or process brought before the Society by a member which shall appear to be of greatest benefit to photography in general; a limit of time to be fixed and the determination to be by a ballot of the whole Society, the condition to be that all details connected with the matter shall be open to the Society." It was further decided that a limit of six months should be fixed.

Mr. E. Sollas was elected a member of the Society.

BOLTON PHOTOGRAPHIC SOCIETY.

The December meeting of the above Society was held on the 4th instant, at The Baths, Bridgman-street,—Mr. Robert Harwood in the chair.

Mr. J. W. Austwick was elected a member of the Society.

The Rev. J. W. Cundey gave a lantern exhibition, the slides including an interesting set of Switzerland from the lanternist's own negatives. Dr. Johnson also exhibited a set illustrating a recent visit to Norway, many of which elicited applause. Slides were also shown by Messrs. Parkinson, Dalton, Knowles, and Leach, those of Mr. Knowles being especially worthy of remark.

At the conclusion Mr. Robert Knott moved a vote of thanks to Mr. Cundey and the exhibitors, which was seconded by Mr. John A. Walker, and suitably acknowledged by Mr. Cundey.

ST. HELENS ASSOCIATION FOR THE PURSUIT OF SCIENCE, LITERATURE, AND ART.

Photographic Section.

A meeting of this Section was held on December 17th, at the Association Rooms, 4, Salisbury-street,—Mr. Heather in the chair. After the ordinary business of the Section was disposed of,

The Chairman showed a number of positives of a brick-red colour by transmitted light, for which he was at a loss to account, as the emulsion was prepared in the usual way.

Mr. J. T. Houghton said that Mr. Taylor had a similar experience, which he attributed to grape sugar.

The Chairman stated that he did not use it in this emulsion, though possibly some may have got in.

Several of these unexposed plates were then distributed for experimental purposes.

Mr. D. Thomason exhibited about sixty views of Scotch and English scenery.

Mr. Brook then read the concluding part of his paper on *Photographic Experiences with the British Association in America.*

After passing a vote of thanks, to which Mr. Brook briefly replied, the meeting adjourned to an upper room, where Mr. Thomason's views were projected on the screen by the aid of Mr. Sherlock's lantern.

The meeting then closed.

Correspondence.

[*All communications for the* EDITORIAL *department of the Journal should be addressed to the "Editors, 2, York-street, Covent-garden, London, W.C."*]

PHOTOGRAPHIC SOCIETIES.

To the EDITORS.

GENTLEMEN,—A notable feature in connection with photography is the remarkable increase in the number of these associations. It is evident from the large amount of space which is allotted to these reports in the photographic papers that the interest taken in the work is great.

It appears to me, however, that the general plan upon which by far the greater number of these associations is conducted is not altogether the test which might be adopted, and I wish to suggest a way in which, as I believe, still greater advantage might be obtained by the great body of members of these societies.

In the first place, it will always be found that when one of these societies has a regular president and vice-president, the tone of the proceedings necessarily gets into a certain groove, with the natural consequence that by degrees a regular clique is formed to which all others must bow. Discussion in the full sense of the term becomes oppressed, if not stifled. This is not the case in those societies where the chairman is chosen, either in rotation or otherwise, from among the members, all being eligible.

In the second place, the usual meetings once a month are quite inadequate; once a week would be far better, and this for several reasons.

Most new members join the societies for the purpose of gaining information upon a thousand and one little details of practice, all important to their own personal success, but which they are very doubtful about being sufficiently interesting to occupy the time of the meeting. Of course, an absolute tyro might come with such a string of elementary questions as to completely stop all the real work of the Society, which, of course, is in explaining and elucidating technical difficulties of manipulation as well as the progress and details of new practice.

I will, therefore, assume as a first condition that new members should be content to listen only until they have once succeeded in producing a good negative and a good print of any kind from it. After that there would be no question, however trivial in its nature it might appear to him, which would not be discussed with the greatest interest by many present, and patiently listened to by all. Indeed, these apparently trivial questions are, even to old hands, infinitely more interesting than papers on scientific points, for they relate to failures of their own often overcome, yet still more frequently unexplained.

In London we can take our choice; we can go, if we like, and hear a paper on the effects of the spectrum on haloid salts of silver, and either feel unutterably bored by it, or try to take an interest in it and be snubbed for making a remark, as, indeed, has happened to myself once on a subject which I thought I had studied. The subject under discussion was *Green Fog*, when something like a definition of its cause was asked for. No member of the Society had a reply to offer. I was present as a visitor, having received a special invitation from the Secretary to attend, and I ventured most timidly to give my explanation—that it was a forced development of an unexposed film. The very polite snubbing I then received decided me never again to attend a meeting of any photographic society with a president.

We have also the Photographic Club, to which I can truly say I am proud to belong. The principles upon which this Club is conducted are exceedingly simple, and have been found after five years' trial to be thoroughly practical. We meet weekly, an hour being supposed to be devoted to the discussion of just those little trivial questions which I have described as so important and so interesting. Another hour is supposed to be devoted to some definite question proposed the week previously, and which is always announced in the photographic papers. But it most generally happens that the trivial questions prove so useful and so interesting that the second hour slips by, and everyone is glad that the definite one has to be postponed. In short, the trivial questions are the main object of our existence, and the serious ones play but a very secondary part. With one single exception, which I have no doubt the well-meaning though offending member now regrets as much as we all do, there has never been the slightest whisper of discontent from the moment the Club was established to the present time. This I attribute mainly to the fact that the chairman of the evening is elected generally and as far as possible in rotation; but I must not omit to state that we owe much also to our indefatigable Secretary, Mr. Edward Dunmore, to whose thoughtful foresight our excellent rules are mainly due.

Not the least advantageous part of our system is that our proceedings are not necessarily reported. Think for a moment what this means as regards freedom of discussion. Very few people have such decided opinions on many photographic questions that they would wish to rush into print with them, and those who do can easily find a way of publishing their views. We of the Photographic Club like to air our opinions and discuss them with the certainty that they will *not* find their way into the public press unless we desire it. Indeed it has happened to me to find that I had made an error in conclusions I had drawn, and so got them withdrawn from the minutes of our proceedings. These proceedings are published annually for private circulation, but any of them considered to be of interest to the profession generally are at once published in the photographic press.

In the country it is somewhat different. The two kinds of societies seem to me to be both necessary and useful, but they might be combined—a weekly meeting for the discussion of the most interesting little questions as well as the monthly meeting for more serious business. The report would be all the more improved if it contained a digest of these little questions, too, omitting the names of members unless the subject was considered, as it often might be, of general importance.

In conclusion: I would ask all the members of the many photographic societies to remember that the meetings of the Photographic Club take place every Wednesday evening, at 8 p.m., at Anderton's Hotel, Fleet-street, and that they are cordially invited to attend. They will always find a full attendance, including many earnest workers; one and all are anxious to communicate every possible information within their knowledge, and to whom no point is too trivial to receive the fullest elucidation. I may further add that although my connection with photography dates back over thirty years, and though I have enjoyed special facilities for becoming acquainted with its details from the fact of my having held responsible appointments in several of the largest and highest-class photographic establishments in the world, I rarely attend one of our meetings without learning something.—I am, yours, &c., GEORGE SMITH.

December 15, 1884.

FIXING AND TONING IN ONE BATH.

To the EDITORS.

GENTLEMEN,—Why is this good old mode of treating prints gone altogether out of fashion? I used constantly to follow it in the old collodion days, and never found it to fail. The tones on albumenised paper were quite as rich as those produced with the separate toning system, and considerable time was thereby saved.

Here is a formula which may be relied on as absolutely certain, and successful with the ready-sensitised papers of most of the London makers:—Four ounces of hypo. dissolved—by heat, if necessary—in four ounces of distilled water; four grains of chloride gold—not *sel d'or*—dissolved in three ounces of distilled water. Pour the gold solution gradually with shaking into the filtered and cooled hypo. solution—not *vice versa*. This bath is ready for immediate use. The prints are then to be washed in two changes of water, and immersed in the above. At first they will turn of a brick-red colour, but in ten minutes or less will change to a fine rich chocolate, and are, of course, perfectly fixed. The bath improves as chloride of silver is being dissolved, and the quantity given will tone between two and three whole sheets of paper. The bath can be renewed by filling up with concentrated hypo., and gold solution added when the toning becomes slow. Ten minutes is the proper time.

As to their permanence: I have some prints thus treated, and, so far as I know, they have not changed since they were framed and exposed to the light fifteen years ago. The final washing must, of course, be thorough.—I am, yours, &c., ETHEL CONSTANCE MAY.

Darmstadt, December 16, 1884.

"THE CAMERA OF THE FUTURE."

To the EDITORS.

GENTLEMEN,—May I trespass on your courtesy to allow me the least space in your Journal to reply to a statement made in your issue of the 5th inst. on the above subject.

Mr. W. H. Harrison closed his very interesting and important communication of that date with the following remark:—"I did not see that it (Mr. McKellen's camera) contained anything to remedy the chief defect of the present tourist's camera, namely, that of unnecessarily wasting the time of the operator."

May I be permitted, as one who is fortunate enough to possess a camera of Mr. McKellen's construction, and who has given it a careful and accurate trial, to say that in my experience it contains everything calculated to *shorten* the time of the operator. Indeed, this is to my mind its unique characteristic, as the camera can be fixed in its very ingenious turntable, the bellows extended by touching a spring, and, finally, fixed to the utmost state of rigidity as quickly as I write it—in fact, in a few seconds. I have tried all kinds of patent cameras, but none equals this for rapidity of adjustment, simplicity, and lightness of construction.—I am, yours, &c.,

H. VICTOR MACDONA, M.A.

LANTERN SLIDES.

To the EDITORS.

GENTLEMEN,—I read the article on the colour of lantern slides as affected by different clearing solutions, by Mr. B. Wyles, with great interest, and was thoroughly taken by surprise to find that one could get colours varying from "warm red" to "cool brown" by such very simple means.

I at once mixed four clearing solutions—those numbered 1, 2, 5, and 7—and having specially procured Britannia plates, in order that every condition might be accurately complied with, I gave the proper exposure to five plates in contact with the same negative, and developed them as mentioned in the article in question. I had as the result five clear transparencies, and put one into each of the four solutions. After a suitable soaking in the clearing solutions—say, rather over an hour—I took them out, having carefully examined them from time to time, and found that No. 1 was pure black, No. 2 was pure black, No. 5 was the same, and No. 7 ditto.

All this surprises me a good deal. When one reads of "warm red," "photographic brown," "sepia," &c., and can see no such colours, even with the aid of friends beyond the suspicion of colour blindness, there is left a feeling of bewilderment. Has Mr. Wyles tried his own prescriptions? Has he omitted some essential part of the experiment? or, can he send either to the writer or to the Editors a warm-red slide prepared in the manner he describes?

I enclose five slides—one plain soda development—to show what is the result on a Fry's ordinary plate, and four numbered as above, 1, 2, 5, 7, to show good black slides perfectly free from any decided tint, even after prolonged immersion in Mr. Wyles's solution.—I am, yours, &c.,

Liverpool, December 17, 1884. H. NORWOOD ATKINS.

THE GELATINO-CHLORIDE PROCESS.

To the EDITORS.

GENTLEMEN,—We see in your issue of last week that Professor Stebbing is inclined to reproach the public on our behalf for a supposed neglect of our process. We must in all humility disclaim such flattery at the expense of a public whose appreciation of our labours has given us considerably more commissions than we can conveniently do, and whose patronage has always been in excess of our power of acceptance. Our modesty recoils from asking Professor Stebbing what is the extent of the greater reward equal the merit of the exertions of—Yours, &c., MORGAN AND KIDD.

Kew-Foot-road, Richmond, S.W., December 18, 1884.

Exchange Column.

Lerebours' *carte-de-visite* lens, beautiful definition, in exchange for anything useful in photography.—Address, J. THATCHER, Potter's-lane, Basingstoke.

I will exchange THE BRITISH JOURNAL OF PHOTOGRAPHY for *The Photo. News* posted on Monday.—Address, W. J. SMITH, 10½, Windmill-street, Horsefair, Birmingham.

Wanted, background and head-rest in exchange for 1,500 ferrotype envelopes and 800 Victoria mounts, quite new and best quality.—Address, R. TANNER, Albert Villa, Kelley-street, Kentish Town.

The following are in good condition, and will be exchanged for anything useful:—Lancaster's quarter-plate instantograph, perfect; 10 × 8 Meagher camera; square half-plate lens; quarter-plate lens, by Damin; half-plate view lens, by Grubb; half-plate rigid camera, &c.; one-third of a-quire of Marion's alpha paper.—Address, FRITZ CAMERA, 41, High Street, Sydenham.

Notes and Queries.

S. P. asks about agar agar. It is a seaweed which comes chiefly from Singapore, and its gelatine is used in the south of Europe for facing silk. Japanese isinglass, which is a gelatine prepared from seaweed, has sometimes been mistaken for it. This isinglass is sold in somewhat rectangular masses of a skinny nature. The real agar agar is something like branch coral in form, and its tendons are extraordinarily tenacious. The value of vegetable gelatines in emulsions is a problem which requires working out. Past published experiments with them are few and far between.

A MINIATURE PAINTER writes:—"For some time past I have been trying to print carbon pictures on ivory by the single transfer method, and I have succeeded in getting some very good results; but in every case the ivory is stained yellow—I presume, by the bichromate in the tissue. How is this to be avoided?"——In reply: All carbon prints on ivory should be made by the double transfer method. The picture must be developed on flexible support, and then transferred to the ivory. This is the only satisfactory plan of producing carbon pictures on ivory free from yellowness.

G. R. M. asks as to the chief sources of supply of glycerine.——Glycerine is an abundant constituent of fats, in which it exists as a base united with stearic acid. When the crude tallow is boiled with slaked lime, stearate of lime is formed, and the crude glycerine is liberated as an outflow liquid, technically called "sweet water." This impure glycerine is of a brown colour. It is largely used for the manufacture of nitro-glycerine, but since the restrictions laid upon the sale of this explosive by the Government the legitimate sale has so fallen off as to have reduced the value of the "sweet water" enormously.

H.—As to the function of waxes in the wax processes, a long series of experiments was once made at Kew Observatory on this question, and the conclusion drawn was that the action of the waxes is purely mechanical. Pure bees' wax was found to answer best. Care had to be taken to avoid the legion of adulterated samples too commonly on sale in the market. Bees' wax is less absorbent of aqueous solutions than the majority of the vegetable waxes, some of which—such, for instance, as Japan wax—will retain a considerable percentage of water, even when not aided by a substratum of paper. "Bees' wax" composed of paraffine, wax, and rosin, with an outside smear of the real thing to give the smell, is said to be of American origin.

E. W. wishes to know how to make the ordinary marking ink, which is fixed and rendered darker by passing a hot iron over the writing. There are many ways of making it. One of the simplest is to dissolve a-quarter of an ounce of nitrate of silver in three-quarters of an ounce of water; then add just enough of the strongest liquor ammonia to dissolve the precipitate it at first forms. Then add one and a-half drachm of mucilage to thicken it, and a little finely-powdered indigo to give the colour. There is no difficulty in washing out the writing produced by these and some other marking inks by the adoption of certain chemical means. One which seems more likely to resist such attempts was devised by Dr. Ure. He used a strong solution of chloride of platinum, with a little potash, and added sugar and gum to thicken it.

"PUZZLED" wishes to know how to keep his paper from going yellow during the dull days that so often come on at this time of the year and delay the finishing of a print for a day or two.——If "PUZZLED" will dry his paper and keep it in a tightly-covered tin case he will find it to keep for a day or two at this time of the year without any difficulty. But by far the best plan is to lay it sheet by sheet between pieces of blotting-paper that have been soaked in a twenty-per-cent. solution of common washing soda and well dried. If placed under pressure in this manner paper a fortnight old will be scarcely discernible from paper a few hours old kept under ordinary conditions. It is the practice of some printers to use this sodic paper as packing in lieu of felt in all their printing frames, and when this plan is adopted no fear need be entertained of a print spoiling by going yellow, even if kept over a second day before toning. We may, at the same time, inform our correspondent that there is further a vast difference in the keeping qualities of the papers obtainable from the various makers.

Answers to Correspondents.

☞ *Correspondents should never write on both sides of the paper.*

RECEIVED.—Glasgow and West of Scotland Amateur Photographic Association; Photographic Society of Ireland. In our next.

M. B.—The dextrine should be mixed with cold water. If it be of good quality it will not require straining.

A. C. M.—Messrs. Lechertin, Barbe, and Co., of Regent-street, supply all the necessary materials for ceramic painting. Apply to them.

QUANDARY.—Your meaning is by no means clear. Surely sufficient has already been said on the theory of development during the last few years.

MEDALIST.—In the first place, does taking the medal warrant you in styling yourself the *Queen's Medalist?* If it do, then, of course, it is a matter of taste whether you should advertise yourself as such.

HERTS.—The pictures in question *are* genuine. How would it be possible to obtain such effects of hoar frost by what you term "a dodge." Select a bright frosty morning and try your hand at similar pictures.

BOZ.—There is no objection whatever to you employing cotton-wool for the filtration of the printing bath. Some operatives use nothing else for filtering their silver solutions. The same wool will do for several filtrations.

J. A. BOTT.—You have made a mistake in taking the prints off the glass. The mounts should be cemented on to them before they are removed; otherwise the gloss will not be retained. The glaze you have obtained is about the average.

ELECTRO.—There is no better conducting surface for your purpose than that produced by plumbago. The gelatine relief should be perfectly dry before it is applied, and then a good polish must be obtained by well brushing the surface with a soft brush.

NOVICE.—Clearly you are employing a much too weak fixing solution. When did you get such a formula as four drachms of hyposulphite of soda to a pint of water for fixing prints? Read again, and doubtless you will find it stands four *ounces*, not drachms.

BERT. H.—Any photographic apparatus manufacturer will get a leather case made for containing your apparatus. If not, any saddler, we imagine, will make one to your order. We do not know when the colours are to be obtained. We have not seen the gentleman's entertainment.

H. HUNT.—To enlarge three diameters with your "rapid symmetrical," you must have a camera capable of expanding to forty-seven inches. For convenience of working, however, it will be better for it to be somewhat longer than this—say, four feet six or so. You will then be less restricted.

A. BURTON.—By some means or other you have got the chloride of silver in far too coarse and flocculent a condition. We fear that now you will be unable to get it in a finer state of division. Better commence afresh, and follow the instructions exactly as they are published. No doubt it is your imaginary improvement which has brought about your trouble.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. STEWARD, Optician,

For the Week ending December 22, 1884.

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

Dec.	Barometer.	Wind.	Dry Bulb.	Wet Bulb	Max. Solar Rad.	Max Shade Tem.	Min. Tem.	Remarks.
18	30·18	W	36	34	—	51	30	Cloudy.
19	29·60	NW	42	39	—	48	35	Hazy.
20	28·88	NW	42	40	—	42	40	Hazy.
22	30·23	NE	39	37	—	42	36	Hazy.

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